EMID-702074
Rec'd 5/25/22

U.S. DEPARTMENT OF ENERGY

National Nuclear Security Administration
Los Alamos Field Office
3747 West Jemez Road, A316
Los Alamos, New Mexico 87544

(505) 667-5105/Fax (505) 667-5948

Environmental Management
Los Alamos Field Office
1200 Trinity Drive, Suite 400
Los Alamos, New Mexico 87544

(240) 562-1122

Date: May 25, 2022

Mr. Rick Shean, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6313

Subject: **Response to Second Administratively Incomplete Determination General Part A and Part B of the Resource Conservation and Recovery Act Permit Renewal Application for Los Alamos National Laboratory EPA ID#NM0890010515, HWB-LANL-20-001**

Dear Mr. Shean:

The U.S. Department of Energy (DOE) and its field offices, the National Nuclear Security Administration Los Alamos Field Office (NA-LA), the Office of Environmental Management Los Alamos Field Office (EM-LA), along with Triad National Security, LLC (Triad), and Newport News Nuclear BWXT-Los Alamos, LLC (N3B), collectively the Permittees, provide this response to the New Mexico Environment Department-Hazardous Waste Bureau (NMED-HWB) letter dated January 25, 2022, titled Second Administratively Incomplete Determination Part A and General Part B of the Resource Conservation and Recovery Act Permit Renewal Application for Los Alamos National Laboratory EPA ID#NM0890010515, HWB-LANL-20-001 (“Second Administratively Incomplete Determination”). On March 16, 2022, NMED-HWB extended the Permittees’ deadline to respond to the Second Administratively Incomplete Determination to May 25, 2022.

The Permittees appreciate NMED-HWB’s efforts in reviewing the Permittees’ Los Alamos National Laboratory (LANL) General Part A Permit Application, Revision 10.0, and Volumes 1 and 2 of the Part B Permit Application for Renewal of the Los Alamos National Laboratory Hazardous Waste Facility Permit dated June 26, 2020 (together, “Permit Renewal Application” or “Application”). This response, including the enclosure and its attachments, revises and provides supplemental information in support of the Permit Renewal Application.

Enclosure 1 provides the Permittees’ responses to NMED-HWB’s comments in its Second Administratively Incomplete Determination. The 14 attachments to Enclosure 1 provide supplemental information and revised Application content as requested by NMED-HWB. The Application does not propose to significantly modify any conditions for currently permitted hazardous waste management units within LANL. The primary changes sought under the Application relate to permitting three hazardous waste management units that have been in operation under the “interim status” requirements of the New Mexico Hazardous Waste Act (HWA) and Title 40 of the Code of Federal Regulations (CFR) Part 265, Subpart P for over 41 years. These interim status units, which have been safely operated for over four decades, include one open burning (OB or flash pad) hazardous waste treatment unit (TA-16-388) and two open detonation (OD; collectively OB/OD or units) hazardous waste treatment units (TA-36-8 and TA-39-6). LANL's flash pad and OD units, in their existing configurations, directly support and are critical to LANL's national security mission, which includes the legally required annual certification of the nuclear stockpile to the President of the United States. *See* 50 U.S.C § 2525, "Annual Assessments and Reports to the President and Congress Regarding the Condition of the United States Nuclear Stockpile," (mandating that "on an annual basis," LANL certify the "safety, reliability, performance, or military effectiveness of [each] nuclear weapon type, [and] complete an assessment of the safety, reliability, performance, or military effectiveness [ ] of that nuclear weapon type" and certify as much to the President and Congress).

Three hard copies and one electronic copy of this response are provided to NMED-HWB. The hard copies include Enclosure 1 and all attachments thereto. The electronic copy contains a reproduction of the hard copy in portable document format (pdf), along with word processing files, analytical data sets, and other information as requested in the Second Administratively Incomplete Determination.

With this response, the Permittees request that NMED deem the Permit Renewal Application to be administratively complete pursuant to 40 CFR § 270.10(c). Notwithstanding this request, the Permittees reserve the right to supplement this response and the Permit Renewal Application with additional information as necessary or as may be requested by NMED. The Permittees respectfully request that NMED-HWB approve the Permit Renewal Application without delay and issue the Part B Permit. Permitting of the units will ensure LANL continue to fulfill its legally mandated national security obligations in a manner that is protective of the environment and worker safety and health.

If you have questions or comments for Triad concerning this submittal, please contact Karen E. Armijo (NA-LA) at (505) 665-7314 or Patrick L. Padilla (Triad) at (505) 412-0462.

If you have questions or comments for N3B concerning this submittal, please contact Arturo Duran (EM-LA) at (575) 373-5966 or Emily Day (N3B) at (505) 695-4243.

Sincerely,

Theodore A. Wyka
Digitally signed by Theodore A. Wyka
Date: 2022.05.20 07:03:24 -06'00'

Theodore A. Wyka
Manager
National Nuclear Security Administration
Los Alamos Field Office
U.S. Department of Energy

Sincerely,

Michael A. Mikolanis
Digitally signed by Michael A. Mikolanis
Date: 2022.05.24 18:11:34 -06'00'

Michael Mikolanis
Manager
Environmental Management
Los Alamos Field Office
U.S. Department of Energy

Enclosure 1: Responses to January 2022 New Mexico Environment Department Second Administratively Incomplete Determination General Part A and Part B of the Resource Conservation and Recovery Act Permit Renewal Application for Los Alamos National Laboratory

Copy w/enclosures:

Laurie King, USEPA/Region 6, Dallas, TX, king.laurie@epa.gov
Rick Shean, NMED-HWB, Santa Fe, NM, rick.shean@state.nm.us
Neelam Dhawan, NMED-HWB, Santa Fe, NM neelam.dhawan@state.nm.us
Siona Briley, NMED-HWB, Santa Fe, NM, siona.briley@state.nm.us
Mitchell Schatz, NMED-HWB, Santa Fe, NM, mitchell.schatz@state.nm.us
Theodore A. Wyka, NA-LA, theodore.wyka@nnsa.doe.gov
Stephen Hoffman, NA-LA, stephen.hoffman@nnsa.doe.gov
Silas DeRoma, NA-LA, silas.deroma@nnsa.doe.gov
Stephen Jochem, NA-LA, stephen.jochem@nnsa.doe.gov
P. Erika Baeza-Wisdom, NA-LA, erika.baeza-wisdom@nnsa.doe.gov
Jason Saenz, NA-LA, jason.saenz@nnsa.doe.gov
Karen E. Armijo, NA-LA, karen.armijo@nnsa.doe.gov
Marcus Pinzel, NA-LA, marcus.pinzel@nnsa.doe.gov
Michael Mikolanis, EM-LA, michael.mikolanis@em.doe.gov
M. Lee Bishop, EM-LA, lee.bishop@em.doe.gov
John Evans, EM-LA, john.h.evans@em.doe.gov
David Nickless, EM-LA, david.nickless@em.doe.gov
Cheryl Rodriguez, EM-LA, cheryl.rodriguez@em.doe.gov
Arturo Duran, EM-LA, arturo.duran@em.doe.gov
Jesse Kahler, EM-LA, jesse.kahler@em.doe.gov
Elizabeth Churchill, EM-LA, elizabeth.churchill@em.doe.gov
Michael W. Hazen, Triad, ALDESHQSS, mhazen@lanl.gov
William R. Mairson, Triad, ALDESHQSS, wrmairson@lanl.gov
Jeannette T. Hyatt, Triad, EWP, jhyatt@lanl.gov
Sylvia Souza, EWP, sdelasancha@lanl.gov
Jennifer E. Payne, Triad, EPC-DO, jpayne@lanl.gov
Kristen A. Honig, Triad, EPC-DO, khonig@lanl.gov
Andie McLaughlin-Kysar, Triad, EPC-DO, andiek@lanl.gov
Jessica L. Moseley, Triad, EPC-WMP, jmoseley@lanl.gov
Cecilia M. Trujillo, Triad, EPC-WMP, ceciliat@lanl.gov
Patrick L. Padilla, Triad, EPC-WMP, plpadilla@lanl.gov
Maxine McReynolds, GC-ESH, mcreynolds@lanl.gov
Cristina Mulcahy, GC-ESH, mulcahy@lanl.gov
Kim Lebak, N3B, kim.lebak@em-la.doe.gov
Joseph Legare, N3B, joseph.legare@em-la.doe.gov
Erik Loechell, N3B, erik.loechell@em-la.doe.gov
Dana Lindsay, N3B, dana.lindsay@em-la.doe.gov
Pamela Maestas, N3B, pamela.maestas@em-la.doe.gov
Emily Day, N3B, emily.day@em-la.doe.gov
Jennifer Von Rohr, N3B, jennifer.vonrohr@em-la.doe.gov
William Alexander, N3B, william.alexander@em-la.doe.gov
rcra-prr@lanl.gov
interface@lanl.gov
adesh-records@lanl.gov
locatesteam@lanl.gov
epccorrespondence@lan.gov
EMLA.docs@em.doe.gov
n3brecords@em-la.doe.gov

U.S. DEPARTMENT OF **ENERGY** COPY

Received

MAY 25 2022

NMED Hazardous Waste Bureau

National Nuclear Security Administration
Los Alamos Field Office
3747 West Jemez Road, A316
Los Alamos, New Mexico 87544

(505) 667-5105/Fax (505) 667-5948

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The Permittees appreciate NMED-HWB's efforts in reviewing the Permittees' Los Alamos National Laboratory (LANL) General Part A Permit Application, Revision 10.0, and Volumes 1 and 2 of the Part B Permit Application for Renewal of the Los Alamos National Laboratory Hazardous Waste Facility Permit dated June 26, 2020 (together, "Permit Renewal Application" or "Application"). This response, including the enclosure and its attachments, revises and provides supplemental information in support of the Permit Renewal Application.

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ENCLOSURE 1

Responses to January 2022 New Mexico Environment Department Second Administratively Incomplete Determination General Part A and Part B of the Resource Conservation and Recovery Act Permit Renewal Application for Los Alamos National Laboratory

May 25, 2022

LA-UR-22-24380

U.S. Department of Energy,
National Nuclear Security Administration Los Alamos Field Office, and
Environmental Management Los Alamos Field Office

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

JEANNETTE HYATT (Affiliate) Digitally signed by JEANNETTE HYATT (Affiliate) Date: 2022.05.18 22:15:30 -06'00'

05/18/2022

Jeannette T. Hyatt
Senior Director
Environment and Waste Programs
Triad National Security, LLC
Operator

Date Signed

Kimberly Lebak Digitally signed by Kimberly Lebak Date: 2022.05.24 19:07:01 -06'00'

05/24/2022

Kimberly D. Lebak
President
Newport News Nuclear BWXT-Los Alamos, LLC
Operator

Date Signed

Theodore A. Wyka Digitally signed by Theodore A. Wyka Date: 2022.05.20 07:14:13 -06'00'

05/20/2022

Theodore A. Wyka
Manager, Los Alamos Field Office
National Nuclear Security Administration
U.S. Department of Energy
Owner/Operator

Date Signed

Michael A. Mikolanis Digitally signed by Michael A. Mikolanis Date: 2022.05.24 18:11:52 -06'00'

05/24/2022

Michael Mikolanis
Manager, Los Alamos Field Office
Environmental Management
U.S. Department of Energy
Owner/Operator

Date Signed

Introduction

On June 29, 2020, the United States (U.S.) Department of Energy (DOE), Newport Nuclear-BWXT (N3B), and Triad National Security, LLC (Triad and collectively, Permittees), submitted the *Los Alamos National Laboratory General Part A Permit Application, Revision 10.0*; and Volumes 1 and 2 of the *Part B Permit Application for Renewal of the Los Alamos National Laboratory Hazardous Waste Facility Permit* (Permit Renewal Application or Application) to the New Mexico Environment Department-Hazardous Waste Bureau (NMED-HWB). The Application seeks renewal of the Permittees' Resource Conservation and Recovery Act (RCRA) Permit for hazardous and mixed waste storage and treatment at Los Alamos National Laboratory (LANL) under the LANL Hazardous Waste Facility Permit (Permit) for an additional period of 10 years.

On March 23, 2021, the NMED-HWB issued its first Administratively Incomplete Determination General Part A and Part B of the RCRA Permit Renewal Application for Los Alamos National Laboratory U.S. Environmental Protection Agency (EPA) ID#NM0890010515, HWB-LANL-20-001 (First Administratively Incomplete Determination). The NMED-HWB granted the Permittees an extension of time to respond to its First Administratively Incomplete Determination. On July 22, 2021, the Permittees submitted timely responses to the NMED-HWB's First Administratively Incomplete Determination.

On January 25, 2022, the NMED-HWB issued its Second Administratively Incomplete Determination General Part A and Part B of the Resource Conservation and Recovery Act Permit Renewal Application for Los Alamos National Laboratory EPA ID#NM0890010515, HWB-LANL-20-001 (Second Administratively Incomplete Determination). On March 16, 2022, NMED-HWB extended the Permittees' deadline to respond to the Second Administratively Incomplete Determination to May 25, 2022. This document and the information attached herein provide responses to the NMED-HWB's Second Administratively Incomplete Determination.

Listed below in date order is each comment from the NMED-HWB to the Permittees regarding matters contained in the Application and the Permittees' respective response to the NMED-HWB's comment. In this response, the Permittees intend to include all information necessary for the NMED-HWB to determine that the Permittees' Permit Renewal Application is administratively complete and initiate technical review of the Application. The Permittees anticipate technical conversations and the potential for supplemental information requests as part of the technical review process but have made every effort to provide the NMED-HWB with a complete Application. Attachments included with this Second Response Document are intended to be replacement pages for the Permit Renewal Application; however, the Permittees will provide a newly compiled version if that is preferred.

Fourteen attachments support the Permittees' responses to this Second Response Document. Attachment 1 includes a crosswalk of changes to the various portions of the Permit Renewal Application; Attachment 2 includes a revised seismic location evaluation for the interim status units; Attachment 3 provides specific changes to the main portion of the Permit Renewal Application; Attachments 4–8 provide revisions of proposed changes to sections and attachments within the Permit; and Attachments 9–14 provide updates to the technical information provided in support of permitting the interim status units at LANL. The attachments outlined are as follows:

- Attachment 1 - Crosswalk of Changes to the General Part A and Part B of the Resource Conservation and Recovery Act Permit Renewal Application for Los Alamos National Laboratory;
- Attachment 2 - Revised Seismic Location Standards Evaluation for Three Open Burning / Open Detonation Locations under Consideration for Permitting under the Resource Conservation and Recovery Act at Los Alamos National Laboratory: Technical Areas 16, 36, and 39;
- Attachment 3 - Revised Sections 1–8 of the Part B Permit Application for Renewal of the Los Alamos National Laboratory Hazardous Waste Facility Permit;

- Attachment 4 - Revised Supplement 1-1, Permittees' Proposed Changes to Permit Parts 1–11;
- Attachment 5 - Revised Supplement 1-5, Permittees' Proposed Changes to Attachment D, Contingency Plan;
- Attachment 6 - Revised Supplement 1-5, Permittees' Proposed Changes to Attachment E, Inspection Plan;
- Attachment 7 - Revised Supplement 1-3, Permittees' Proposed Changes to Attachment C, Waste Analysis Plan;
- Attachment 8 - Revised Supplement 3-1, Permittees' Proposed Changes to Attachments G.1 through G.30, Closure Plans;
- Attachment 9 - Revised Supplement 4-1, Assessment of Alternatives for Open Burn and Open Detonation Units;
- Attachment 10 - Revised Supplement 4-2, Open Detonation Unit Groundwater Monitoring and Surface Drainage Information;
- Attachment 11 - Revised Supplement 4-5, Soil Sampling Results Summary Report for the Open Detonation Unit at Technical Area (TA) 36-8;
- Attachment 12 - Revised Supplement 4-6, Soil Sampling Results Summary Report for the Open Detonation Unit at Technical Area (TA) 39-6;
- Attachment 13 - Revised Supplement 4-7, Open Detonation Unit at Technical Area 36 Human Health and Ecological Risk Screening Assessments; and
- Attachment 14 - Revised Supplement 4-8, Open Detonation Unit at Technical Area 39 Human Health and Ecological Risk Screening Assessments.

Additional changes are also proposed in Permit Attachment D, *Contingency Plan* (within Attachment 5). The proposed changes in Permit Attachment D relate to updating the emergency communication system with a more modern technology. Specific changes are identified with red editing marks in Permit Renewal Application Sections 2.6, *Contingency Plan*, and 6.2, *Other Permit Changes*, in Attachment 3 of this Second Response Document and are included in Attachment 5, *Revised Supplement 1-5, Permittees' Proposed Changes to Attachment D, Contingency Plan.*

Permittees Responses to NMED's January 2022 Comment

2. NMED 1 Comment (March 2021):

40 CFR 270.14 (b)(11), Facility Location:

Facility location information:

(i) *In order to determine the applicability of the seismic standard (40 CFR 264.18(a)) the owner or operator of a new facility must identify the political jurisdiction (e.g., county, township, or election district) in which the facility is proposed to be located.*

(ii) *If the facility is proposed to be located in an area listed in appendix VI of part 264, the owner or operator shall demonstrate compliance with the seismic standard.*

Los Alamos National Laboratory is located in the Los Alamos County, which is an area listed in Appendix VI of 40 CFR 264, therefore, the Permittees must provide geologic data which demonstrates compliance with the seismic standard (see 40 CFR 270.14 (b)(11) for more information). The Permittees must provide seismic information for the three (3) waste treatment units proposed to be included in this permit (i.e., Technical Area (TA) 16-388, 36-8, and 39-6).

The Permittees have stated that these units are not newly built, however, these units have existed and operated only as interim status units. For NMED to consider these units to be included in the permit the

Permittees must demonstrate that these units meet all requirements of the permitted units, including compliance with the seismic standard.

Permittees Response (June 2021):

Attachment 3 includes maps and seismic location information for the proposed open burning and open detonation units at TA-16-388, TA-36-8, and TA-39-6. Text reflecting the addition of the seismic location information is added to the Permit Renewal Application Section 2.10.1, Seismic Standard in Attachment 4 of this response. Although the seismic investigation included in Attachment 3 demonstrates that there has been no direct evidence observed for Holocene faulting within the required radius of the facility, it is noted within the seismic report that field reconnaissance may be required to confirm the determination, as field activities are delayed due to COVID 19 safety restrictions.

NMED Response (January 2022):

NMED notes that the Permittees do not have sufficient information to evaluate if the lineaments within the Pajarito fault system (PFS) have been active within the Holocene. NMED notes that near TA-16-388, the lineaments associated with the PFS, have had at least one earthquake on the Eastern edge of TA-16, that have not been investigated within the 3,000-foot boundary of TA-16-388. NMED notes that the lineaments at 36-8 and 39-6 have not been investigated for faults. The Permittees must perform a geologic investigation of lineaments within the 3,000-foot boundary and provide a revised Attachment 3 with the results of the investigation. NMED understands that this will require some time for the Permittees to plan and implement these investigations; please provide an estimated schedule of when this will be completed. The results of the investigation will be reviewed by NMED through the technical review process.

Permittee Response (May 2022):

The NMED-HWB's January 2022, comment requested that the Permittees (1) perform a geologic investigation of lineaments with the 3,000-foot boundary of TA-16-388 and (2) revise the seismic locations standards evaluation to present the results of the geologic investigation of the lineaments. In response to the NMED's comment, the Permittees completed the requested geologic investigation by field reconnaissance on April 19, 2022, at Technical Areas 16, 36, and 39. As a result of the investigation, the Permittees created and have included herein Attachment 2 of this Second Response Document, *Revision 1: Seismic Location Standards Evaluation for Three Open Burning / Open Detonation Locations under Consideration for Permitting under the Resource Conservation and Recovery Act at Los Alamos National Laboratory: Technical Areas 16, 36, and 39*. The investigation determined that there are no faults within 200 feet of the TA-16-388, TA-36-8, or TA-39-6. Faults present between 200 and 3,000 feet at all three sites do not contain sufficient young geologic material to determine whether those faults have had Holocene activity. Geologic materials present at the sites are much older than the Holocene time period, and as such, the determination of Holocene fault activity would be difficult to impossible to achieve through further field investigations. Additionally, the positions of TA-36 and TA-39 several miles east of the Pajarito fault system further reduce the likelihood that faults with Holocene seismic surface rupture are present at either of those two locations.

4. NMED Comment (March 2021):

<u>Section 2.7.6, Preventing Releases to the Atmosphere, page 2-7:</u>

The information provided is not adequate because it does not address modifications required for the proposed thermal treatment units (open burn and open detonation (OB/OD)) to prevent releases to the atmosphere. The Permittees must revise this section to include additional information about how releases to the atmosphere will be prevented or mitigated at the three new thermal treatment units, and how releases will be monitored and how would the Permittees communicate information to NMED and the public.

Permittees Response (June 2021):

Section 2.7.6, Preventing Releases to the Atmosphere, is revised (in Attachment 4) to include references to the sections where these considerations are documented for the proposed open detonation and open burning treatment units. The requested information is specifically addressed in the Permit Renewal Application Sections 4.7.6, Preventing Releases to the Atmosphere and 5.7.6, Preventing Releases to the Atmosphere.

Unexpected releases or operational upsets will be reported to the NMED-HWB and the public utilizing the reporting requirements in Permit Section 1.9.12, 24 Hour and Subsequent Reporting, or Permit Section 1.9.13, Written Reporting of a Non-threatening Release, as appropriate. All monitoring reports will be provided to NMED-HWB and the public via official submittals and entry into the LANL Public Reading Rooms. Additionally, any monitoring that may be required after an unplanned release will be conducted as outlined in Section D.7, Unplanned Nonsudden Releases.

NMED Response (January 2022):

The Permittees have provided cross-references but have not addressed how releases from OB/OD units will be measured, and how those releases will be communicated to the public other than contingency plan implementation communications to NMED (Attachment D) or general emergency response services.

Please provide the detailed information required by this comment.

Permittee Response (May 2022):

The NMED-HWB's January 2022 comment requested that the Permittees address how releases from the OB/OD Units will be measured. In response, the Permittees revised Sections 2.7.6, 4.7.6, and 5.7.6 of the Permit Renewal Application (Attachment 3 of this Second Response Document) to provide additional information regarding the impact from the three interim status (1 OB and 2 OD) Units to the air. The proposed permit conditions in Permit Sections 5.3.2 and 6.3.3 (in Attachment 4 of this Second Response Document) are designed to prevent releases during waste treatment events. Additionally, Permit Renewal Application Section 2.7.6, *Preventing Releases to the Atmosphere* (Attachment 3 of this Second Response Document), includes a description of the overall ambient air monitoring network at LANL, called AIRNET.

AIRNET air monitoring stations are located at varying distances from the Units onsite, at the Laboratory boundaries, and downwind of LANL that monitor the air quality and provide air monitoring data for protection of human health and the environment. As of May 2022, the Permittees operate 46 total AIRNET stations in various locations, divided as follows:

- 30 stations on LANL perimeter with Los Alamos townsites;
- 2 Stations onsite near Pajarito Road;
- 8 stations near TA-54 Area G, mostly along the northern boundary with the San Ildefonso Pueblo near areas that the Pueblo identifies as culturally important;
- 3 stations on nearby Pueblos;
- 1 station in Española;
- 1 station in El Rancho (Pojoaque area); and
- 1 station in Santa Fe.

The Permittees also regularly review the need for additional stations or stations in different locations and makes upgrades to AIRNET accordingly.

The AIRNET stations constantly monitor air quality and report the monitoring data to a public database. Ambient air monitoring is the systematic, long-term assessment of pollutant levels by measuring the quantity and types of certain pollutants in the surrounding outdoor air. AIRNET stations monitor 24 hours a day, 365 days of the year. Particulates are collected on a filter and then analyzed every 2 weeks for identification of analytes and assessment of the potential impact on the public. Data collected by the AIRNET monitoring stations are publicly available and can be located at www.intellusnm.com. AIRNET gives LANL and the public a comprehensive understanding of air quality within LANL's boundaries; in the Los Alamos townsite; in neighboring Pueblos; and downwind in Española, the Pojoaque area, and Santa Fe. For more than a decade, monitoring reports have confirmed that the Laboratory is releasing no air emissions higher than regulations and our Title V Air Permit allow.

The Permittees have additionally revised Attachment 3 of this Second Response Document to describe the small size of the units and the operational history of these units, which evidences more than 40 continuous years of safely operating these units with all due considerations for human health, safety, and the environment. Furthermore, the Permittees have undertaken concerted efforts to minimize waste creation; have self-imposed waste treatment limits at both the OB and OD units; and have self-imposed critical safety measures before, during, and after each operation of the units, including the following:

- prohibiting operation of the units under certain lightning, wind, and other weather conditions;
- groundwater and surface water monitoring;
- strictly enforcing worker safety measures at, near, and around these units;
- controlling access to the units; and
- limiting OD and OB operations to only once in a 24-hour period.

Additionally, these Units do comply and will continue to fully comply with the provisions of 40 CFR § 264, 40 CFR § 264.601, and 40 CFR § 270.14 by proper operation of the Units in compliance with the terms of a RCRA permit issued by the NMED-HWB.

Supplement 4-3, *Screening Level Air Modeling Analysis and Risk Evaluation for Open Detonation Operations*, of this Permit Renewal Application, includes the full air-modeling evaluation conducted for OD treatment operations at LANL. Air-dispersion modeling predicts the maximum ground-level contaminant concentrations predicted to occur downwind from the treatment operations. Conservative parameters were used as inputs, and results indicate that the maximum ground-level contaminant concentrations for each detonation site occur on LANL property adjacent to the Units and do not carry further, *i.e.*, do not disperse or "kick out." Data discussed in Permit Application Section 5.16.3, *Protection of Atmosphere*, and included in Permit Application Supplement 4-12, *Screening Level Air Modeling Analysis and Risk Evaluation for Open Burning Operations at Los Alamos National Laboratory*, which likewise uses extremely conservative inputs, also demonstrate that estimated emissions from OB will not exceed regulatory levels established to protect human health, safety, and the environment.

In 2010 and 2011, the Permittees conducted air sampling at each of the OD Units to determine if dioxins, furans, or metals could be detected in the air after an OD treatment event. These sampling efforts and the analytical results are detailed in Permit Application Supplement 4-4, *Air Sampling at Open Detonation Units*, of Appendix 4 of this Permit Renewal Application. No dioxins or furan compounds were detected within any of the samples collected. Comparisons of metals detected within the samples were below acute inhalation-exposure screening levels. Air monitoring data collected in 2011, during treatment events at the OB unit are included as Permit Application Supplement 4-13, *Air Sampling at Open Burning Treatment Unit*, of this Permit Renewal Application. Each sample was collected downwind of the TA-16-388 Flash Pad at 25 feet and 75 feet. Samples collected from five treatment events were analyzed for metals and dioxins/furans. The analysis results were then compared with acute air-inhalation exposure concentration screening levels, where screening levels could be identified. The data comparisons indicate that the operations monitored did not exceed any appropriate state or federal levels specified for the analytes monitored.

The NMED-HWB comment additionally requested information on how releases from the Units will be communicated to the public. In the unlikely event that a release from the Units does occur that is a threat to human health or the environment, the Permittees propose permit conditions within Permit Parts 5 and 6 (Attachment 4 of this Second Response Document) that outline emergency notifications. The Permittees propose to provide the following notifications:

- to the NMED-HWB by telephone within 24-hours of an unexpected event that results in the Permittees calling emergency services;
- unexpected events that are not a threat the human health or the environment will be reported to the NMED-HWB and the public in accordance to Permit Section 1.9.13; and
- any unexpected release of waste to the environment that may endanger human health or the environment will be reported as required by Permit Sections 1.9.12 and 1.9.12.2.

In response to NMED's comment, the Permittees propose these revisions to Permit Parts 5 and 6, in Permit Sections 5.4 and 6.4 (Attachment 4 of this Second Response Document). Attachment 5 of this Second Response Document includes updated proposed changes to Permit Application Supplement 1-4 Permittees' *Proposed Changes to Attachment D, Contingency Plan*, reflecting these notifications. These permit conditions have been proposed for Permit Sections 5.3 and 6.3 and Permit Attachment Section D.4.1.4 for the OD and OB treatment Units, respectively. These proposed permit conditions are intended to provide direction at the time of incidents that may result in exceedances and the potential for acute exposure rather than chronic exposure at these Units, as well as provide a pathway for communication regarding these situations.

10.b NMED Comment (March 2021):

1-1, Redline Permit Parts 1-11, Section 5.1, page 99

The information is missing from this section regarding waste which is prohibited from treatment at the OD units. The 2002 EPA Region 3 *Draft Final Open Burning/Open Detonation Permitting Guidelines* Section 2.2.5 recommends prohibiting thermal treatment of biologic or chemical warfare weaponry, depleted uranium, and small arms ammunition up to 50 caliber. Include the information on wastes that will be prohibited from treatment at the OD units.

Permittees Response (June 2021):

The Permittees added a Section addressing prohibited wastes to the suggested changes to Permit Part 5, Treatment by Open Detonation, included in Attachment 6 of this response. The prohibited wastes section includes wastes that do not meet the definition of waste explosives per 40 CFR §265.382, Open burning; waste explosives, materials containing beryllium, materials containing perchlorate-based propellants or explosives, and polychlorinated biphenyls (PCBs). Additionally, the Permittees removed reference any waste stream descriptions that are not consistent with the waste explosives definition from the suggested changes in Supplement 1-3, Permittees' Proposed Changes to Attachment C, Waste Analysis Plan, included as Attachment 7 of this response. The waste streams removed were "small arms ammunition" and "black powder and gun powder."

NMED Response (January 2022):

The Permittees are proposing to only treat waste that meets the definition of reactive (D003). The Permittees have stated that the OB/OD units will not treat waste that contains Be, Perchlorates, or PCBs. However, the Permittees have not addressed NMED's concerns based on Open Burning/Open Detonation Permitting Guidelines Section 2.2.5 which recommends explicitly prohibiting the thermal treatment of biologic or chemical warfare weaponry, depleted uranium, and small arms ammunition up to 50 calibers. Permittees must revise this section to explicitly state that the thermal treatment of biologic or chemical warfare weaponry, depleted uranium, and small arms ammunition up to 50 calibers will be prohibited.

The Permittees must also provide information on how prohibited waste will be evaluated and prevented from treatment at OB/OD units.

Permittee Response (May 2022):

The NMED-HWB's January 2022, comment requests that the Permittees address prohibition of thermal treatment of biologic or chemical warfare weaponry, depleted uranium, and small arms ammunition up to .50 caliber. In response to the NMED-HWB's January 2022 comments, the Permittees revised Permit Sections 5.2 and 6.2 (Attachment 4 of this Second Response Document), which include the proposed permit conditions that prohibit treatment of waste that contains radiological components, biologic or chemical warfare weaponry, or small arms ammunition up to .50 calibers. The Permittees proposed these conditions for Permit Sections 5.2 and 6.2 for the OD units and OB unit, respectively.

In its January 2022 comments, the NMED-HWB also requested information regarding how prohibited waste will be evaluated and prevented from treatment at the units. LANL characterizes all waste streams that are treated at the OD and OB Units. In fact, all waste streams generated at LANL are characterized before any treatment. These waste streams are documented in writings called "waste stream profiles," which undergo a rigorous review process by the relevant subject matter experts (SMEs) to ensure that the waste that is generated may be accepted by a particular facility for treatment and then ultimately offsite disposal. For the waste to be treated at a given facility, an approved waste stream profile must be on file. If a given waste does not have an active, SME-approved waste stream profile on file, then a given waste cannot be treated at the respective facility(ies).

The process of generating, reviewing, and approving a waste stream profile includes the following:

- a certification by the generator that the characterization is complete,
- a review by hazardous waste management SMEs, and
- a review by an environmental professional that the waste meets waste acceptance criteria.

The final check occurs when the waste is picked up from the storage/accumulation area, and a visual inspection of the waste is conducted to ensure that the waste picked up is consistent with the waste described in the waste stream profile. This process is outlined in Sections 4.2 and 5.2 of the Permit Renewal Application (Attachment 3 of this Second Response Document).

LANL has also included herein the pre- and post-treatment checklist in the proposed revisions to Attachment E, *Inspection Plan*. Attachment E includes a checklist (Form E-4, *Pre- and Post-Treatment Checklist for Detonation or TA-16-388 Flash Pad Treatment Operations*) that contains an item that mandates that the firing site leader will ensure that a current and approved waste stream profile is associated with the waste(s) being treated during the thermal treatment event and that the required operational restrictions are in place. The proposed revisions to Permit Attachment E are included as Attachment 5 of this Second Response Document. Changes have been made to Attachment Section E.9.3, Open Burning/Open Detonation Treatment, and Form E-4 is included.

Lastly, Attachment 7 of this Second Response Document includes updated proposed changes to Permit Attachment C, *Waste Analysis Plan*, because additional references to "depleted uranium" were found that were not included in the last Response Document and are removed from the Attachment to complete the changes requested by the NMED-HWB, and an additional review was conducted to ensure that all proposed revisions are consistent with changes to the application made by the Permittees requested by the NMED-HWB.

11. NMED Comment (March 2021):

Supplement 1-1, Redline Permit Parts 1-11, Section 5.2.3.2 Weather Conditions, page 100:

The Permittees have proposed to use red flag conditions to determine when open detonation will not be performed, but have not provided the information on what constitutes red flag conditions for the units. The Permittees must revise this section to include details on weather conditions (e.g., precipitation, wind speed) under which detonation operations will be prohibited.

Permittees Response (June 2021):

The Permittees revised Permit Renewal Application Supplement 1-1, Permittees' Proposed Changes to Permit Parts 1-11, Permit Section 5.2.3.2, Weather Conditions, to include weather conditions under which treatment activities ore prohibited. The list includes when lightning is detected within a six mile radius of the open detonation units, icy roads (for transport), winds greater than 20 miles per hour, and during precipitation events. Additionally, all treatment operations are prohibited during "Red Flag conditions" that indicate warm temperatures, very low humidity, and winds above 10 miles per hour specifically in accordance with the guidelines outlined in the "LANL Fire Danger Matrix": https://www.lanl.gov/resources/emergency/fire-danger-matrix.php. This condition provides that treatment operations are prohibited when the fire danger is in the "Extreme" category and winds are in excess of 10 miles per hour. However, since these conditions are more subjective and cannot be rephrased to be an enforceable permit condition, it has been removed from the weather conditions restrictions in the suggested changes for Permit Parts 5 and 6 (Attachment 6) of this response document.

NMED Response (January 2022):

The Permittees' response to this comment indicated that red flag conditions are based on wind speeds greater than 10 mph during dry conditions. However, the text in Section 5.2.3.2 (page 102) only restricts OB/OD activities when winds are greater than 20 mph. The Permittees must revise this Section to be consistent and also address dry condition restrictions.

Permittee Response (May 2022):

In response to the NMED-HWB's January 2022 comment, the Permittees revised Permit Parts 5 and 6 (Attachment 4 of this Second Response Document) to include proposed conditions for Permit Sections 5.3.2.2 and 6.3.3 for the OB and OD units, respectively, that impose dry condition-operational restrictions. The section now states that restrictions for treatment may not occur any time winds are greater than 20 miles per hour and if winds are greater than 10 miles per hour in drier weather conditions, such as in the spring and summer seasons when the fire danger rating is deemed to be Very High or Extreme. The LANL Weather Machine compiles temperature, wind, barometric pressure, relative humidity, data collected by LANL meteorological towers, and other pertinent National Weather Service forecast information and is used to inform treatment restrictions. Additional clarification regarding the information that the LANL Weather Machine provides was added to Sections 4.12.1.3.3 and 5.12.7.4 of the Permit Renewal Application (Attachment 3 of this Second Response Document).

12. NMED Comment (March 2021):

Supplement 1-1, Permit Parts 1-11, Permit Part 6.4 Alternative Assessment, page 107:

The Permittees have proposed submitting an alternative treatment assessment report for the permitted OB units to NMED by no later than 8 years after the effective date of the OB permit, but have not provided a similar deadline in Permit Part 5 for the proposed permitted OD unit. Please provide a rationale for this frequency and propose a similar deadline for the OD unit.

Permittees Response (June 2021):

The Permittees have removed the proposed language in Permit Part 6.4 from the revised Supplement 1-1, Permittees' Proposed Changes to Permit Parts 1-11, (Attachment 6), because the proposal to submit an alternatives assessment report was left in the redline language as an oversight and should not have been included as a proposed change. The intention of the Permittees was to include the assessment in the application. Permit Renewal Application, Supplement 4-1, Assessment of Alternatives for Open Detonation and Open Burning Activities, presents the Permittees' assessment of alternative technologies as referenced by #12. An updated version of this assessment is included as Attachment 8 of this response.

NMED Response (January 2022):

For clarity, NMED is directing the Permittees to retain the deadline for alternative treatment assessment report for the permitted OB in Permit Part 6 and provide a similar deadline for the OD units in Permit Part 5.

Permittee Response (May 2022):

To fulfill the NMED-HWB's request, the Permittees proposed revisions to Permit Parts 5 and 6 (Attachment 4 of this Second Response Document) that include permit conditions in Permit Sections 5.6 and 6.7 that require the Permittees to develop a report that assesses alternative technologies to OD and OB before the sixth anniversary of the permit effective date.

13. NMED Comment (March 2021):

Permittees must revise Permit Attachment D, Section 2 to indicate how spills or off-site contamination from OB/OD operations will be monitored and reported to NMED and communicated to the public to prevent harm to human health or the environment as required by 40 CFR 270.32(b).

Permittees Comment (June 2021):

Any spill or release of hazardous waste at the open detonation or open burning treatment units will be reported in the same manner as a spill or release at the current permitted units utilizing the reporting requirements at Permit Section 1.9.12, 24 Hour and Subsequent Reporting, or Permit Section 1.9.13, Written Reporting of a Non-threatening Release, as appropriate. As outlined in Section D.4.2, Decontamination Verification, any spills or releases at the units will be decontaminated or removed.

Additionally, any monitoring that may be required after an unplanned release will be conducted as outlined in Section D.7, Unplanned Nonsudden Releases. Permit Attachment D, Contingency Plan, outlines actions that will be taken in the event of an emergency or release of hazardous waste to prevent harm to human health or the environment and has not been modified. Attachment D, Section D.2, Emergency Equipment and Communications, includes information regarding the equipment that may be used by the Permittees in case of an emergency.

NMED Response (January 2022):

Since this is a different treatment activity from stabilization or neutralization, NMED expects that additional spill/release response measures would be implemented by the Permittees for OB/OD units. This section must be revised to include additional details specific to the OB/OD units and how spills or off-site contamination from OB/OD operations will be monitored and reported to NMED and communicated to the public to prevent harm to human health or the environment as required by 40 CFR 270.32(b).

Permittee Response (May 2022):

The Permittees have operated these three interim status units compliantly for more than 40 years in accordance with applications that have included emergency preparedness and response activities appropriate for all hazardous waste activities conducted at the Laboratory.

Regarding the OB Unit, waste is generally treated in a tray-like structure that contains the waste and prevents it from spilling or releasing into the environment. A secondary concrete containment pad surrounds the tray-like structure to further prevent waste from spilling or releasing to the environment. To prevent the waste from blowing, spreading, or releasing to the environment, a variety of different objects are used. At the OB Unit, two containments—a primary tray and a secondary pad—prevent the waste from spilling or releasing in addition to screened metal containment placed around the waste. These containment structures are provided in addition to the other measures outlined in the Permittees' response to NMED-HWB's Comment #4 to prevent spills or releases to the environment. Because of the nature of the waste the OD Units treat, the OD Units cannot have such tray-like and secondary containment structures in place; therefore, other measures identified in the Permittees' response to NMED-HWB's Comment #4 assist in preventing such spills or releases to the environment. Such measures include avoiding waste treatment under certain wind and other weather conditions; groundwater monitoring; surface water monitoring; and air quality monitoring so that, in the event of any type of release (which has not occurred in the 40+ years of operating these Units), the response will be timely and adequate.

Attachment 5 of this Second Response Document includes updated proposed changes to Permit Application Supplement 1-4 Permittees' Proposed Changes to Attachment D, Contingency Plan, reflecting notification requirements and emergency communication requirements. These permit conditions have been proposed for Permit Sections 5.3 and 6.3 and Permit Attachment Section D.4.1.4 for the OD and OB treatment units, respectively. These proposed permit conditions are intended to provide direction at the time of incidents regarding spill/release response measures and communications that will be implemented for the OB and OD units.

14. NMED Comment (March 2021):

The Permittees must include details on how the Facility will notify the fire department, or emergency medical responders, one day prior to performing treatment at the OD unit. NMED notes that other RCRA permitted OD units also require documentation (e.g., pre-treatment inspection checklist) that OD/high explosive (HE) personnel contacted a meteorology team to get a predicted forecast for the day of the planned event prior to conducting operations

Permittees Response (June 2021):

Additions to the Permittees revised descriptions of how treatment activities are conducted at the units, are included in Section 4.12.2, Operating Requirements, for open detonation units, and include specifics regarding the notifications and access to meteorological data before and during these activities, as requested. These sections also provide the precautions, restrictions, notifications, and clearance activities conducted under interim status at each of the units. Attachment 4 includes a red fine version of the additional information in the Permit Renewal Application text. No changes were made to Permit

Attachment E, Inspection Plan, that outlines the inspections conducted at each of the hazardous waste management units to meet the general inspection requirements outlined in 40 CFR §264.15 and to ensure that communication and equipment for use in case of an emergency are in working order

Inspections conducted on the day of treatment are included in the changes proposed to incorporate the open detonation units, and include requirements to inspect the area in and around the units on the day of treatment events to ensure that there is no deterioration or vegetation in the area that could catch fire. The Permittees follow a robust proceduralized and documented process for each treatment that involves a detailed hazard analysis for each treatment activity to be conducted as well as review by a safety review committee prior to treatment activities. A specific pre-treatment checklist (other than inspection record form) is not currently used to conduct open detonation operations

The procedures for conducting treatment ore outlined in the Operating Requirement sections for each unit type. Prior to the day of treatment, as part of the pre-treatment protocol, the composition of each treatment is reviewed for a hazard analysis that is then presented to a safety committee with representation from various safety groups (including Access Control and the Emergency Operations Support Center) to ensure that all required notifications and analysis of the treatment to take place have been made prior to performing each treatment at the open detonation units. This safety review committee conducts a thorough review during planning for any explosives work conducted on the firing range, including waste treatment detonations. The committee is tasked with assessment of the potential risk of the activity and the effects of weather, temperature, and dryness conditions. The Permittees welcome the opportunity to discuss specific technical requirements associated with pre-treatment activities and to discuss the development of any additional actions that the NMED-HWB recommends be documented prior to conducting treatment activities at the open detonation units

NMED Response (January 2022):

The Permittees have made changes to Attachment E which addresses the need for required documentation in the pre-treatment Inspection Checklist that high explosive (HE) personnel contacted a meteorology team to get a predicted forecast for the day of the planned event prior to conducting operations documented. The Permittees must revise Attachment E and include these procedures provided in the Response, in the pre- and post-inspection checklist in Attachment E.

Permittee Response (May 2022):

The NMED-HWB's January 2022, comment requires that Attachment E be revised and include the procedures from the proposed language in the Operating Requirements sections of the Permit separated into a pre- and post-treatment checklist.

The Permittees developed a pre- and post-treatment checklist, which is now included in the proposed revisions to Attachment E, *Inspection Plan*. The checklist expressly includes a pre-treatment requirement that the firing site leader ensure that a current and approved waste stream profile is associated with the waste(s) being treated at the Unit before any treatment is initiated. Additional checklist requirements include a pre-treatment assessment of operating conditions and restrictions outlined for the treatment activities, including weather restrictions; and a post-treatment inspection for any potential residues in/around the area after treatment concludes. The proposed revisions to Permit Attachment E are included as Attachment 6 of this Second Response Document. Please see the response to NMED-HWB Comment 4 for more information about changes made to the Permit Renewal Application regarding the waste characterization activities and operational restrictions for these Units.

15. NMED Comments (March 2021):

Supplement 3-1, Closure Plans, G.2, G.3 and G.28:

The closure plans for the proposed thermal treatment units do not account for the limited available documentation of RCRA hazardous waste treatment activities during the units' operational history, specifically prior to 1980 when the units became interim status units. The closure plans must be modified to address the limited knowledge of waste treated at these units prior to 1980. Since the Permittees have not been able to provide documentation of waste treatment activities for that time frame, the proposed analytical suite must be expanded to account for the lack of this knowledge

Permittee Response (June 2021):

The Permittees proposed analytical suites within each of the unit closure plans are based on all known past activities at the units (treatment or otherwise} and have been presented within previously approved drafts of closure plans included within the current Permit. The constituents proposed include high explosives and associated compounds, toxic metals, semi-volatile organic compounds, volatile organic compounds, as well as other constituents of concern like perchlorate, dioxins/furan congeners (open burning unit), and kerosene (open burning unit). The Permittees welcome the opportunity to discuss technical issues regarding the potential addition of analytical suites for site closure

NMED Response (January 2022):

The Permittees have not included additional analytical suites to the closure plans for the OB and OD Units, and have not adequately addressed NMED's concern. To address the limited available knowledge and documentation of RCRA hazardous waste management practices prior to 1980, the constituents of potential concern (COPCs) must be revised to include the following text and COPCs and with updated sampling methods as applicable

This Sampling and Analysis Plan (SAP) is designed to verify decontamination of surfaces, equipment, and materials; and determine whether a release of hazardous constituents to any environmental media has occurred. The SAP shall include:

a. Target analyte list (TAL) metal analysis for 24 analytes using Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) Methods 6010B, 6020 (inductively coupled plasma - mass spectrometry), and 7471A;
b. Dioxins/Furans analysis using EPA Method 8290A;
c. High explosives analysis for 20 target compounds using EPA Method 8330B or 8321A with a modification to add explosive compounds generated specifically at LANL listed in Tables 2 and 4 of the Closure Plan;
d. Analysis for SVOCs using EPA Method 8270C;
e. Analysis for VOCs using EPA Method 8260B;
f. Perchlorate anion (CIO,) by EPA Method 6850 or 6860;
g. DRO and GRO by EPA Method 8015B; and
h. Nitrates by EPA Method 9056A

Table 1. Hazardous Waste Constituents of Concern at Treatment Unit[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
High explosives and associated compounds	D003	HMX, RDX, TNT, PETN, TATB, Tetryl, and mixtures of explosives including; ANFO, Composition B, Cyclotol, IMX- 101, PBX 9404, PBX 9407, PBX 9501, PBX 9502, X0233, X0533, XTX 8003, XTX 8004, LX-02, LX-07, LX-10, and LX-14
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Semi- volatile Organic Compounds	D030, D036, F004	2,4-Dinitrotoluene, Nitrobenzene
Other constituents of concern		Dioxins/Furans, Perchlorate, PFAS, kerosene, and depleted uranium

[a] Based on the Unit operating record 1980–2012.
PETN = pentaerythrioltetranitrate (2,2-bis[(nitroxy)methyl)-1,3-propanediol dinitrate)
HMX = cyclotetramethylenetetranitramine (octahydro, 1,3,5,7-tetranitro, 1,3,5,7-tetrazocine)
RDX = cyclonite (cyclo-1,3,5-trimethylene-2,4,6-trinitramine) TNT= 2,4,6-trinitrotoluene
TATB = 1,3,5-triamino-2,4,6-trinitrobenzene

Permittee Response (May 2022):

The NMED-HWB's January 2022, comment requires that the Permittees include additional analytical suites to the closure plans for the OB and OD Units to address the limited available knowledge and documentation of RCRA hazardous waste management practices before 1980. The NMED-HWB provided a list of the COPCs and required updated sampling methods, as applicable. The Permittees updated the proposed closure plans in Permit Attachment G-2 and G-3 to include the constituents requested by the NMED-HWB. Attachment 8, *Revised Supplement 3-1 Permittees' Proposed Changes to Attachments G.1 through G.30, Closure Plans* of this Second Response Document includes redline for the updated proposed closure plans.

17a. NMED Comment (March 2021):

Supplement 4-1 Assessment of Alternatives for OD and OB Activities:

The Permittees have not evaluated the OB/OD technology and the alternative technologies for impacts to human health and the environment nor the clean-up costs associated with each technology.

Permittee Response (June 2021):

An assessment of the impacts to human health and the environment, as well as clean-up cost considerations associated with the technologies, are added to Permit Renewal Application, Supplement 4-1, Assessment of Alternatives for Open Burn and Open Detonation Units (Attachment 9). The assessment and justification report includes a systemic evaluation of the available alternative treatment technologies, and, as discussed in Supplement 4-1, the conclusion is that the proposed permitted units are the most appropriate treatment technologies for treatment of wastes based on the LANL operational and mission requirements. For clarification, evaluation criteria within Supplement 4-1 are adjusted to comparatively address human health and the environment, as well as relative costs to the extent practicable. In particular, Section 6.3 Focused Evaluation of Potential Alternative Technologies for alternative technologies which were initially screened, is modified to incorporate subject considerations as *summarized in Table 6-3. Specific environmental performance considerations at the open detonation units and the open burning unit are located in Section 4.16, Environmental Performance Standards, and 5.16, Environmental Performance Standards, of Volume 1 of the Part B Application. These sections, along with the subsections and the supplements provided as part of Appendix 4 of the Permit Renewal Application, discuss the potential impact to human health and the environment through impact to groundwater, surface water, air, and soil pathways. Clean-up cost estimates for the units are not included in the application because LANL is a federally-owned facility and is exempt from the financial assurance requirements of 40 CFR Subpart H. However, general considerations are included within the assessment in Supplement 4-1.*

NMED Response (January 2022):

The Permittees must modify Table 6-2 to include the benefits and drawbacks with regards to impacts on human health and the environment and cleanup costs, specific *to* each listed treatment option to facilitate comparisons of the treatment options. Currently, the table includes references to general discussions of impacts and cleanup costs that do not adequately address the issues raised in the original comment.

Permittee Response (May 2022):

The Permittee made revisions to Supplement 4-1, *Assessment of Alternatives for Open Detonation and Open Burning Activities* (Alternatives Analysis), in response to the NMED-HWB's comment. The Permittees reorganized and enhanced the Alternatives Analysis to assist readers in understanding the mission-critical nature of the Permittees' OB and OD Units. The enhanced Alternatives Analysis identifies the increased environmental and human health impacts and safety risks associated with each assessed technology when compared with the existing OB and OD Units. Identification of these factors, along with the environmental impacts and clean-up cost estimates, as requested by the NMED-HWB, and other enhancements, will facilitate a more comprehensive and insightful comparison of the assessed treatment technologies. The Permittees believe that the reorganized and enhanced Alternatives Analysis will aid the NMED-HWB in a more rapid and efficient review of the Permittees' overall Application. Because of the reorganization of the supplement, the information NMED-HWB's comment request is located in Table 8-2, *Comparison of Alternative Technologies for Opening Burning/Open Detonation Waste Treatment*.

Additional language associated with the compliance history of the units has also been included in the Permit Renewal Application, Sections 4.2 and 5.2 (Attachment 3 of this Second Response Document).

17b. NMED Comment (March 2021):

<u>Supplement 4-1 Assessment of Alternatives for OD and OB Activities:</u>

Table 1-2 provides quantities of explosives treated at TA 36-8 and TA 39-6 OD units from 2012–2020 by waste streams. The Permittees must separate waste volumes from the two different OD units, into two different tables. It is unclear from the table the volumes of waste that have been historically treated at each unit.

Permittee Response (June 2021):

The tables below provide waste treatment volumes by unit from 2011 through 2020. Information on estimated treatment volumes over the life of the unit is located within the proposed closure plan for each unit.

Open Detonation Treatment Activities at TA-36-8 (Minie) by Year in Pounds

	Excess explosives	Explosives contaminated debris	Detonators, initiators, and mild detonating fuses	Shaped charges and test assemblies	Projectiles and munitions larger than .50 caliber	Pressing molds	Small caliber ammunition	Black powder or gunpowder	Total
2011	1025	0	0	0	0	0	0	0	1,025
2012	206	12	0	0	0	0	0	0	218
2013	274	0	0	0	0	0	0	20	294
2014	5	2	0	0	0	0	0	0	6
2015	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0

Open Detonation Treatment Activities at TA-39-6 (Point 6) by Year in Pounds

	Excess explosives	Explosives contaminated debris	Detonators, initiators, and mild detonating fuses	Shaped charges and test assemblies	Projectiles and munitions larger than .50 caliber	Pressing molds	Small caliber ammunition	Black powder or gunpowder	Total
2011	523	0	0	0	0	0	0	0	523
2012	168	0	0	0	0	0	0	0	168
2013	82	0	0	0	0	0	0	0	82
2014	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0

NMED Response (January 2022):

Based on the information provided by the Permittees, two additional issues regarding the quantities of explosives treated at TA-36-8 and TA 39-6 were identified. First, the total pounds listed for 2014 is incorrect in the table entitled Open Detonation Treatment Activities at TA-36-8 (Minie) by Year in Pounds. The Permittees should review this information and correct any errors.

Secondly, the tables provided in the Permittees' response were not incorporated into Attachment 8, Revised Supplement 4-1, Assessment of Alternatives for Open Detonation and Open Burning Activities.

The Permittees should revise Attachment 8 to include the tables provided in the facility response.

Permittee Response (May 2022):

The NMED-HWB's January 2022, comment identified inaccuracies in the quantities of explosives presented in the Treatment Activities by Pounds tables for the OD Units provided in the Permittees' June 2021 response. Corrected tables are now incorporated into the Permit Renewal Application, Supplement 4-1, *Assessment of Alternatives for Open Burn and Open Detonation Units* (Attachment 9).

18. NMED Comment (January 2021):

Supplement 4-2:

The Permittees have not provided sufficient information on surface water and groundwater sampling data. To facilitate the review, the data must include the date the samples were collected at each location and provide the frequency of exceedances above the regulatory limits. Revise the table accordingly.

Permittee Response (June 2021):

A raw data from intellusnm.com containing the data summarized in the tables included in Supplement 4-2 has been provided as port of the electronic copy of this response. No specific sampling and analytical data associated with surface water is included in the Permit Renewal Application. However, surface water is specifically described in Section 4.18.2.1.1, Hydrologic Assessment and Surface Water Flow. Summary of surface water protection can be found in Section 4.18.2, Protection of Surface Water/Wetlands/Soil Surface, its subsections, and Section 4.18.1, Protection of Groundwater/Vadose Zone, and subsections include information of groundwater in the area and monitoring and protection of groundwater by the Permittees. These sections are presented to demonstrate compliance with the environmental performance standards for surface water and groundwater protection. Sections 4.18.1 and 4.18.2 provide context for the technical information within Supplement 4-2, Open Detonation Unit Groundwater Monitoring and Surface Drainage Information, the sections and should be reviewed together, as the sections together may address NMED's concerns.

NMED Response (January 2022):

NMED clarifies that this comment is not requesting raw data on surface and groundwater sampling. NMED's is commenting that tables in Supplement 4-2, Open Detonation Unit Groundwater Monitoring and Surface Drainage Information, must be revised to include the date the samples were taken at each location and the frequency of exceedances above regulatory limits at each location. NMED clarifies that the Permittees must provide the complete data table as an Excel file in a CD attachment. The Permittees must revise Table 4.1-1, to include a column with the number of exceedances, and a column indicating the date the maximum was detected.

Permittee Response (May 2022):

Tables 4.2-1 and 4.2-2 in the *Revised Supplement 4-2, Open Detonation Unit Groundwater Monitoring and Surface Drainage Information* (Attachment 10), have been updated to include the dates of each regulatory limit exceedance. The associated electronic data are included on the compact disc (CD) included with this Second Response Document.

19d. NMED Comment (March 2021):

The Permittees conclusion section does not describe the detected analyte concentrations, nor does it make comparisons to background values, and EPA Region 6 air quality standards. At a minimum, the Permittees must provide a summary of the sampled results, gaussian comparisons within the data including 95% upper tolerance limit (UTL), the maximum values detected, and compare those results to current EPA screening level values. The Permittees have not provided adequate information to demonstrate that the air releases from OD sites do not pose a threat to human health or the environment, please see Permit Part 11.10.4, Site-Specific Human Health Risk; 11.5, Site-Specific Ecological Risk Assessment Methods; and 11.6 Determination of Background guidance on for general information on reporting requirements to NMED. NMED notes that this information from the sampling event does not appear to be included in Supplements 4-7 and 4-8, OD Unit 36 and 39, Human Health and Ecological Risk Assessment.

Permittees Response (June 2021):

The analytical data generated for this project and detailed within the summary report were directly compared to acute air inhalation exposure concentrations from the 2005 EPA Human Health Hazard Risk Assessment Protocol for Hazardous Waste Combustion Facilities, or the acute inhalation screening levels within the 1999 Air Toxics Hot Spots Program Risk Assessment Guidelines Part I The Determination of Acute Reference Exposure Levels for Airborne Toxicants, drafted by the Office of Environmental Health Hazard Assessment of the California Environmental Protection Agency. These references provide the most applicable comparison levels for the short-term air impacts to the immediate area around the proposed hazardous waste management units. The air modeling report, Supplement 4-3, Screening Level Air Modeling Analysis and Risk Evaluation for Open Detonation Operations, more completely provides a discussion of the potential overall impact to air quality that may be caused by open detonation treatment activities. The air sampling summary report was not drafted with the intention of providing risk assessment, but as stated in Permit Renewal Application Section 4.18.3, Protection of Atmosphere, "the Permittees conducted air sampling at each of the open detonation units to determine if dioxins, furans, or metals could be detected in the air after an open detonation treatment event." Risk assessments associated with constituent soil level concentrations are included as Supplements 4-7, Open Detonation Unit at Technical Area 36 Human Health and Ecological Risk-Screening Assessments; 4-8, Open Detonation Unit at Technical Area 39 Human Health and Ecological Risk-Screening Assessments; and 4-9, Revision of 2011 Open Detonation Risk Assessment.

NMED Response (January 2022):

The Permittees have provided information that adequately addresses the issue and concerns raised in the original comment. The facility response provided for original comment 19d in Enclosure 1 clarifies the purpose of the air sampling event and comparative analysis described in Supplement 4-4 of the Part B permit application. In addition, the response distinguishes between the information in Supplement 4-4 and the analyses described in Supplement 4-3, Screening Level Air Modeling Analysis and Risk Evaluation for Open Detonation Operations.

Permittee Response (May 2022):

This comment is acknowledged as being complete, with no further changes to the Permit Renewal Application necessary.

20a. NMED Comment (March 2021):

<u>Supplement 4-5, Laboratory Analysis and Reporting, page 1-2</u>

Polychlorinated biphenyls (PCBs) were not included in the analytical suites for the samples collected at TA 36-8. However, PCBs were detected in soil samples as noted in the 2011sampling report, and PCBs were detected in three of the five whole-body field mice samples collected from TA 36. The Permittees must provide additional information to address the following issues:

- A discussion justifying why PCBs were not included for sample analyses when PCBs were detected in mice at TA 36.
- A discussion addressing the lack of current PCB data, and whether this constitutes a data gap and must evaluate whether additional sampling is needed.
- Please also see NMEDs comments on Supplement 4-7: at a minimum, the historic PCB soil data should be included in the current risk assessment.

Permittees Response (June 2021):

PCB soil data was collected in 2010 and 2011, because the soil monitoring conducted at that time was designed to be a baseline data set to begin an assumed soil monitoring program at each of the detonation units. Assessment of these data is included in Supplement 4-9, Revision of 2011 Open Detonation Risk Assessment, and a copy of the raw data set is included with the electronic copy of this response.

Constituents chosen for the 2018 sampling effort were based on the likelihood that current operational activities may contribute to deposition of the constituents.

PCB waste is not treated or used in association with the current operational activities at either of the units; therefore, PCBs should not be added to the soil surface since initial detection. Because of these reasons, the lack of 2018 PCB data should not be considered a data gap. At the time of closure of the units, PCBs should be evaluated based on the sites historic use. Please see the Permittees' response to #22 for information regarding the drafting or reorganization of the three open detonation risk assessments within the Permit Renewal Application.

NMED Response (January 2022):

The Permittees have provided information that partially addresses the issues raised in the original comment. The Permittees have discussed why soil was not sampled for PCBs in 2018. The response further states that PCB waste is not currently treated or used at the open detonation (OD) units. The Permittees also state that a copy of the 2010 and 2011 PCB data set was included in the electronic response to original comment 20a. As of the date of this letter, the electronic data furnished by the Permittees has not been submitted.

Permittee Response (May 2022):

LANL has included an electronic copy of the analytical data for the 2010 and 2011 soil sample collections on the CD included with this Second Response Document.

20b. NMED Comment (March 2021):

Laboratory Analysis and Reporting page 3:

Soil samples were inadvertently analyzed for plutonium instead of isotopic uranium. The report states that previous sampling included uranium (U-234, U-235/236, and U238} and that the 2011 risk assessment addressed uranium. However, the current risk assessment does not include the uranium data. The Permittees must provide additional information to address the following issues:

i. The Permittees have not included a complete list of constituents of potential concern (COPCs) analysis, at a minimum, the uranium data provided in the 2011sampling report should be used in the current risk assessment. It is noted for TA 36-8 that all three isotopes of uranium were detected above background levels and were retained as COPCs in the 2013 risk assessment.

ii. The Permittees must provide a discussion on whether any depleted uranium has been treated since the sampling was conducted in 2010. If any depleted uranium has been treated at TA 36- 8, then the historical data likely underestimate potential concentrations and sampling must be conducted to fill this data gap. Previously the Permittees have treated depleted uranium at TA 36-8 and must clarify whether this has occurred since the last soil sampling event in 2010.

Permittee Response (June 2021):

The Permittees have not treated explosives-contaminated depleted uranium waste since the last soil sampling event in 2010. In 2011, Permittees determined appropriate constituents based on all historic activities at the unit. The units are used for treatment of high explosives and high explosives contaminated wastes, however, both units are primarily used for non-treatment related testing and other operational detonations. Therefore, uranium will be included in soil sampling and monitoring at the sites. The Permittees would like to emphasize that plutonium is not considered a constituent of potential concern at either of the open detonation treatment units, and was not detected in any of the samples analyzed for plutonium. It was mistakenly requested for analysis through a typographical error on the chain of custody documentation.

Permit Renewal Application Section 4.18.2.2, Soil Surface Monitoring, provides context for the soil analytical results presented in Supplement 4-5, Soil Sampling Results Summary Report for the Open Detonation Unit at Technical Area (TA) 36-8, and Supplement 4-6, Soil Sampling Results Summary Report for the Open Detonation Unit at Technical Area (TA) 39-6, and the information should be reviewed together for a complete overview of the soil sampling.

NMED Response (January 2022):

The Permittees have provided information that partially addresses the issues raised in the original comment. In the facility response, the Permittees have discussed why soil was not sampled for PCBs in 2018. The response further states that PCB waste is not currently treated or used at the open detonation (OD) units. The Permittees also state that a copy of the 2010 and 2011 PCB data set was included in the electronic response to original comment 20a. As of the date of this letter, the electronic data furnished by the Permittees has not been submitted.

Attachment 1, Crosswalk of Changes to the Part A and General Part B of the Resource Conservation and Recovery Act (RCRA) Permit Renewal Application Los Alamos National Laboratory, notes that no changes were made to Supplement 4-5 in response to original comment 20a. However, the Permittees have provided changes to the Part B permit application in response to the original comment. Attachment 6, Revised Supplement 1-1, Permittees' Proposed Changes to Permit Parts 1-11; Section 5.2, *Waste Streams to be Treated at the Open Detonation Units,* states that the Permittees will not treat PCBs by open detonation. However, the discussion does not identify any controls and/or procedures in place to ensure PCBs are not treated at the OD units.

The Permittees must provide documentation justifying the elimination of PCBs from the 2018 soil sampling event to Supplement 4-5. In addition, Attachment 6, Section 5.2, should be revised to include a discussion of the controls and/or procedures in place to ensure that PCBs are not treated at the OD units.

Permittee Response (May 2022):

As stated in the Permittees' response to comment 20a, electronic analytical data for the 2010 and 2011 soil sample collections (including PCBs) are included by CD herein with this Second Response Document.

The NMED-HWB's January 2022 comments requested that the Permittees provide documentation to eliminate PCBs from the soil sampling in revised attachments. Justification for elimination of PCBs from the 2018 soil sample collection events presented in the Permittees' June 2021 response to Comment 20a (above) is included in the *Revised Supplement 4-5, Soil Sampling Results Summary Report for the Open Detonation Unit at Technical Area (TA) 36-8* (Attachment 11 of this Second Response Document), and *Revised Supplement 4-6, Soil Sampling Results Summary Report for the Open Detonation Unit at Technical Area (TA) 39-6* (Attachment 12 of this Second Response Document).

Specifically, the Permittees' have both controls and procedures in place to ensure that PCBs are not treated by OD, as more fully described in the Permittees' response to NMED-HWB Comment 10b regarding waste characterization practices and the addition of a check for an approved waste stream profile in the pre- and post-treatment checklist. The waste stream profile development process includes a determination regarding the presence of PCBs in a waste stream, and waste streams that contain PCBs are prohibited from treatment by OB or OD.

21. NMED Comment (March 2021):

Appendix 4: Supplement 4-6 Soil Sampling Results Summary Report for the OD Unit at TA 39-6, *Laboratory Analysis and Reporting* pages 1 and 2:

PCBs were not included in the analytical suites for the samples collected at TA 39-6. However, PCBs were detected (minimally) in the soil as noted in the 2011sampling report. The Permittees must provide additional information to address the following issues that are noted by NMED:

- A discussion of why PCBs were not included for sample analyses.
- A discussion of whether the lack of current PCB data constitutes a data gap and must evaluate whether additional sampling is needed.
- Please also see comments on Supplement 4-8: at a minimum, the historic PCB soil data should be included in the current risk assessment.

Permittee Response (June 2021):

Please see response to #20 with regards to the lack of 2018 PCB data. Please see the Permittees' response to #22 for information in regards to the drafting or reorganization of risk assessments within the Permit Renewal Application.

NMED Response (January 2022):

The facility response to original comment # 21 submitted by the Permittees is acknowledged. However, issues remain with the Permittees' response to original comment# 20a. Once the Permittees adequately address those remaining issues, the issue identified in original comment # 21 will also be resolved.

Permittee Response (May 2022):

Please see Permittees' response to NMED-HWB Comment 20a.

22a. NMED Comment (March 2021):

Appendix 4: Supplement 4-7 Open Detonation Unit at Technical Area 36 Human Health and Ecological Risk-Screening Assessments, Executive Summary page ii

The risk assessment does not address the potential for contaminants in the soil to migrate to groundwater (refer to Section 4 of the New Mexico Environment Department Soil Screening Guidance (NMED SSG). As noted in Table 4.2-1of Supplement 4-2, several constituents have been detected in groundwater at levels above action levels. Revise the assessment to address the potential leaching of contaminants from the vadose zone to groundwater and correlate detections in the soil to groundwater results.

Permittee Response (June 2021):

The potential for the open detonation units to impact groundwater in the area and monitoring and protection of groundwater by the Permittees are presented in the Permit Renewal Application to demonstrate compliance with the environmental performance standards for groundwater protection within Section 4.18.1, Protection of Groundwater/Vadose Zone and relevant subsections. Information included within Supplement 4-2, Open Detonation Unit Groundwater Monitoring and Surface Drainage Information, should be reviewed with the context provided by Section 4.18.1 of the Permit Renewal Application.

NMED Response (January 2022):

The Permittees have provided information in the response that does not address the issue raised in original comment # 22a. In the response, the Permittees reference Attachment 4, Section 4.18.1, Protection of Groundwater/Vadose Zone. The referenced discussion provides information on hydrogeology and groundwater monitoring. No information on the soil-to-groundwater exposure pathway and its potential to impact the OD units were found in the referenced material. Examination of Supplement 4-7 (and Supplement 4-8) indicates that no discussion of the soil-to-groundwater pathway is provided. The potential for soil contaminants to reach groundwater and lead to possible exposures must be addressed to ensure the conceptual site model for each OD unit reflects consideration of all potential exposure pathways and inclusion or exclusion of a pathway is based on defensible lines of evidence. The Permittees must revise Supplement 4-7 (and Supplement 4-8) to address the potential for contaminants from the vadose zone to migrate to groundwater at the OD units. The discussion should correlate detections in the soil to groundwater sampling results. NMED recommendations on the type of information to be considered in determining if the soil-to-groundwater pathway is complete or incomplete at the OD units are provided in the last paragraph of Section 4.9, Summary of the Migration to Groundwater Pathway SL-SSLs, of the NMED SSG.

Permittee Response (May 2022):

The NMED-HWB's January 2022 comment notes that the Permittees' risk assessments for the OD Units did not include assessments of the soil-to-groundwater exposure pathway and its potential to impact the interim status units. Soil-to-groundwater discussions and evaluations pursuant to the guidance provided in the NMED Risk Assessment Guidance for Site Investigations and Remediation are included in the following attachments to this Second Response Document:

- Attachment 13 – Revised Supplement 4-7, Open Detonation Unit at Technical Area 36 Human Health and Ecological Risk Screening Assessments; and
- Attachment 14 – Revised Supplement 4-8, Open Detonation Unit at Technical Area 39 Human Health and Ecological Risk Screening Assessments.

Additional revisions to the risk assessments include other revisions and now the assessments align with guidance provided by the NMED-HWB. Language regarding these risk assessments generally appears in 4.18.2.2, *Soil Surface Monitoring*, in Attachment 3 of this Second Response Document.

22b. NMED Comment (March 2021):

Section 2.2.1 Sampling and Analysis Data page 2:

PCBs were not included in the analytical suites for the samples collected at TA-36-8. However, PCBs were detected in soil as noted in the 2011 sampling report and PCBs were detected in three of the five whole body field mice samples collected from TA 36. Address this potential data gap. At a minimum, revise the report to include the historic PCB soil data in the current risk assessment.

Permittee Response (June 2021):

Please see response to #20 for information addressing PCBs within the soil at the open detonation units.

NMED Response (January 2022):

The facility response to original comment # 22b submitted by the Permittees is acknowledged. However, issues remain with the Permittees' response to original comment # 20a. Once the Permittees adequately address those remaining issues, the issue identified in original comment # 22b will also be resolved.

Permittee Response (May 2022):

Please see Permittees' response to NMED-HWB Comment 20a.

Attachment 1

Crosswalk of Changes to the General Part A and Part B of the Resource Conservation and Recovery Act Permit Renewal Application for Los Alamos National Laboratory

Crosswalk of Changes to the General Part A and Part B of the
Resource Conservation and Recovery Act Permit Renewal Application for Los Alamos National Laboratory

NMED Comment		Response Location	Summary of Changes
2	NMED notes that the Permittees do not have sufficient information to evaluate if the lineaments within the Pajarito fault system (PFS) have been active within the Holocene. NMED notes that near TA-16-388, the lineaments associated with the PFS, have had at least one earthquake on the Eastern edge of TA-16, that have not been investigated within the 3,000-foot boundary of TA-16-388. NMED notes that the lineaments at 36-8 and 39-6 have not been investigated for faults. The Permittees must perform a geologic investigation of lineaments within the 3,000-foot boundary and provide a revised Attachment 3 with the results of the investigation. NMED understands that this will require some time for the Permittees to plan and implement these investigations; please provide an estimated schedule of when this will be completed. The results of the investigation will be reviewed by NMED through the technical review process.	Attachment 2	Field walkdown occurred in April 2022, and the Permittees provided an updated seismic location standard report for the proposed OB and OD units at TA-16-388, TA-36-8 and TA-39-6 to address 40 CFR 270.14 (b)(11).
4	The Permittees have provided cross-references but have not addressed how releases from OB/OD units will be measured, and how those releases will be communicated to the public other than contingency plan implementation communications to NMED (Attachment D) or general emergency response services. Please provide the detailed information required by this comment.	Attachment 3 (Permit Renewal Application): Sections 2.7.6, 4.7.6, 5.7.6, 5.2.3, and 6.2.3 Attachment 4 (Changes to Permit Parts 1-11): Permit Part 5, Sections 5.3.2 and 5.4 and Permit Part 6, Sections 6.3.3 and 6.4 Attachment 5 (Changes to Permit Attachment D): Permit Attachment D, Attachment Section D.4.1.4	The Permittees revised the Permit Renewal Application to provide references in Section 2.7.6 that point to where releases to the atmosphere information is presented in the specific sections for the proposed OB and OD units in Sections 4.7.6 and 5.7.6 and to add information regarding monitoring at LANL. The revision proposed permit conditions to address prevention of releases and to describe how any release will be communicated (see proposed Permit Sections 5.3.2, 6.3.3, 5.4, and 6.4). Additionally, the notification requirements not previously included in the Contingency Plan were added.

	NMED Comment	Response Location	Summary of Changes
10b	The Permittees are proposing to only treat waste that meets the definition of reactive (D003). The Permittees have stated that the OB/OD units will not treat waste that contains Be, Perchlorates, or PCBs. However, the Permittees have not addressed NMED's concerns based on Open Burning/Open Detonation Permitting Guidelines Section 2.2.5 which recommends explicitly prohibiting the thermal treatment of biologic or chemical warfare weaponry, depleted uranium, and small arms ammunition up to 50 calibers. Permittees must revise this section to explicitly state that the thermal treatment of biologic or chemical warfare weaponry, depleted uranium, and small arms ammunition up to 50 calibers will be prohibited The Permittees must also provide information on how prohibited waste will be evaluated and prevented from treatment at OB/OD units.	Attachment 3 (Permit Renewal Application): Sections 4.2 and 5.2 Attachment 6 (Changes to Permit Attachment E): Permit Attachment E, Section E.9.3 and Form E-4 Attachment 7 (Changes to Permit Attachment C): In waste descriptions and in tables	A section regarding prohibited waste was added to the suggested changes in Permit Part 5, and references to waste streams that are not consistent with the waste explosives definition were removed from Supplement 1-3, *Permittees' Proposed Changes to Attachment C, Waste Analysis Plan*. References to "depleted uranium" were removed from Attachment C. The Permittees revised Permit Attachment E to include a pre- and post-treatment checklist that addresses ensuring a check for a current approved waste stream profile (Form E-4).
11	The Permittees' response to this comment indicated that red flag conditions are based on wind speeds greater than 10 mph during dry conditions. However, the text in Section 5.2.3.2 (page 102) only restricts OB/OD activities when winds are greater than 20 mph. The Permittees must revise this Section to be consistent and also address dry condition restrictions.	Attachment 3 (Permit Renewal Application): Sections 4.12.1.3.3 and 5.12.7.4 Attachment 4 (Changes to Permit Parts 1-11): Permit Part 5, Section 5.3.3.2 and Permit Part 6, Section 6.3.3	Descriptions of weather conditions under which treatment activities are prohibited were added to the revised sections of the application and the proposed revisions to the Permit. References to the "Red Flag" conditions were removed. Clarification regarding the LANL Weather Machine was added to Attachment 3.
12	For clarity, NMED is directing the Permittees to retain the deadline for alternative treatment assessment report for the permitted OB in Permit Part 6 and provide a similar deadline for the OD units in Permit Part 5.	Attachment 4 (Changes to Permit Parts 1-11): Permit Part 5, Section 5.5 and Permit Part 6, Section 6.7	The requested revisions were added to the proposed changes to the Permit.

NMED Comment		Response Location	Summary of Changes
13	Since this is a different treatment activity from stabilization or neutralization, NMED expects that additional spill/release response measures would be implemented by the Permittees for OB/OD units. This section must be revised to include additional details specific to the OB/OD units and how spills or off-site contamination from OB/OD operations will be monitored and reported to NMED and communicated to the public to prevent harm to human health or the environment as required by 40 CFR 270.32(b).	Attachment 4 (Changes to Permit Parts 1-11): Permit Part 5, Section 5.3 and Permit Part 6, Section 6.3 Attachment 5 (Changes to Permit Attachment D): Permit Attachment D, Attachment Section D.4.1.4	Revisions in Permit Parts 5 and 6, as well as Attachment D, were revised to include proposed language that outlines notifications for unexpected events. Please see Comment Response 4 for additional information.
14	The Permittees have made changes to Attachment E which addresses the need for required documentation in the pre-treatment Inspection Checklist that high explosive (HE) personnel contacted a meteorology team to get a predicted forecast for the day of the planned event prior to conducting operations documented. The Permittees must revise Attachment E and include these procedures provided in the Response, in the pre- and post-inspection checklist in Attachment E.	Attachment 6 (Changes to Permit Attachment E): Permit Attachment E, Section E.9.3 and Form E-4	Attachment E was revised to include pre- and post-treatment checklist. Please also see Response to Comment 4.
15	The Permittees have not included additional analytical suites to the closure plans for the OB and OD units, and have not adequately addressed NMED's concern. To address the limited available knowledge and documentation of RCRA hazardous waste management practices prior to 1980, the constituents of potential concern (COPCs) must be revised to include the following text and COPCs and with updated sampling methods as applicable…[Remaining comment not included]	Attachment 8 (Closure Plans): Permit Attachment G-2 Permit Attachment G-3	The closure plans were updated to include the constituents in the NMED's table.
17a	The Permittees must modify Table 6-2 to include the benefits and drawbacks with regards to impacts on human health and the environment and cleanup costs, specific to each listed treatment option to facilitate comparisons of the treatment options. Currently, the table includes references to general discussions of impacts and cleanup costs that do not adequately address the issues raised in the original comment.	Attachment 3: Section 4.2 Section 5.2 Attachment 9 (Alternatives Assessment): Supplement 4-1, Table 6-2, and Table 6-3	Evaluation criteria within Supplement 4-1 were adjusted to comparatively address human health and the environment, as well as relative costs to the extent practicable.

	NMED Comment	Response Location	Summary of Changes
17b	Based on the information provided by the Permittees, two additional issues regarding the quantities of explosives treated at TA-36-8 and TA 39-6 were identified. First, the total pounds listed for 2014 is incorrect in the table entitled Open Detonation Treatment Activities at TA-36-8 (Minie) by Year in Pounds. The Permittees should review this information and correct any errors Secondly, the tables provided in the Permittees' response were not incorporated into Attachment 8, Revised Supplement 4-1, Assessment of Alternatives for Open Detonation and Open Burning Activities The Permittees should revise Attachment 8 to include the tables provided in the facility response.	Attachment 9 (Alternatives Assessment): Additional tables	Corrected tables are now included.
18	NMED clarifies that this comment is not requesting raw data on surface and groundwater sampling. NMED's is commenting that tables in Supplement 4-2, Open Detonation Unit Groundwater Monitoring and Surface Drainage Information, must be revised to include the date the samples were taken at each location and the frequency of exceedances above regulatory limits at each location. NMED clarifies that the Permittees must provide the complete data table as an Excel file in a CD attachment. The Permittees must revise Table 4.1-1, to include a column with the number of exceedances, and a column indicating the date the maximum was detected.	Attachment 10 (Groundwater Monitoring): Supplement 4-2, Tables 4.2-1, and 4.2-2	Requested information is included in the tables, and the electronic data are included on the compact disc included with the response document.
19d	The Permittees have provided information that adequately addresses the issue and concerns raised in the original comment. The facility response provided for original comment 19d in Enclosure 1 clarifies the purpose of the air sampling event and comparative analysis described in Supplement 4-4 of the Part B permit application. In addition, the response distinguishes between the information in Supplement 4-4 and the analyses described in Supplement 4-3, Screening Level Air Modeling Analysis and Risk Evaluation for Open Detonation Operations.	N/A	No changes proposed.

	NMED Comment	Response Location	Summary of Changes
20a	The Permittees have provided information that partially addresses the issues raised in the original comment. The Permittees have discussed why soil was not sampled for PCBs in 2018. The response further states that PCB waste is not currently treated or used at the open detonation (OD) units. The Permittees also state that a copy of the 2010 and 2011 PCB data set was included in the electronic response to original comment 20a. As of the date of this letter, the electronic data furnished by the Permittees has not been submitted.	Compact disc	Analytical data are included on the compact disc.
20b	The Permittees have provided information that partially addresses the issues raised in the original comment. In the facility response, the Permittees have discussed why soil was not sampled for PCBs in 2018. The response further states that PCB waste is not currently treated or used at the open detonation (OD) units. The Permittees also state that a copy of the 2010 and 2011 PCB data set was included in the electronic response to original comment 20a. As of the date of this letter, the electronic data furnished by the Permittees has not been submitted Attachment 1, Crosswalk of Changes to the Part A and General Part B of the Resource Conservation and Recovery Act (RCRA) Permit Renewal Application Los Alamos National Laboratory, notes that no changes were made to Supplement 4-5 in response to original comment 20a. However, the Permittees have provided changes to the Part B permit application in response to the original comment. Attachment 6, Revised Supplement 1-1, Permittees' Proposed Changes to Permit Parts 1-11; Section 5.2, Waste Streams to be Treated at the Open Detonation Units, states that the Permittees will not treat PCBs by open detonation. However, the discussion does not identify any controls and/or procedures in place to ensure PCBs are not treated at the OD units. The Permittees must provide documentation justifying the elimination of PCBs from the 2018 soil sampling event to Supplement 4-5. In addition, Attachment 6, Section 5.2, should be revised to include a discussion of the controls and/or procedures in place to ensure that PCBs are not treated at the OD units.	Compact disc Attachment 11 (TA-36-8 Soil Monitoring): Introduction Attachment 12 (TA-39-6 Soil Monitoring): Introduction	Please see Response to Comment 20a and Response to Comment 10b. Justification for not monitoring for PCBs in 2018 is included in both soil monitoring reports.

NMED Comment		Response Location	Summary of Changes
21	The facility response to original comment # 21 submitted by the Permittees is acknowledged. However, issues remain with the Permittees' response to original comment# 20a. Once the Permittees adequately address those remaining issues, the issue identified in original comment # 21 will also be resolved.		See Comment Response 20 regarding 2018 PCB data. See also Comment Response 22 for information regarding the drafting or reorganization of risk assessments within the Permit Renewal Application.
22a	The Permittees have provided information in the response that does not address the issue raised in original comment # 22a. In the response, the Permittees reference Attachment 4, Section 4.18.1, Protection of Groundwater/Vadose Zone. The referenced discussion provides information on hydrogeology and groundwater monitoring. No information on the soil-to-groundwater exposure pathway and its potential to impact the OD units were found in the referenced material. Examination of Supplement 4-7 (and Supplement 4-8) indicates that no discussion of the soil-to-groundwater pathway is provided. The potential for soil contaminants to reach groundwater and lead to possible exposures must be addressed to ensure the conceptual site model for each OD unit reflects consideration of all potential exposure pathways and inclusion or exclusion of a pathway is based on defensible lines of evidence. The Permittees must revise Supplement 4-7 (and Supplement 4-8) to address the potential for contaminants from the vadose zone to migrate to groundwater at the OD units. The discussion should correlate detections in the soil to groundwater sampling results. NMED recommendations on the type of information to be considered in determining if the soil-to-groundwater pathway is complete or incomplete at the OD units are provided in the last paragraph of Section 4.9, Summary of the Migration to Groundwater Pathway SL-SSLs, of the NMED SSG.	Attachment 13 (TA-36 Risk Assessment) Attachment 14 (TA-39 Risk Assessment)	Risk assessments have been revised to include soil-to-groundwater pathway assessment and to make other changes that align with NMED guidance.
22b	The facility response to original comment # 22b submitted by the Permittees is acknowledged. However, issues remain with the Permittees' response to original comment # 20a. Once the Permittees adequately address those remaining issues, the issue identified in original comment # 22b will also be resolved.		Please see Comment Response 20.

Attachment 2

Revised Seismic Location Standards Evaluation for Three Open Burning/Open Detonation Locations under Consideration for Permitting under the Resource Conservation and Recovery Act at Los Alamos National Laboratory: Technical Areas 16, 36, and 39

To: Luciana Vigil-Holterman, EPC-WMP
Patrick Padilla, EPC-WMP
Jessica Moseley, EPC-WMP
From: Emily Schultz-Fellenz, EES-14
Anita Lavadie-Bulnes, EES-14
Elizabeth Miller, EES-14
Brandon Crawford, EES-14
Date: May 12, 2022

REVISION 1: SEISMIC LOCATION STANDARDS EVALUATION FOR THREE OPEN BURNING / OPEN DETONATION LOCATIONS UNDER CONSIDERATION FOR PERMITTING UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT AT LOS ALAMOS NATIONAL LABORATORY: TECHNICAL AREAS 16, 36, AND 39

1 Introduction

To address the New Mexico Environment Department's comments to the Resource Conservation and Recovery Act (RCRA) permit renewal application, incorporating three long-standing open burning and open detonation units at the facility, this memorandum summarizes geologic investigations at and around three separate sites of the Los Alamos National Laboratory (LANL or "the Laboratory") in Los Alamos County, New Mexico. These sites include:

- an open burning treatment unit - the "Flash Pad" site at Technical Area (TA) 16 (TA-16-388);
- an open detonation unit - Minie Site at TA-36 (TA-36-8); and
- a second open detonation unit - Point 6 at TA-39 (TA-39-6).

Portions of new facilities where treatment of hazardous waste occur must adhere to seismic location standards as identified in the Code of Federal Regulations, Title 40 (40 CFR), Part 264.18. Part of these requirements include that such facilities will not be located within 200 ft (61 m) of a fault that has experienced displacement in the Holocene time period, i.e., within the last 11,700 years. The guidelines used to demonstrate compliance with the aforementioned location standard are presented in 40 CFR, Part 270.14(b)(11).

Context and details on the construction, relevant operational history, and intended use under RCRA permit guidelines can be found in the Permittees Permit Renewal Application, consisting of the *Los Alamos National Laboratory (LANL) General Part A Permit Application, Revision 10.0*; and Volumes 1 and 2 of the *Part B Permit Application for Renewal of the Los Alamos National Laboratory Hazardous Waste Facility Permit.*

In this revised memorandum, we address the three sites' adherence to the seismic location standard through presentation and summarization of published geologic data. We begin with a brief overview of the general geologic setting of the Laboratory, including a Pajarito Plateau-scale map of faults and lineaments to provide context for the geologic structural (faults) setting at each of the three sites. Next, we summarize pertinent regional-scale geologic studies and lineament mapping from the mid-1980s to the early 1990s; these studies provided important control on the known extent of possible faults in the TA-16, TA-36, and TA-39 areas. Then we present regional- and local-scale geologic studies near each of the three sites from best available published studies for purposes of evaluating Holocene seismic surface rupture potential at the three sites. In the case of more recent geologic investigations at TA-16 in particular, these studies examined whether previously mapped lineaments were surface-rupturing faults or fractures. We also include geospatial analyses of aerial photography covering a 5-mile (8 km), 3,000 ft (915 m), and 200 ft (61 m) radius of each facility. We include a summary of site-specific field reconnaissance observations and geologic site characteristics from each of the three locations.

1.1 Definitions

The following technical terms are used frequently throughout this document, and merit consistency in their definition and use. Definitions are taken from The Dictionary of Geological Terms (Bates and Jackson, eds., 1984).

Displacement: a general term for the relative movement of the two sides of a fault, measured in any chosen direction; also, the specific amount of such movement. Within this report, “displacement” and “offset” are interchangeable terms.

Holocene: an epoch or time interval of the Quaternary period, from the end of the Pleistocene, approximately 8 thousand years ago (ka) (*sic*; Ogg et al. (2008) have updated the beginning of the Holocene to 11.7 ka) to the present time.

Fracture: a crack, joint, fault, or other break in rocks.

Fault: a fracture or fracture zone along which there has been displacement of the sides relative to one another parallel to the fracture.

Lineament: a linear topographic feature of regional extent that is believed to reflect crustal structure. Examples are fault lines, aligned volcanoes, and straight stream courses.

<u>*Note:*</u> the definition of “lineament” does not imply that such an identified feature is actually a surficial manifestation of crustal structure with recent tectonic activity (e.g., a fault) until the local geology is evaluated. Additionally, unless otherwise clarified through detailed field examination or other means, the definition of “fault” does not imply a tectonic mechanism for genesis and/or growth; the definition also does not imply that each “fault” is independently seismogenic. Features defined as faults through geologic mapping must be considered in the context of the surrounding geology before their mechanism of formation is determined.

2 General Geologic Setting of the Laboratory

The Pajarito Plateau is a high volcanic tableland in north-central New Mexico, bounded on its western edge by the Pajarito fault system (PFS). The PFS is a 30-mile-long (50-km-long) system of normal faults, including the down-to-the-east Pajarito fault (the master fault) and subsidiary down-to-the-west Rendija Canyon, Guaje Mountain, and Sawyer Canyon faults (Figure 1). This fault system is thought to form the local active western margin of the Rio Grande rift near Los Alamos. The Pajarito fault system is thought to have been active since approximately the middle Miocene epoch, or approximately 14 ka (Kelley, 1979; Lewis et al., 2009). The Pajarito, Rendija Canyon, and Guaje Mountain faults of the PFS exhibit evidence of at least one earthquake (or probable movement) during the Holocene (Gardner et al., 1990; Wong et al. 1995; Kelson et al. 1996; McCalpin 1998, Wong et al., 2007; Lewis et al., 2009; Lettis Consultants International, 2019). It should be noted that data are lacking across the PFS that temporally correlates paleoearthquake activity across multiple segments (LCI, 2020).

The local bedrock at LANL is the Bandelier Tuff, which formed in two eruptive pulses from the Valles caldera, located approximately 4.67 miles (7.5 km) west of TA-16-388 at LANL. The older member of the Bandelier Tuff, the Otowi Member (Qbo), has been dated at 1.61 million years (Ma) (age from Izett and Obradovich 1994). The younger member of the Bandelier Tuff, the Tshirege Member (Qbt), has been dated at 1.256 Ma (age from Phillips et al. 2007) and is widely exposed as the mesa-forming unit around Los Alamos. Tephras and volcaniclastic sediments of the Cerro Toledo interval (Qct) separate the two members of the Bandelier Tuff. Several discrete subunits comprise the Tshirege Member of the Bandelier Tuff (Figure 2); these subunit contacts have been used by LANL geologists to confirm the presence or absence of faults in specific areas. Broxton and Reneau (1995) and Lewis et al. (2009) describe in detail the commonly accepted stratigraphic nomenclature of the Tshirege Member of the Bandelier Tuff. Since the Pajarito fault system has been active since approximately 14 ka, the Pajarito fault system predates the deposition of the Bandelier Tuff (Kelley, 1979; Lewis et al., 2009).

2.1 Geologic Setting of TA-16

TA-16 sits between Cañon de Valle and Water Canyons in the southwestern portion of LANL (Figure 1). The Qbt subunits exposed in the TA-16 area are predominantly Qbt3, Qbt3T, and Qbt4. Much of the mesa tops within TA-16 also include younger geomorphic units, such as older alluvium. Select areas of these mesa-top regions of TA-16 also preserve primary and reworked deposits of the El Cajete pumice, or Qec. Qec is the youngest known eruptive unit produced by the Valles-Toledo caldera complex , and its age has been most recently constrained at 74 ka (Zimmerer et al., 2016). Based on subsurface geologic analysis, the presence and position of these major canyons is thought to pre-date the deposition of the Bandelier Tuff (D. Broxton, unpublished data).

At the southwestern corner of the Laboratory, at the western side of TA-16 adjacent to West Jemez Road (NM State Road 501), the Pajarito fault and its subsidiary faults are prominent. TA-16 lies at the base of the main, 400-foot (122-m) high escarpment formed by the Pajarito fault. From the escarpment, faulting and related deformation extend at least 5000 ft (1,524 m) to the east. However, most of the structural deformation east of the main escarpment occurs within a zone that is about 2000 ft (610 m) wide. Much of the TA-16 region has been mapped at 1:1200 scale by LANL geologists (Gardner et al., 2001; Lewis et al., 2009).

The TA-16-388 site is adjacent to Material Disposal Area (MDA) P. This region, along with the TA-16-260 outfall area (a site not under consideration within this memorandum) have been geologically characterized in detail by a number of studies undertaken by the former LANL Environmental Restoration (ER) program (e.g., Broxton et al., 1996, 2002; Warren et al., 1997; LANL ER Project, 1998).

These studies focused on constraining subsurface geologic parameters for the purpose of constructing a three-dimensional subsurface stratigraphic model in support of removal of waste items and clean-up activities. These studies did not focus on identification of faults, their ages of activity, or surface rupture potential.

This memorandum notes that TA-16-388 is intended as a “place-and-treat” location and is not intended for material storage. We include site-specific geologic characterization information in this document for completeness.

2.2 Geologic Setting of TA-36

TA-36 sits within Fence Canyon, between Potrillo Canyon to the north and Water Canyon to the south, in the south-central part of LANL (Figure 1). The site is situated near the Fence Canyon headwaters region. The local bedrock is the Bandelier Tuff, with primary exposures of units Qbt3 and Qbt2. This technical area is included within 1:24,000 scale geologic quadrangle mapping. This site is located 2.4 mi (3.8 km) E of the main Pajarito fault, and approximately 3.1 miles (5 km) SSE of the southernmost mapped extent of the antithetic Guaje Mountain fault (Figure 1).

2.3 Geologic Setting of TA-39

TA-39 sits within Ancho Canyon in the southeastern portion of LANL (Figure 1). The local bedrock is the Bandelier Tuff, with primary exposures of units Qbt1 and Qbt2. This technical area is included within 1:24,000 scale geologic quadrangle mapping. TA-39-6 is the easternmost site within LANL considered for possible RCRA permit, located 2.5 mi (4 km) east of the main Pajarito fault, and approximately 4.67 mi (7.5 km) SSW of the southernmost mapped extent of the antithetic Sawyer Canyon fault (Figure 1).

3 Regional-Scale Geologic Studies, mid-1980s to early 1990s

This section reviews pertinent regional-scale geologic studies and lineament mapping that have been conducted on the Pajarito Plateau in order to provide context for site-specific studies discussed later in this memorandum.

3.1 Geologic Quadrangle Mapping

Goff et al. (2001) completed geologic and structural mapping of the Frijoles quadrangle at 1:24,000 scale. The Frijoles quadrangle covers much of the LANL campus, except for the easternmost regions. Goff et al. (2001) identified no surficial geologic faults in the vicinity of TA-16-388 or TA-36-8. From the mapping at this scale, the geology of TA-16-388 includes Qbt, older Quaternary alluvium, and the El Cajete pumice. At TA-36-8, the site geology at the site includes Qbt and Quaternary alluvium.

Dethier (1997) completed geologic and structural mapping of the White Rock quadrangle at 1:24,000 scale. The White Rock quadrangle covers the easternmost portions of LANL. The map identifies approximately three small faults on the southern side of Ancho Canyon near its intersection with the Rio Grande Gorge at White Rock Canyon. However, it must be noted that due to edge effects between the quadrangle boundaries, portions of TA-39, including the specific TA-39-6 site, are not included on either the Frijoles or White Rock geologic quadrangle maps.

3.2 Lineament Mapping via Aerial Photographs

Early geologic studies, performed before the fine detail of the Bandelier Tuff subunits were well-understood and before any high-resolution geologic mapping was performed, noted prominent lineaments identified through aerial photographic analysis (Dransfield and Gardner, 1985; Vaniman and Wohletz 1990; Wong et al. 1995; Olig et al. 1996; Rogers et al. 1996). These aerial photographic lineaments project through the central and eastern sectors of LANL. It is not clear whether these lineaments correlate with surface exposures or subsurface projections of the Rendija Canyon, Guaje Mountain, and Sawyer Canyon faults. Dransfield and Gardner (1985) hypothesizes that the lineaments could correlate to surficial manifestations of eroded fracture zones propagating upward from the subsurface trace of the faults. At the time of Dransfield and Gardner's publication, LANL had not yet undertaken a detailed surficial mapping campaign to verify the southern extent of surface traces of these antithetic components of the Pajarito fault system. It has also been hypothesized that these lineaments may be subsurface paleotopographic features related to either old faulting (cf. Lewis et al., 2002) or deposition of geologic units, e.g., the Cerros del Rio basalts in the eastern and central portions of LANL, that predate the deposition of Qbt and Qbo (cf. WoldeGabriel et al., 2001) and are unrelated to recent fault activity.

4 Regional- and Local-Scale Geologic Studies, early 1990s to present

Site-specific geologic studies provide important constraints on the location, size, distribution, and implications of known faults located proximal to TA-16, TA-36, and TA-39. However, the presence of high-hazard category facilities in select areas of LANL have resulted in detailed site-specific local geologic studies only within certain LANL technical areas. As such, detailed geologic investigations have taken place at TA-16 but geologic investigations focused specifically at TA-36 and TA-39 are minimal. This section summarizes key results from local geologic studies that are pertinent to these three sites. Given TA-16's proximal location to the main Pajarito fault, the following summaries focus on fault presence and rupture potential within this zone.

4.1 Kolbe et al. (1994): Evaluation of the Potential for Surface Faulting at the Proposed Mixed Waste Disposal Facility, TA-67

This study's detailed investigations at this site are the closest site-specific studies conducted to TA-36-8 (2.2 mi/3.6 km SSE from TA-67) and TA-39-6 (4.3 mi/6.9 km ESE from TA-67). This study excavated numerous trenches on Pajarito Mesa across the southern extent of the Rendija Canyon fault near TA-67. These trenches show evidence for several near vertical faults within a zone 100 ft (30 m) wide roughly coincident with an aerial photographic lineament along the strike of the easternmost trace of the southern Rendija Canyon fault; displacement is less than 2 ft (0.6 m) down-to-the-west and does not offset the most recent Valles caldera eruptive deposits (e.g. El Cajete pumice). Kolbe et al. (1994) concluded that active faulting on Pajarito Mesa near TA-67 has been absent for at least the last 50-60 ka.

4.2 Reneau et al. (1995): Surficial Materials and Structure at Pajarito Mesa

Similar to the study by Kolbe et al. (1994), the investigations of Reneau et al. (1995) at TA-67 are the closest site-specific studies conducted to TA-36-8 (2.2 mi/3.6 km SSE from TA-67) and TA-39-6 (4.3

mi/6.9 km ESE from TA-67). A proposed mixed waste disposal facility at Pajarito Mesa prompted geologic surface mapping, high-precision total station mapping, and exploratory trenching around TA-67. At the time of this study, it was postulated that young surface faulting associated with the Rendija Canyon fault might trend southward from the Los Alamos townsite, directly through TA-60, TA-48, and TA-64. Previous studies (including Dransfield and Gardner, 1985) had shown southern projections of the Rendija Canyon and Guaje Mountain faults through Pajarito Mesa. The geological mapping and trenching of Reneau et al. (1995) showed that faulting had affected Pajarito Mesa in the past, but the faulting is more complicated than previously inferred by Dransfield and Gardner (1985). Both down-to-the-east and down-to-the-west faulting is seen at Pajarito Mesa. These small faults were identified through conventional geologic mapping and mesa-edge investigations. Their lateral continuity could not be constrained, so these small faults are identified on maps as point-locations of offset on Tshirege Member subunits (cf. Plate 1). A full paleoseismic history was not determined through the trenching investigations of this study, but it was determined that faults did not affect geologic units younger than 50-60 ka. No increase in fracture density across the projections of the Rendija Canyon or Guaje Mountain faults was seen, and a detailed geodetic survey of pyroclastic surge beds showed no displacement of the Bandelier Tuff subunits along the Rendija Canyon fault projection.

4.3 Self et al. (1996): Field excursions to the Jemez Mountains, New Mexico

The bulletin report of Self et al. (1996) compiles information from two separate but interrelated field guides of the Jemez Mountains into a single document. Information presented in Self et al. (1996) includes a field guide developed to support the 1989 International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI), complete with stop locations and information on geologic observations and conditions at those locations. This road log included three specific stops along NM Highway 4 at and near Ancho Canyon, and adjacent to the public highway access to LANL's TA-39. These road logs indicate that in this area, Qbt thickens from a few meters to over 200 m thick over a lateral distance of less than 1 km, due to paleotopography. At the NM Highway 4 road cut south of the TA-39 access road, correlative with IAVCEI's Stop 21, the oldest Qbt subunit is exposed, which is expressed as a bedded, crystal-rich tuff occurring between welded and vapor-phase altered horizons. The road log neither notes nor describes any faults or related geologic structures at the Ancho Canyon locations.

4.4 Reneau and McDonald (1996): Landscape History and Processes on the Pajarito Plateau, Northern New Mexico

Reneau and McDonald (1996) developed a guidebook in support of a field trip organized by the Friends of the Pleistocene. This guidebook offers a broad summary of studies related to the recent geologic and geomorphic history of the Pajarito Plateau. Within the Day 1 road log, a number of stops describe details of the geology and geomorphology near Ancho Canyon and TA-39. The field guide notes that Ancho Canyon within TA-39 exposes both the Tshirege and Otowi Members of the Bandelier Tuff, and dacite-rich alluvial deposits exist between those units in some canyon wall exposures. Similar to that reported by Self et al. (1996), Reneau and McDonald (1996) describe in additional detail the paleodrainage systems preserved in outcrop, as well as the classic roadcut exposure of Qbo, a thin colluvial soil, the Tsankawi Pumice, and the nonwelded Tshirege Member subunit Qbt1-g. Within Qbt1-g at this location are distinct zeolitized zones, thought to have formed due to hydrolysis of the vitric ash in a saturated environment shortly after deposition. The zeolitization expressed at this particular roadcut is not isolated to this location, but is thought to be prevalent across the Pajarito Plateau. The road log neither notes nor describes any faults or related geologic structures at the Ancho Canyon locations; other portions of the road log and field guidebook include extensive discussions on faults in other locations.

4.5 Gardner et al. (2001): Geology of the Pajarito fault zone in the vicinity of S-Site (TA-16), Los Alamos National Laboratory, Rio Grande rift, New Mexico

Gardner et al. (2001) gathered structural geologic data for the TA-16 region of LANL using high-precision geologic mapping, conventional geologic mapping, stratigraphic studies, drilling, and petrologic studies. This study found that in the TA-16 region, the Pajarito fault is comprised of four clearly definable sets of structures: north trending faults and one large monocline marking the main zone of deformation of the Pajarito fault system, and defining a graben in the southwestern corner of the technical area; north-northeast trending faults and fissures which bound the eastern side of the graben; northeast trending structures, dominated by two down-to-the-west monoclines; and an east-southeast trending fault. These structural elements are similar to those identified and mapped farther north along the Pajarito fault system by Gardner et al. (1999). In addition, the study recognized similar variable styles of deformation on structures as reported by Gardner et al. (1999), and as such, Gardner et al. (2001) interpreted all structures in the study area to be related to deeper seated normal faulting. In general, the structural setting of TA-16 appears similar in many respects to the setting of TA-3 to the north (Gardner et al., 1999). At both locations a relatively narrow graben, about 1000 feet wide, lies at the base of and parallel to the main escarpment of the Pajarito fault. Structure to the east of the narrow graben is dominated by north-northeast and northeast trending normal faults and monoclines, all of which show significant net down-to-the-west displacements on Bandelier Tuff. To the west of TA-16, the main Pajarito fault exhibits evidence for approximately 400 ft (122 m) of displacement in the last 1.256 million years.

4.6 Lewis et al. (2002), Geology of the Western Part of Los Alamos National Laboratory (TA-3 to TA-16), Rio Grande Rift, New Mexico

Lewis et al. (2002) collected data to improve the understanding of the geology, stratigraphy, geomorphology, and geologic structure of LANL from TA-3 to TA-16 using similar methods to those employed by Gardner et al. (2001), including high-precision geologic mapping, conventional geologic mapping, stratigraphic studies, drilling, and petrologic studies. This study also included logging of a gas pipeline trench at TA-9, on the north side of Canon del Valle from TA-16-388. This study produced a detailed geologic and structural map of the TA-3 to TA-16 area, and found that in northern TA-16, faulting is present but distributed, and includes short-length, small-displacement subparallel segments oriented predominantly north-south.

4.7 Lewis et al. (2009), Fault interaction and along-strike variation in throw in the Pajarito fault system, Rio Grande rift, New Mexico

This study aggregated, synthesized, and published in a peer-reviewed journal the detailed geologic mapping performed by Gardner et al. (1999, 2001), Lewis et al. (2002), and others. Furthermore, the study analyzed the variation in fault displacement, or throw, at different locations along the fault's length from its southern termination near Cochiti to its northern boundary near Santa Clara Canyon, in order to assess the interaction of the Pajarito fault system with neighboring fault systems within the Rio Grande rift. The paper also presented previously unpublished analyses on past earthquake timing and recurrence on the Pajarito fault system.

4.8 Lettis Consultants International, Inc. (2019), Pajarito Fault System Paleoseismic Trenching Project: Phase 1 Report, Los Alamos, New Mexico

Under subcontract to LANL, Lettis Consultants International Inc. conducted a paleoseismic trenching project that involved detailed geologic and geomorphic mapping for trench siting, trench excavation and logging, and detailed post-fielding analysis including samples to establish ages of paleoseismic events identified in the trenches. The report includes discussion on two trenches excavated in the extreme western portions of TA-16, approximately 8,200 ft (2.5 km) SSW of TA-16-388, on an antithetic down-to-the-west fault facing the main Pajarito fault. Both trenches at the TA-16 site contained evidence for a single Holocene paleoearthquake at this site, but the timing of this most recent event (MRE) at this site is poorly constrained using optically-stimulated luminescence age dating techniques on quartz grains taken from within and above the fault plane. The stratigraphic and relative age data developed within the two trenches at the TA-16 site suggest the MRE occurred less than 5.7 ka, and involved approximately 5.9 - 7.9 in (15-20 cm) of dip displacement across the fault at this location. The study also includes discussion of scientific analyses and assessments from four additional trenches in two separate sites west of West Jemez Road/NM Highway 501. In contrast to the conclusions of Lewis et al. (2009), the work of Lettis Consultants International Inc. concludes that paleoseismic analyses from modern trenches on multiple strands of the main Pajarito fault shows evidence for only one Holocene earthquake.

4.9 Microseismic Monitoring and Analyses

The Los Alamos Seismic Network (LASN), owned and operated by Los Alamos National Laboratory's Seismic Hazards Program, maintains 14 seismic stations in and around Los Alamos County (Figure 3). The most recent update to the LASN catalogue includes events recorded through 2013 (ref?). All earthquakes identified in the LANL area via the LASN have magnitudes of 3 or less, and most appear to cluster in two zones: (1) the northern part of the Pajarito fault system, where the fault becomes broadly distributed into a "horsetail" splay of small-displacement subparallel segments, and (2) east of Los Alamos through the Rio Grande Basin, possibly associated with the Rio Grande rift. No earthquake epicenters are mapped within 3,000 ft (914 m) of any of the three locations considered for permit within this memorandum. The closest earthquake epicenter to any of the three sites is located approximately 8,200 ft (1.6 mi; 2.5 km) WSW of TA-39-6. This event, recorded on 29 July 2013, was a M 0.2 at 7.1 mi (11.4 km) depth, and is not correlated to a mapped geologic fault.

5 Local Geologic and Faulting Conditions at TA-16, TA-36, and TA-39

This section describes a series of figures [plates] focused around each of the three facilities under consideration. These figures [plates] include the facility intended for permitting, mapped surface faults, and various distance buffers around the facility per 40 CFR 270.14(b)(11)(A)(2). Facility-specific discussions on the information shown in these figures are included below.

Plate 1 shows the three sites proposed for permit with 5-mile (8 km) buffers plus mapped surficial faults (Lewis et al. 2009). The surficial faults shown on Plate 1, published by Lewis et al. (2009), represent the most recent and detailed state of knowledge of the surficial expression of the Pajarito fault system near LANL. Mapping of the Pajarito fault system was done at 1:1,200 scale by personnel with a detailed knowledge of structural geology and Bandelier Tuff Tshirege Member subunits, and represents a culmination of many years of research, verification, and updating by the LANL Seismic Hazards Geology Team. Large portions of the Pajarito fault system fall within five miles of TA-16-388 and TA-36-8, according to the buffers shown on Plate 1. Fewer faults fall within the five-mile buffer surrounding TA-39-6. Lineaments identified by Vaniman and Wohletz (1990) and Wong et al. (1995) fall within 3,000 ft (914 m) of each site (Plates 2, 3, and 4).

5.1 Local Geologic and Faulting Conditions at TA-16-388

Plate 2 presents TA-16-388 with a 3,000 ft (914 m) and 200 ft (61 m) buffers surrounding the site (as mandated by 40 CFR 270.14(b)(11)(A)(2)), plus mapped surficial faults (Gardner et al., 2001; Lewis et al., 2002; Lewis et al. 2009), mapped lineaments (Vaniman and Wohletz 1990; Wong et al. 1995), and any other identified point-location offsets on geologic contacts. The data are shown atop both orthoimagery and digital elevation model base data. Numerous faults, a mapped lineament, and point-location offsets fall within the 3,000 ft (914 m) buffer; no lineaments, faults, or offsets are mapped within the 200 ft (61 m) buffer. The local geology consists of the uppermost subunits of Qbt and old alluvium (Qoal), as well as regions of colluvium (Qc) and disturbed lands.

The faults mapped by Lewis et al. (2002) that fall within the 3,000 ft buffer have varying displacement directions, with some faults expressing down-to-the-west motion while others express down-to-the-east motion. Maximum displacement of any fault within the 3,000-ft buffer is 5 ft (1.5 m). The 3,000-ft buffer region also includes an observed synclinal hinge, a small U-shaped fold or geostructural low with linear continuity that rocks on either side dip toward.

Identified point-location offsets on Bandelier Tuff Tshirege Member subunits from Lewis et al. (2002) fall within the 3,000 ft buffer. These identified offsets were measured using the high-precision geologic contact mapping methods described in that study, and are shown as point-locations because those particular faults were found to have trace lengths of 16 ft (5 m) or less, and lacked stratigraphic observations to estimate displacement and lateral continuity. The faults have various senses of displacement (both down-to-the-east and down -to-the-west), but the majority of faults within the 3,000-ft buffer have down-to-the-west displacement. The greatest amount of displacement (in any sense) within the 3,000-ft buffer is 3 ft. This map shows no mapped faults within the 200-ft buffer.

5.2 Local Geologic and Faulting Conditions at TA-36-8

Plate 3 presents TA-36-8 with a 3,000-ft (914-m) and 200-ft (61-m) buffers surrounding the site (as mandated by 40 CFR 270.14(b)(11)(A)(2)), plus mapped surficial faults (Lewis et al. 2009), mapped lineaments (Vaniman and Wohletz 1990; Wong et al. 1995), and any other identified point-location offsets of geologic contacts. Three mapped lineaments fall within the 3,000 ft (914 m) buffer; these lineaments trend primarily NNW-SSE and are located to the north and east of TA-36-8. No lineaments, faults, or offsets are identified or mapped within the 200 ft (61 m) buffer. This technical area has not been mapped in detail by LANL geologists.

5.3 Local Geologic and Faulting Conditions at TA-39-6

Plate 4 presents TA-39-6 with a 3,000-ft (914-m) and 200-ft (61-m) buffers surrounding the site (as mandated by 40 CFR 270.14(b)(11)(A)(2)), plus mapped surficial faults (Lewis et al. 2009), mapped lineaments (Vaniman and Wohletz 1990; Wong et al. 1995), and any other identified point-location offsets of geologic contacts. Only a single mapped lineament falls within the 3,000 ft (914 m) buffer; this lineament is west of TA-39-6 and oriented predominantly N-S. No lineaments, faults, or offsets are mapped within the 200 ft (61 m) buffer. This technical area has not been mapped in detail by LANL geologists.

5.4 Summary

Based on the available data presented here, small faults are present within 3,000 ft of TA-16-388 (Plate 2). The fault segments within this 3,000 ft buffer have short along-strike lengths, and as such they empirically are not independently seismogenic (*cf*. Wells and Coppersmith, 1994). No earthquake epicenters have been identified on those fault segments (Figure 3). The detailed geologic mapping data from Lewis et al. (2002; 2009) suggests that the undisturbed geologic materials present at the TA-16-388 site are much older than the Holocene time period, and as such the determination of Holocene fault activity on the fault strands within the 3,000 ft buffer would not be achieved through further field investigations.

It does not appear that faults, or lineations that suggest the presence of a fault, are present within 3,000 feet of TA-36-8 and TA-39-6.

We emphasize that for determining whether any geologic feature is a Holocene fault, conventional field geologic mapping must be employed or consulted to confirm (1) that a lineament is truly a fault, and (2) that it has recent tectonic movement. This validation of regionally-mapped or remotely-observed lineaments in finer scale mapping products is, writ large, the objective of field-based fault investigations, and is underscored locally by Olig et al. (1998) when discussing lineament mapping done by Wong et al. (1995): "The lineaments were identified on aerial photographs or observed during an aerial reconnaissance and field-checked at a reconnaissance level. However, this generalized map [by Wong et al, 1995] …should be considered preliminary in nature until a more comprehensive and detailed surficial mapping of LANL is completed." Therefore, the comprehensive geologic observations of Reneau and McDonald (1996), Self et al. (1996), and the detailed geologic mapping of Gardner et al. (2001), Lewis et al. (2002), and Lewis et al. (2009) clarify the geologic and faulting conditions of the area.

6 Field Reconnaissance at TA-16, TA-36, and TA-39

In April 2022, site-specific geologic field-based reconnaissance was performed by LANL geologists Emily Schultz-Fellenz, Elizabeth Miller, and Brandon Crawford, supported by staff from LANL's Environmental Protection and Compliance Division, at TA-16-388, TA-36-8, and TA-39-6. The reconnaissance at these sites consisted of re-examining previous geologic observations where available, performing geologic observations and documentation of geologic units and features present in the 3,000 ft radius area (including faults or lineaments), and determination of (a) whether young (< 1.25 Ma, younger than the Bandelier Tuff) geologic materials are present and (b) whether those young materials preserve information related to Holocene activity on nearby faults. Pristine preservation of geologic deposits younger than the Bandelier Tuff are necessary to determine whether faults have had Holocene-age activity.

6.1 Field Reconnaissance at TA-16-388

Reconnaissance activities at TA-16-388 did not identify any faults within the 200 ft buffer surrounding the "Flash Pad" location. Field observations included visual reconnaissance of the Lewis et al. (2009) mapped faults and the Vaniman and Wohletz (1990) mapped lineament that fall within the 3,000 ft buffer as shown on Plate 2. The field reconnaissance visited and viewed the eight point-locations of offset mapped by Lewis et al. (2009) that fall within approximately a 1,000 ft radius of TA-16-388. Seven of the eight locations – those located north, west, and south of the proposed unit – had either Qbt bedrock outcropping at the ground surface, or less than 3" of younger geologic materials, and limited to no soil development atop Qbt. One of the eight locations – east of the proposed unit – had El Cajete pumice present in the overlying unit, but the unit was thin (less than 4 in thickness) and its absolute age was not able to be determined.

The lineament mapped by Vaniman and Wohletz (1990) was not found to exist as a surface fault, and field observations did not identify geologic, topographic, or fracture density changes along the lineament that would be consistent with the presence of a fault where that feature is mapped. The locations of the faults mapped by Lewis et al. (2009) were confirmed. The mapped faults in the northwestern quadrant of the 3,000 ft buffer of Plate 2 were identified and expressed through Qbt subunit displacement visible within canyon exposures. These faults do not appear to physically correlate with the presence of younger geologic materials, and as such the ages of most recent activity on these faults cannot be determined.

Features observed during field reconnaissance at TA-16-388 can be seen in Plates 2(c) and 2(d).

6.2 Field Reconnaissance at TA-36-8

Reconnaissance activities at TA-36-8 did not identify any faults within the 200 ft buffer surrounding the proposed unit. Field observations identified that Qbt comprises much of the area shown in Plate 3, and in select regions has a thin cover of Quaternary colluvium and fan material that contained reworked El Cajete pumice. However, no Holocene-aged soils were identified during the TA-36-8 field reconnaissance. The field investigations focused on determining whether the two mapped lineaments from Wong et al. (1995) – located to the east of the proposed unit – were faults. The field observations did not identify geologic, topographic, or fracture density changes along these lineaments that would be consistent with the presence of throughgoing faults. The field reconnaissance identified new faults in the northern portions of the 3,000 ft buffer, but only one showed evidence of southward continuation beyond Potrillo Canyon.

Features observed during field reconnaissance at TA-36-8 can be seen in Plates 3(c) and 3(d).

6.3 Field Reconnaissance at TA-39-6

Reconnaissance activities at TA-39-6 represent the first site-specific bedrock and fault geologic investigations undertaken at TA-39 by the LANL Seismic Hazards Program. Exposed units in the region shown in Plate 4 are Qbt subunits 1g, 1v, and 2 (cf. Broxton and Reneau, 1995). Geologic contacts visible in the area appear flat or gently (2-3°) east-dipping, consistent with undisturbed units on the Pajarito Plateau. Throughout the area, Qbt is exposed at the ground surface, and no younger deposits or soils are present. The field investigation focused on two principal objectives: (1) determining whether the single mapped lineaments from Wong et al. (1995) – mapped to the west of the proposed unit – was a fault, and (2) determining whether any other faults may exist. With regards to determining whether the Wong et al. (1995) lineament was a fault, the team's field observations along and in the vicinity of that mapped feature did not identify geologic, topographic, or fracture density changes that would be consistent with the presence of a throughgoing fault. The field reconnaissance identified two faults NW of TA-39-6. These faults have very short lengths (< 500 ft along strike) and displacements of less than 10 ft, and appear to form a narrow graben. Across these faults, Qbt outcrops directly at the ground surface and no geologic materials younger than Qbt were present. These faults did not continue south into the south fork or north into the main stem of Ancho Canyon, and do not connect to other, larger structures associated with the Pajarito fault system.

Features observed during field reconnaissance at TA-39-6 can be seen in Plates 4(c) and 4(d).

7 Overall Summary

Geologic investigations identified that faults are present within 3,000 ft of all three sites, but no site has faults within 200 ft and none contain sufficient young geologic material to determine whether the faults have had Holocene activity. Several small (both in length and total displacement) fault segments and lineaments are identified within the 3,000 ft (914 m) buffer around TA-16-388 (Gardner et al., 2001; Lewis et al., 2002; Lewis et al., 2009). Overall displacement across all structures within 3,000 ft of TA-16-388 is approximately a net of zero; the region includes both down-to-the-west and down-to-the-east faults of nearly identical displacement, with a maximum of 5 ft (1.5 m) offset on single segments. Displacements mapped as discrete point-locations are present within 3,000 ft of TA-16-388; these are represented as such because they cannot be traced through the stratigraphic section, they cannot be traced laterally across mesa-tops through conventional geologic mapping, and are not found to displace geologic units younger than the Bandelier Tuff. The closest mapped lineament (from Vaniman and Wohletz, 1990) is located northwest of TA-16-388 within the 3,000 ft buffer, and projects southwest, away from the facility, but field reconnaissance revealed that lineament is not a surface-rupturing fault. Bandelier Tuff is exposed at the ground surface, and post-Bandelier Tuff sediments have been stripped from the mesa-top within the 3,000 ft buffer. The absence of undisturbed post-Bandelier Tuff deposits provides no evidence to determine whether Holocene surface rupture has occurred on the fault segments in this area.

Similar to TA-16-388, TA-36-8 and TA-39-6 have mapped faults within 3,000 ft of those locations, but the faults are small (both in length and total displacement) and none project within 200 ft of the sites. Both sites had mapped lineaments that projected within 3,000 ft of the sites, but field reconnaissance revealed those lineaments are not surface-rupturing faults. At these sites, the Bandelier Tuff is exposed at the ground surface throughout the area, and post-Bandelier Tuff deposits do not exist across or adjacent to faults in sufficient quantities to assess the age of most recent fault activity. The positions of TA-36 and TA-39 several miles east of the Pajarito fault system further reduces the likelihood that faults with Holocene seismic surface rupture are present at either of those two locations.

8 Figure and Plate Captions

Figure 1. Overview of the Pajarito fault system in the vicinity of LANL (gray outline). Technical Areas (TA) 16, 36, and 39 are highlighted. The locations of the TA-16-388, TA-36-8, and TA-39-6 sites proposed for permitting are shown as red polygons. PF = Pajarito fault; RCF = Rendija Canyon fault; GMF = Guaje Mountain fault; SCF = Sawyer Canyon fault. Mapped geologic structures (faults; bold purple lines) from Lewis et al. (2009).

Figure 2. Generalized, schematic cross section of the Bandelier Tuff (modified from Broxton and Reneau, 1995).

Figure 3. Overview of the Los Alamos Seismic Network (green triangles) and local earthquakes (1973-2013) relative to the three locations considered for permit within this memorandum. The vicinity of Los Alamos National Laboratory is represented by the gray outline. TA-16-388, TA-36-8, and TA-39-6 are highlighted. PF = Pajarito fault; RCF = Rendija Canyon fault; GMF = Guaje Mountain fault; SCF = Sawyer Canyon fault. Structural mapping (bold purple lines) from Lewis et al. (2009).

Plate 1. Color orthophotography, mapped fault, and mapped lineaments within a 5-mile (8 km) and 3,000 ft (914 m) buffer of the three facilities. Structural mapping (purple lines) from Lewis et al. (2009). Mapped lineaments from Vaniman and Wohletz (1990; pink lines) and Wong et al. (1995; blue lines). While TA-36 and TA-39 are east of the main trace of the Pajarito fault system, TA-16 falls within the hanging-wall (downthrown block) of the main Pajarito fault. See text for further discussion.

Plate 2. Mapped faults and lineaments in the area surrounding TA-16-388 as well as a 3,000 ft (914 m) and 200 ft (61 m) buffer, overlain atop (a) digital elevation model and (b) orthoimagery. Faults published in Lewis et al. (2009; pink lines) include those mapped by Gardner et al. (2001) and Lewis et al. (2002). Lineaments from Vaniman and Wohletz (1990; blue lines). Five faults and one lineament fall inside or project into the 3,000 ft (914 m) buffer around TA-16-388. None project within 200 ft (61 m) of the facility. Nine point-location offsets are identified within the 3,000 ft (914 m) buffer and were mapped by high-precision geodetic studies (Lewis et al., 2002). While a small fault segment is co-located with the southern termination of the single mapped lineament, no offset locations fall along mapped lineaments. Following completion of field reconnaissance in April 2022, site geologic observations are overlaid atop (c) digital elevation model and (d) orthoimagery. See text for further discussion.

Plate 3. Mapped faults and lineaments in the area surrounding TA-36-8 as well as a 3,000 ft (914 m) and 200 ft (61 m) buffer, overlain atop (a) digital elevation model and (b) orthoimagery. Faults published in Lewis et al. (2009; pink lines); lineaments from Wong et al. (1995; blue lines). Three lineaments fall inside or project into the 3,000 ft (914 m) buffer around TA-36-8. None project within 200 ft (61 m) of the facility. No mapped faults or point-location offsets are identified within the 3,000 ft (914 m) buffer. Following completion of field reconnaissance in April 2022, site geologic observations are overlaid atop (c) digital elevation model and (d) orthoimagery. See text for further discussion.

Plate 4. Mapped faults and lineaments in the area surrounding TA-39-6 as well as a 3,000 ft (914 m) and 200 ft (61 m) buffer, overlain atop (a) digital elevation model and (b) orthoimagery. Faults published in Lewis et al. (2009; pink lines); lineaments from Wong et al. (1995; blue lines). One lineament falls inside the 3,000 ft (914 m) buffer around TA-39-6. None project within 200 ft (61 m) of the facility. No mapped faults or point-location offsets are identified within the 3,000 ft (914 m) buffer. Following completion of field reconnaissance in April 2022, site geologic observations are overlaid atop (c) digital elevation model and (d) orthoimagery. See text for further discussion.

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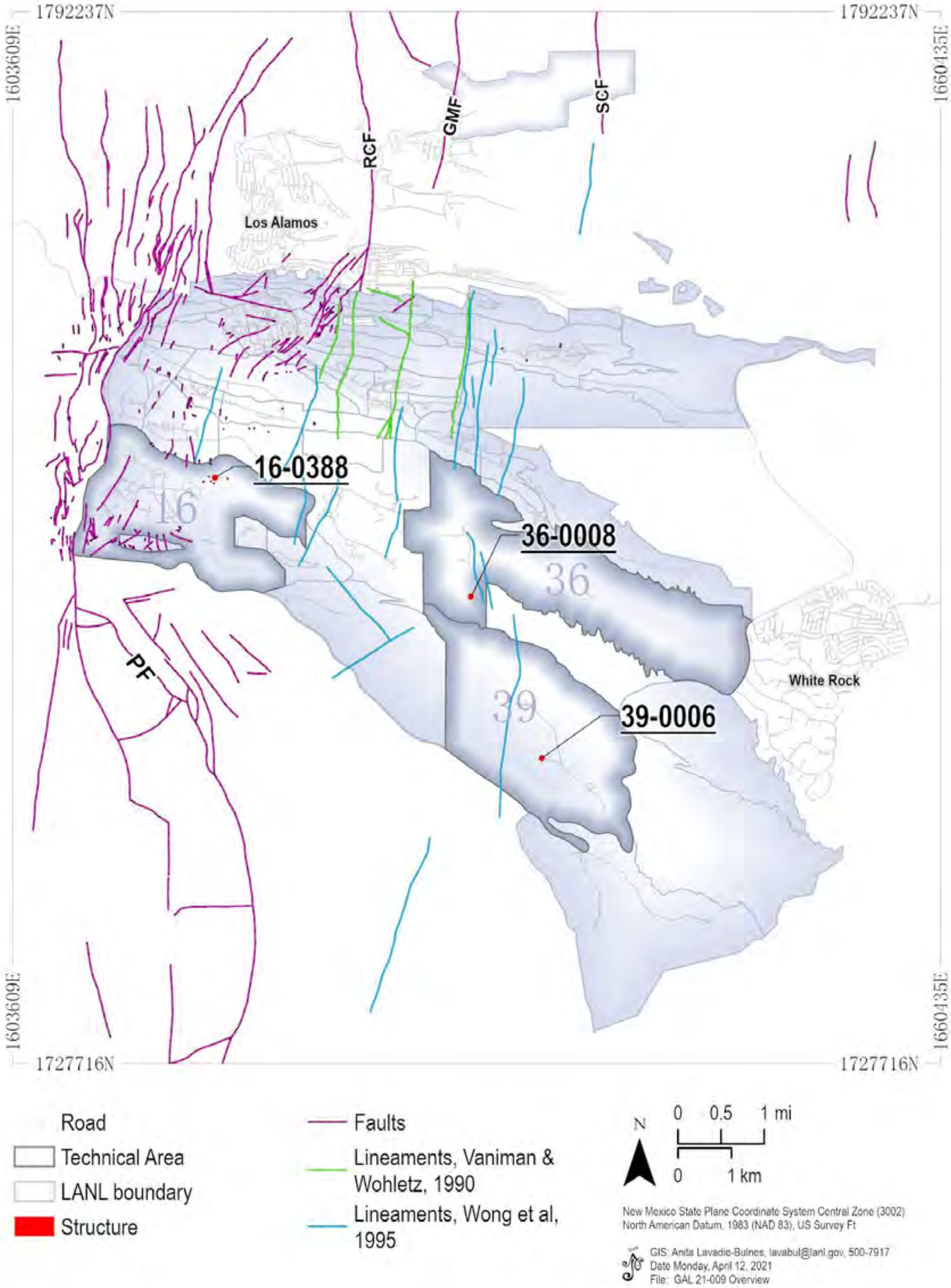
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Los Alamos
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16
36-0008
36
39
39-0006
White Rock
PF
Road
Technical Area
LANL boundary
Structure
Faults
Lineaments, Vaniman & Wohletz, 1990
Lineaments, Wong et al, 1995
N
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New Mexico State Plane Coordinate System Central Zone (3002)
North American Datum, 1983 (NAD 83), US Survey Ft
GIS: Anita Lavadie-Bulnes, lavabul@lanl.gov, 500-7917
Date Monday, April 12, 2021
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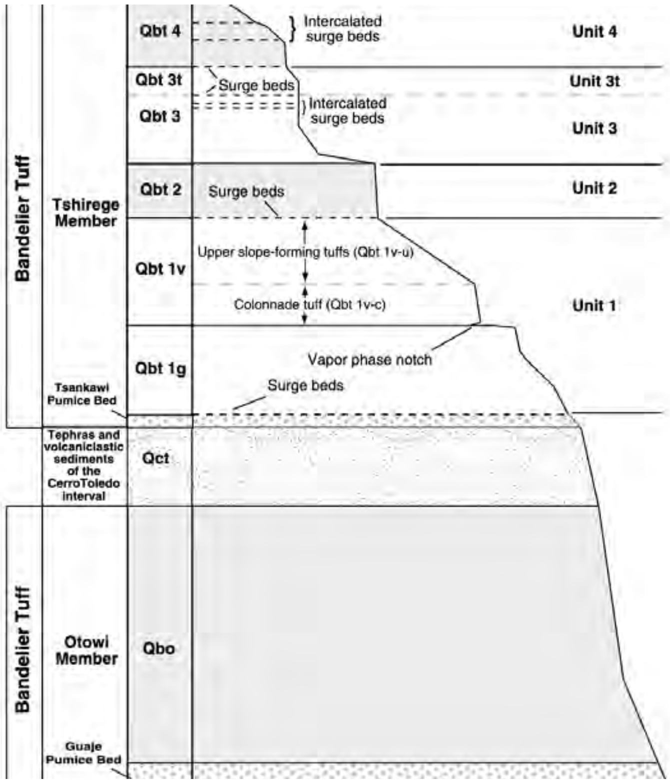
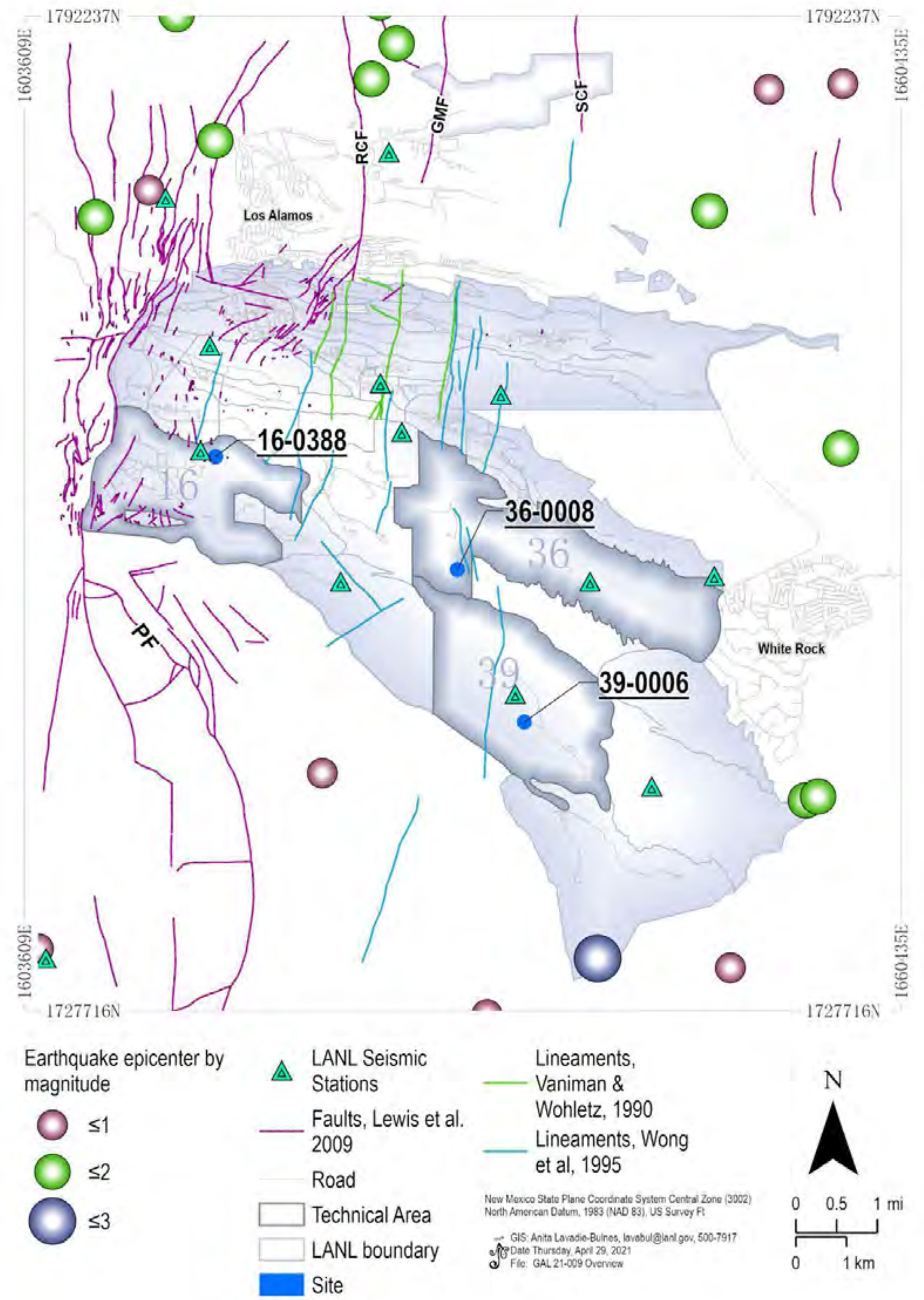
Figure 1.



Bandelier Tuff
Tshirege Member
Qbt 4
Intercalated surge beds
Unit 4
Qbt 3t
Surge beds
Unit 3t
Qbt 3
Intercalated surge beds
Unit 3
Qbt 2
Surge beds
Unit 2
Qbt 1v
Upper slope-forming tuffs (Qbt 1v-u)
Colonnade tuff (Qbt 1v-c)
Unit 1
Qbt 1g
Vapor phase notch
Surge beds
Tsankawi Pumice Bed
Tephras and volcaniclastic sediments of the CerroToledo interval
Qct
Bandelier Tuff
Otowi Member
Qbo
Guaje Pumice Bed

Figure 2.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RCF
GMF
SCF
PF
Los Alamos
White Rock
16-0388
36-0008
39-0006
16
36
39
Earthquake epicenter by magnitude
≤1
≤2
≤3
LANL Seismic Stations
Faults, Lewis et al. 2009
Road
Technical Area
LANL boundary
Site
Lineaments, Vaniman & Wohletz, 1990
Lineaments, Wong et al, 1995
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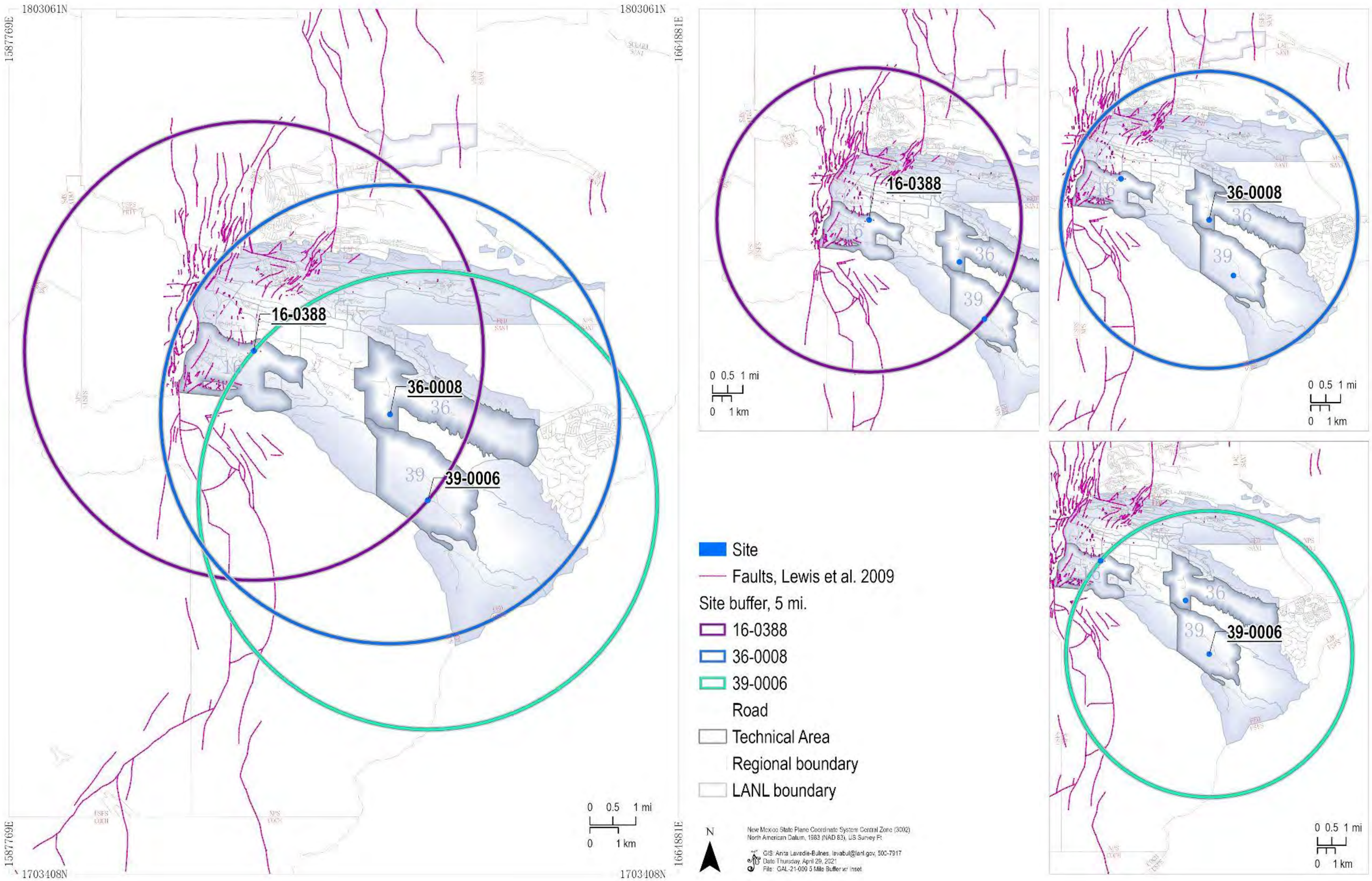
0 1 km

Figure 3.



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16-0388
36-0008
39-0006
36
39
0 0.5 1 mi
0 1 km
Site
Faults, Lewis et al. 2009
Site buffer, 5 mi.
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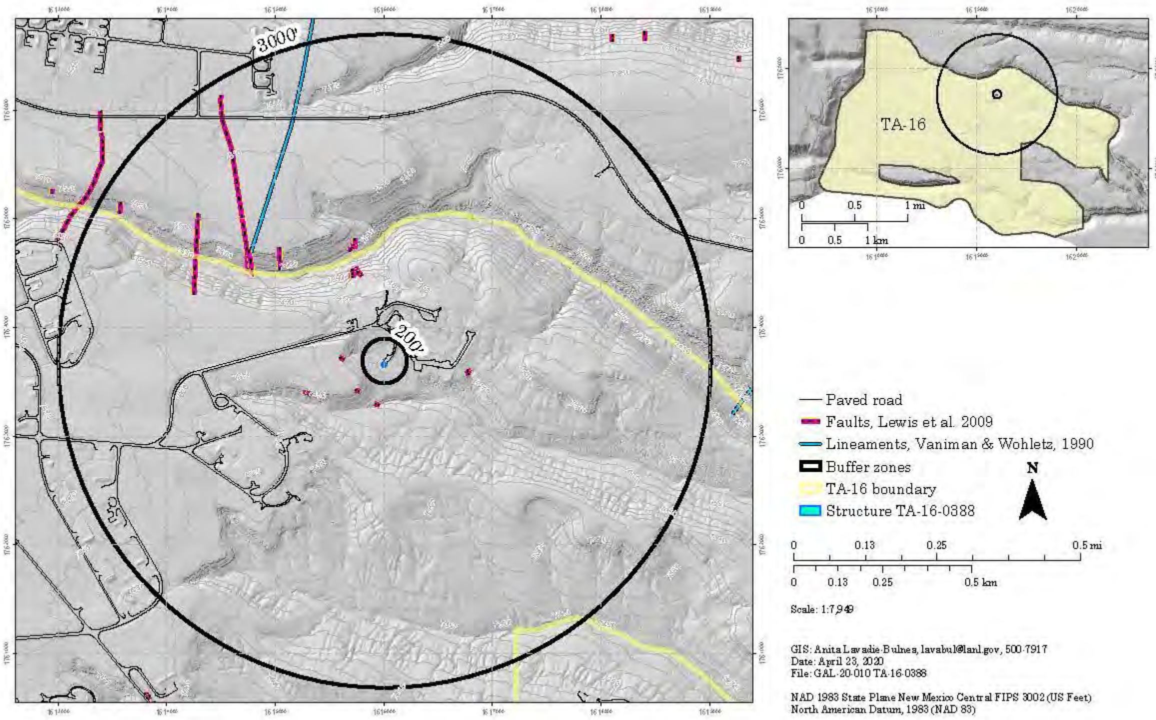
36-0008
39-0006
Road
Technical Area
Regional boundary
LANL boundary
N

Plate 1.

(a)



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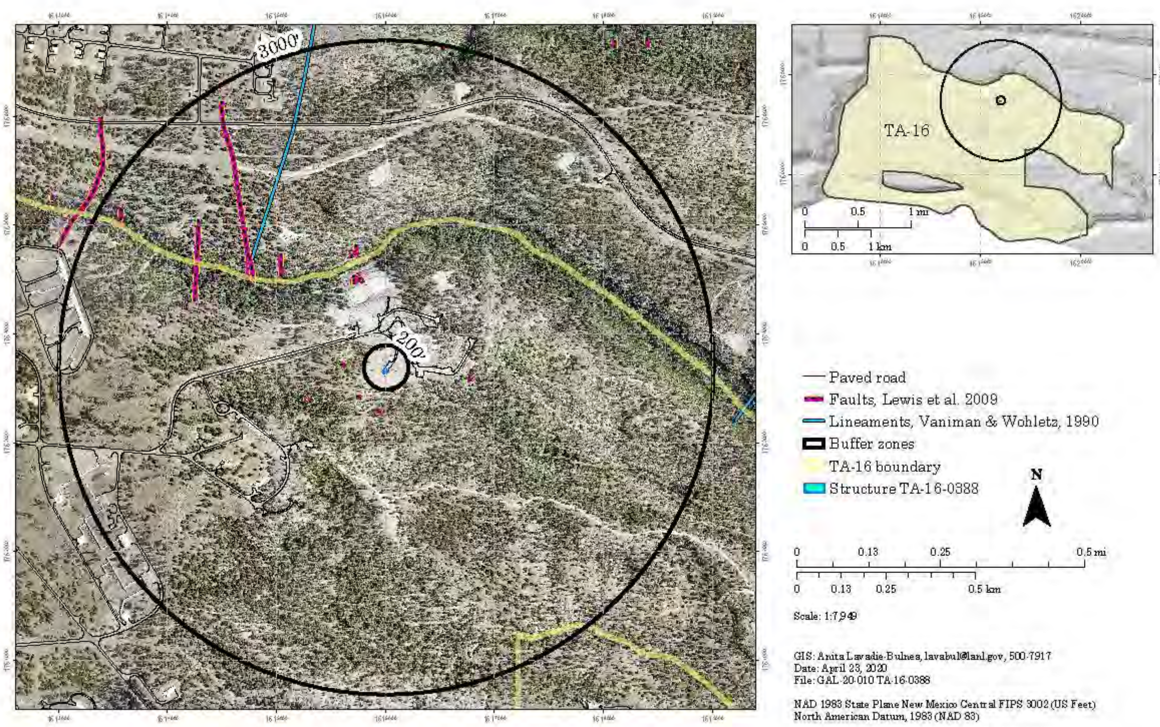
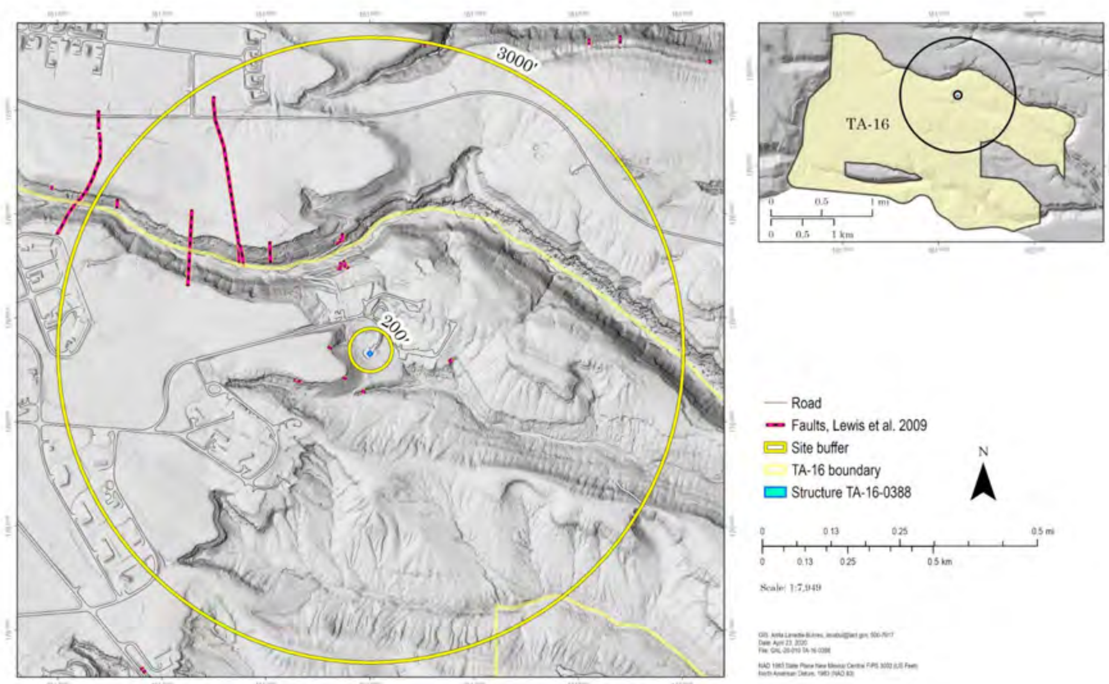


Plate 2. TA-16-388 (a) digital elevation model; (b) imagery.

(c)



(d)

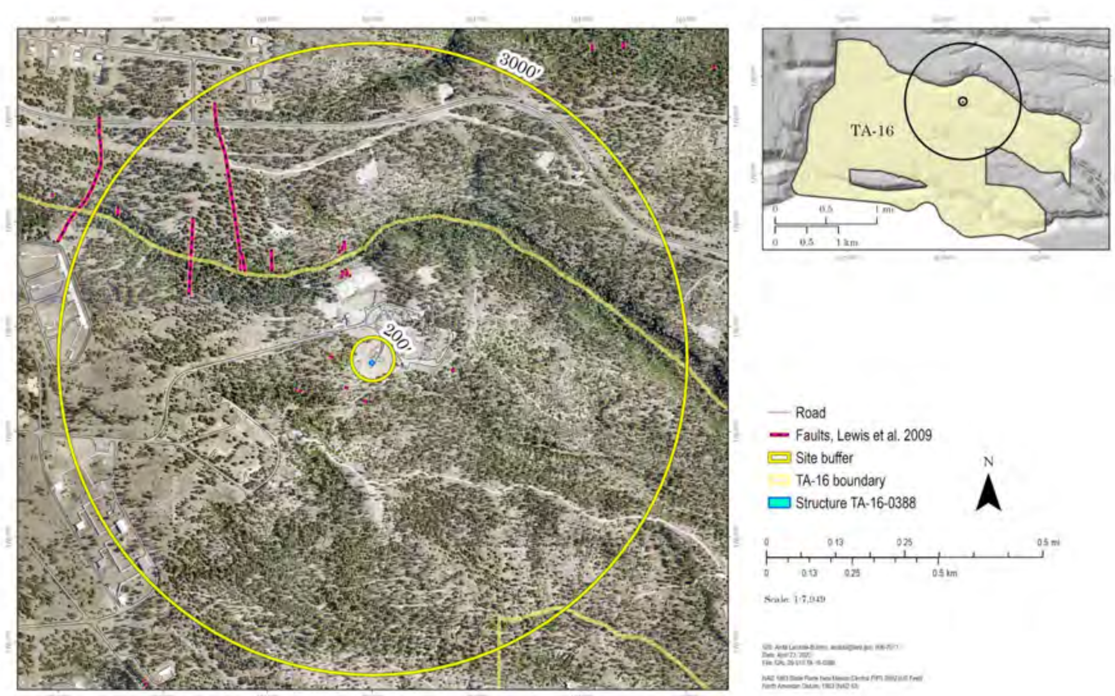


Plate 2. (c) digital elevation model and (d) imagery maps of TA-16-388 showing features observed during field reconnaissance.

(a)

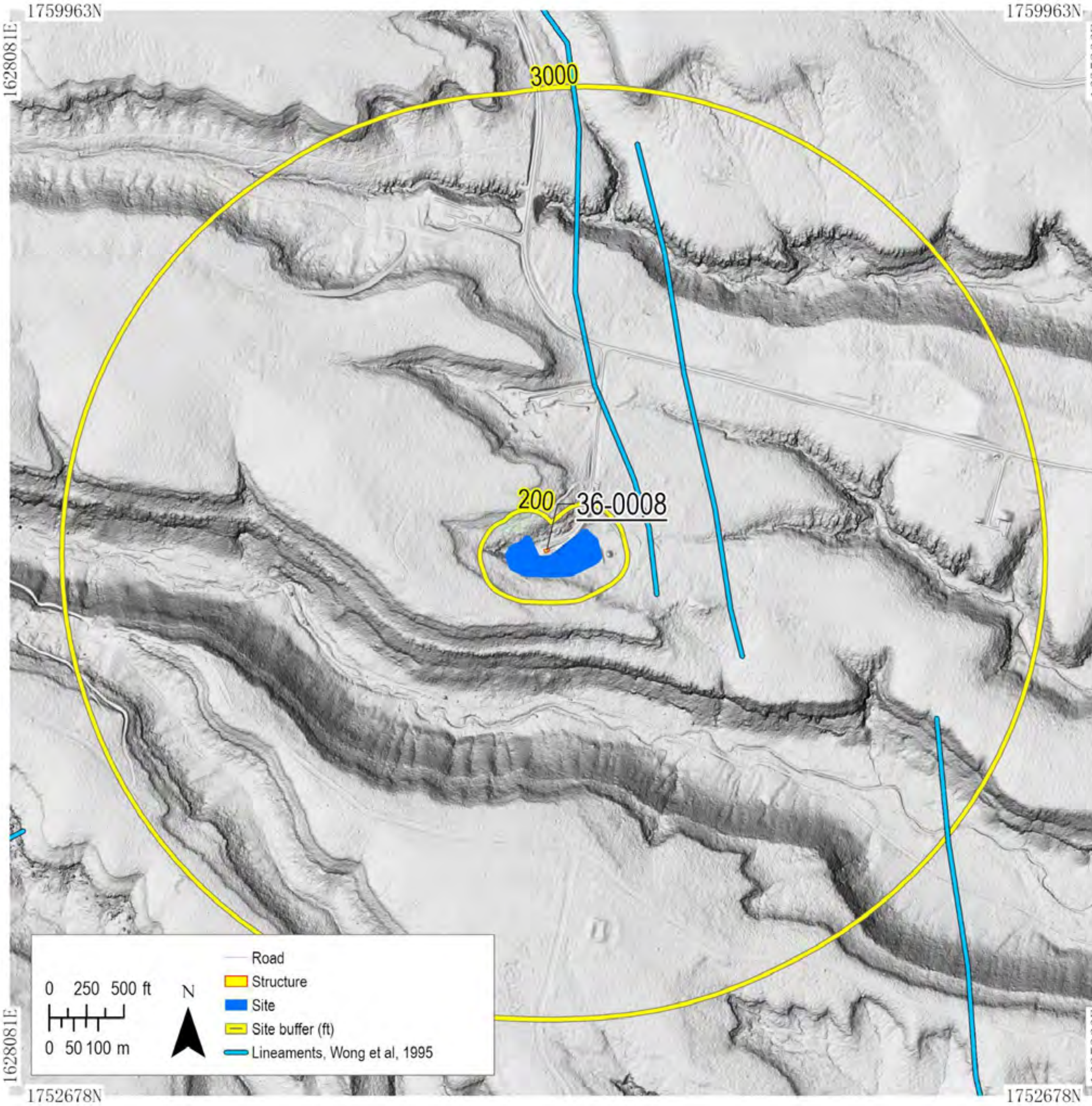


Plate 3. TA-36-8 (a) digital elevation model

(b)

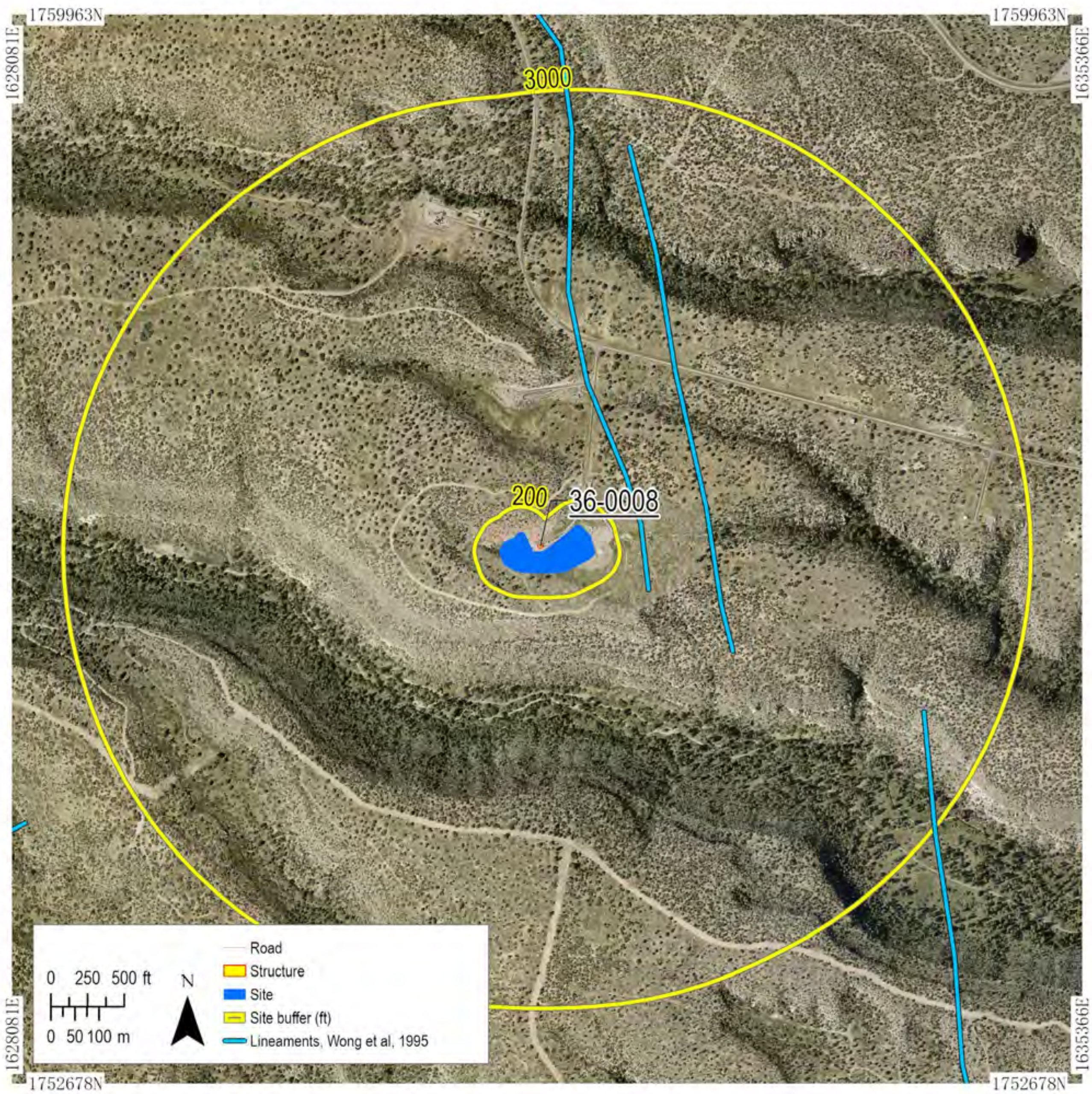


Plate 3. TA-36-8 (b) imagery.

(c)

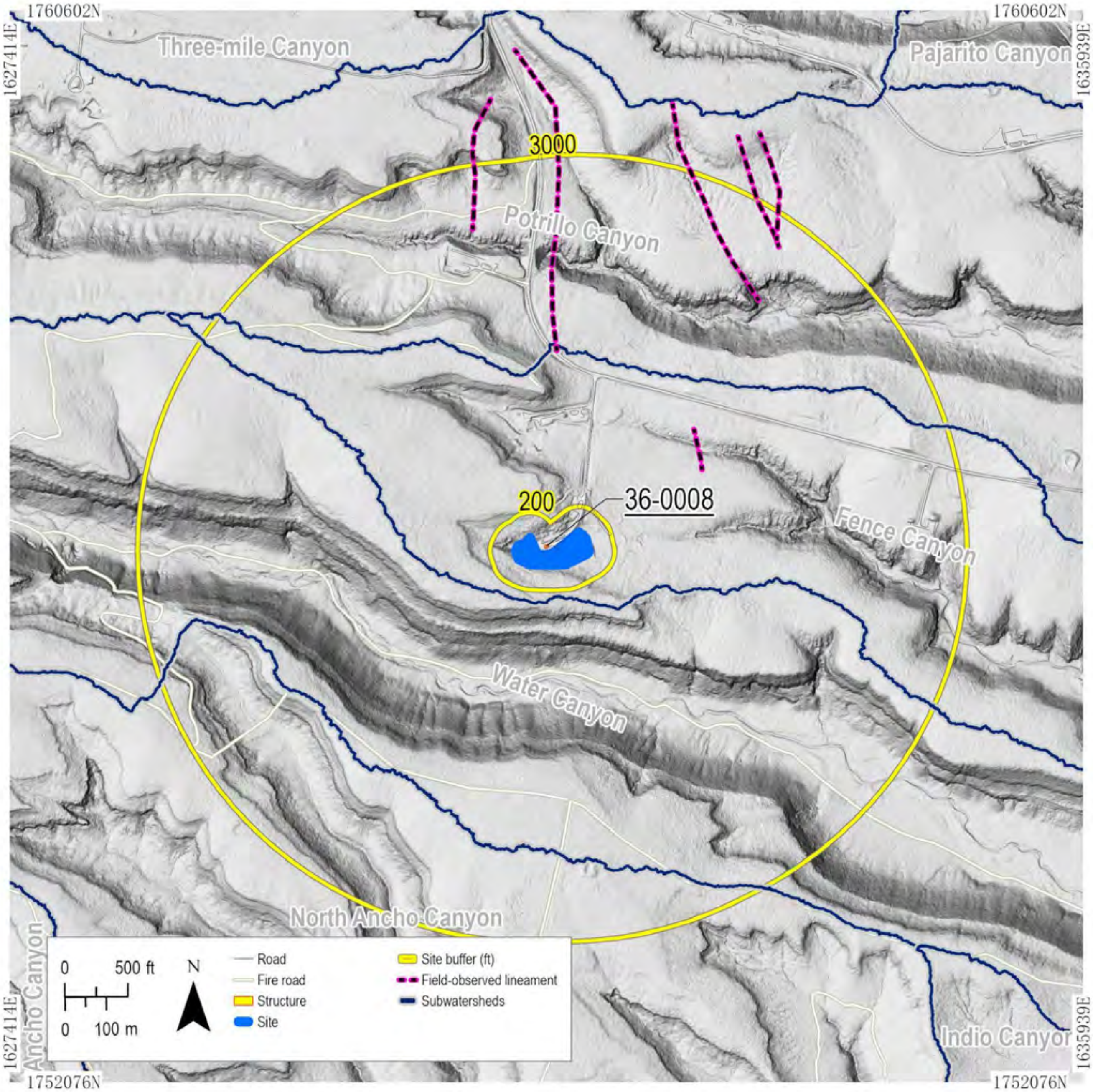


Plate 3. TA-36-8 (c) digital elevation model map showing features observed in field reconnaissance

(d)

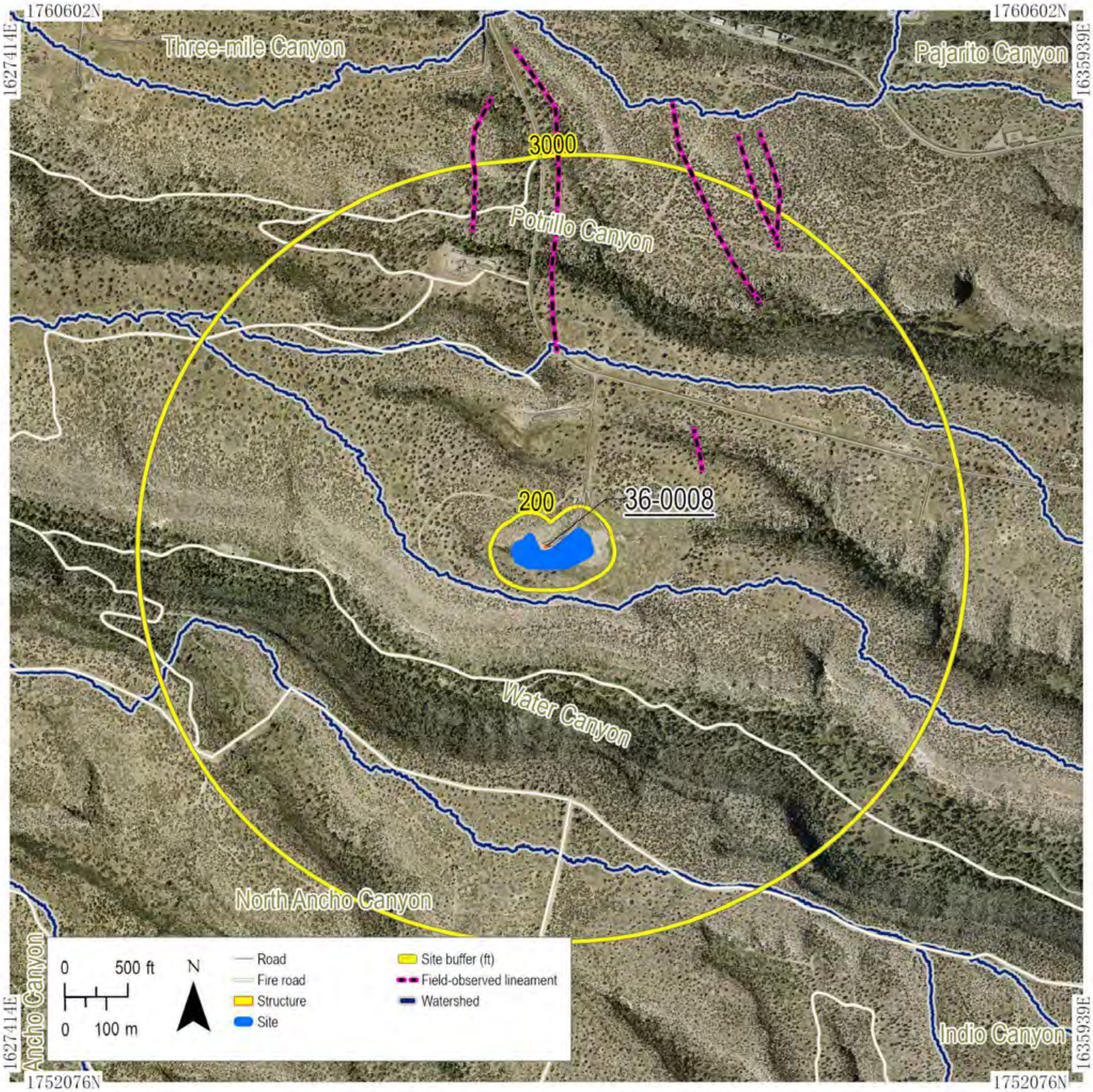


Plate 3. TA-36-8 (d) imagery map showing observations from field reconnaissance

(a)

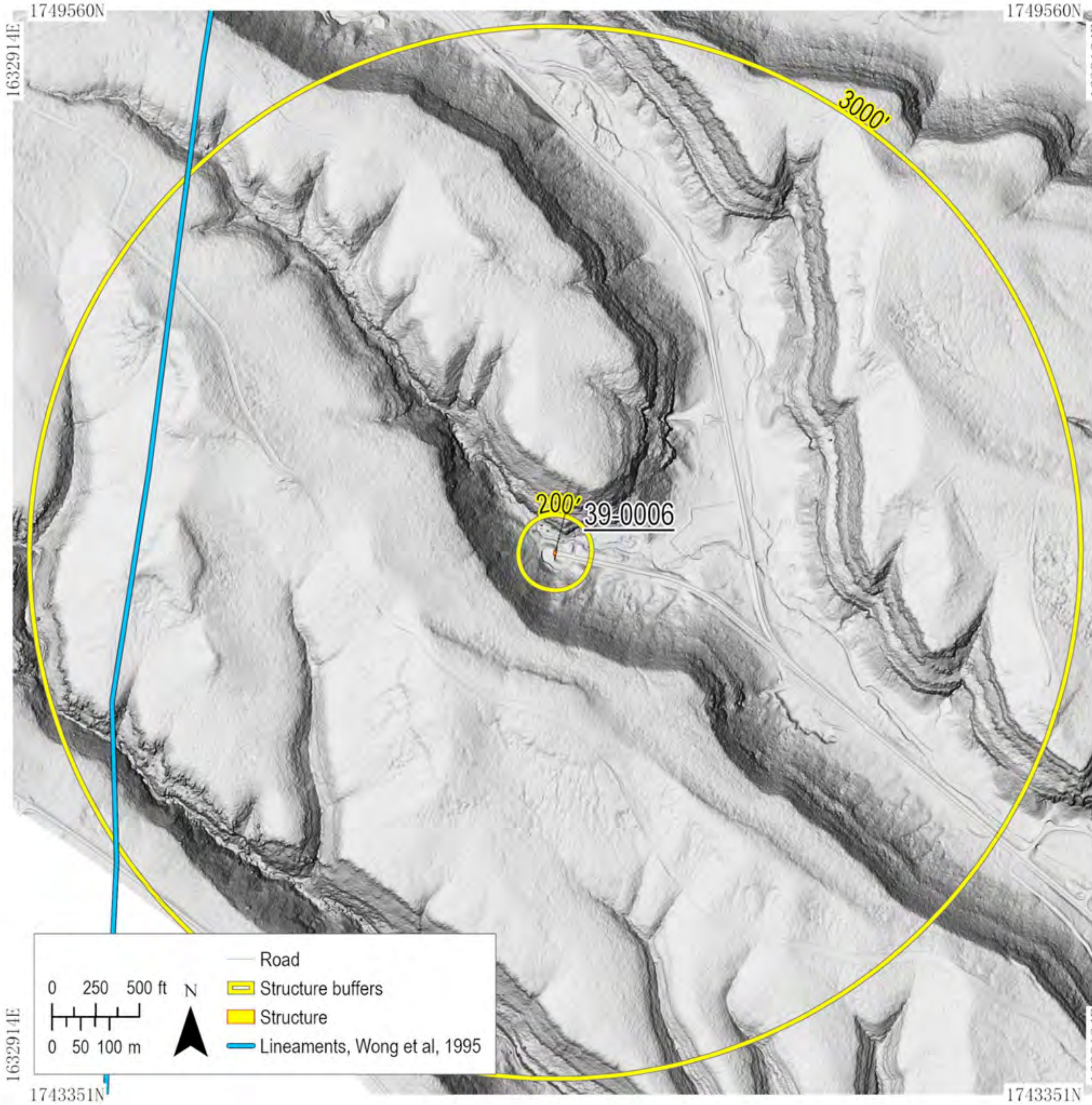


Plate 4. TA-39-6 (a) digital elevation model

(b)

Plate 4. TA-39-6 (b) imagery.

(c)

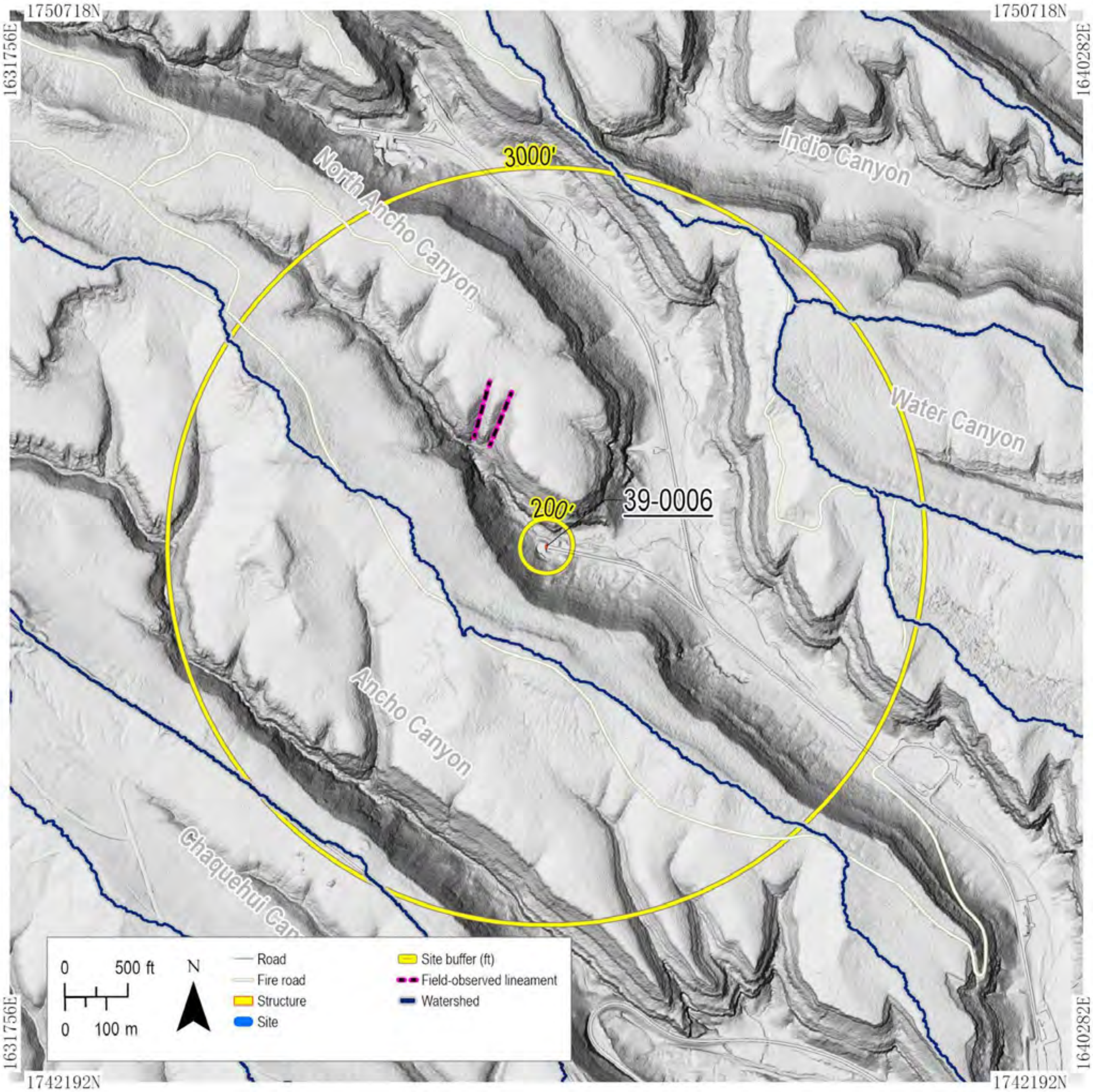


Plate 4. TA-39-6 (c) digital elevation model map showing observations from field reconnaissance

(d)

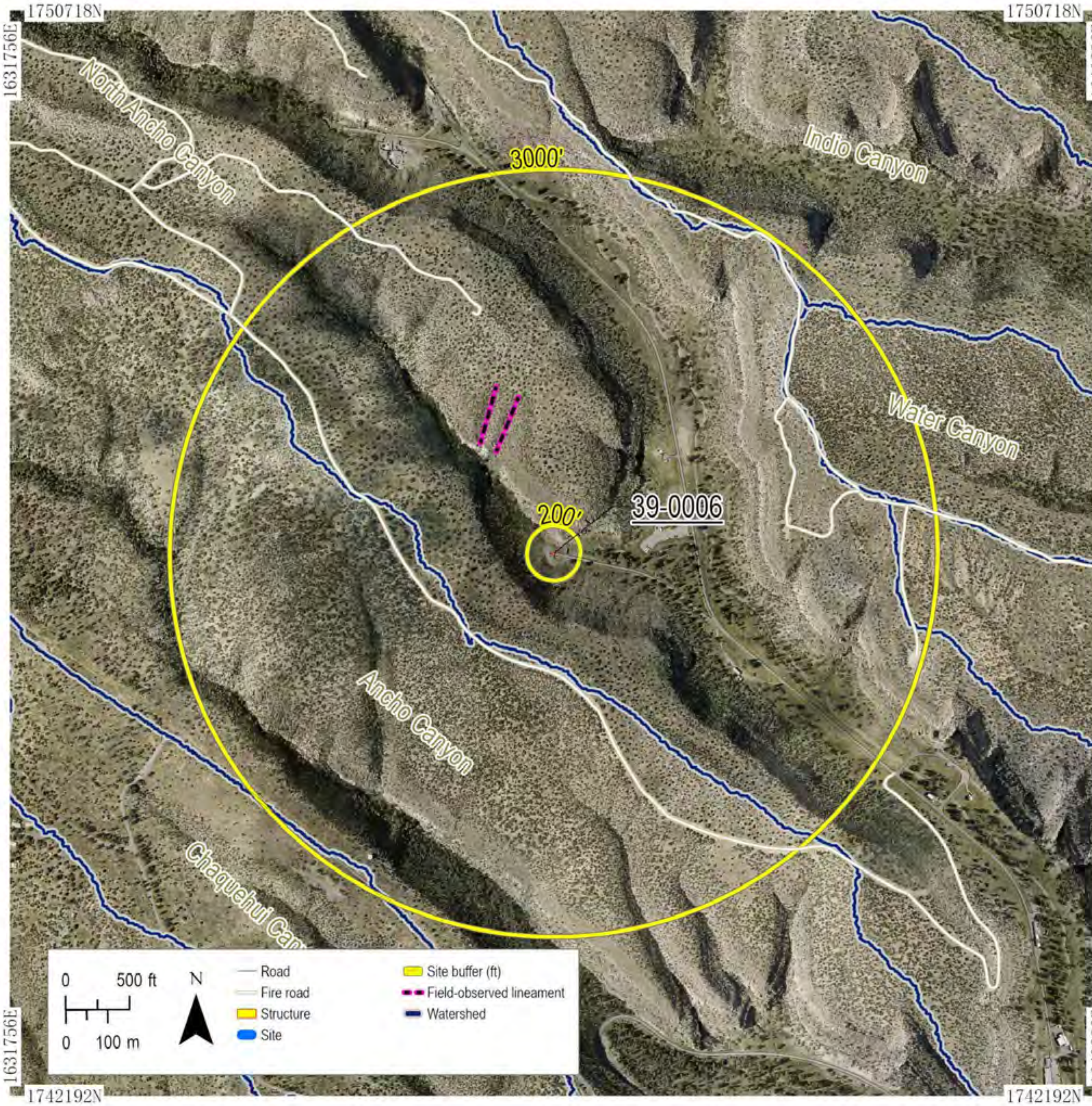


Plate 4. TA-39-6 (d) imagery map showing features observed in field reconnaissance

Attachment 3

Revised Sections 1–8 of the Part B Permit Application for Renewal of the Los Alamos National Laboratory Hazardous Waste Facility Permit

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1.0 INTRODUCTION

A research and defense institution located on the Pajarito Plateau, Los Alamos National Laboratory (LANL) occupies an area of approximately 40 square miles in Los Alamos County, New Mexico. LANL treats and stores hazardous and radioactive mixed waste, as authorized by a Hazardous Waste Facility Permit with U.S. Environmental Protection Agency (EPA) Identification Number NM0890010515 (hereafter referred to as the 2010 Permit). The 2010 Permit was issued by the New Mexico Environment Department (NMED) to the U.S. Department of Energy (DOE), the owner and operator of LANL; Triad National Security, LLC (Triad); and Newport News Nuclear BWXT-Los Alamos, LLC (N3B), co-operators (collectively “the Permittees”) with an effective date of December 30, 2010.

This Permit Renewal Application is submitted to meet the requirements of the New Mexico Hazardous Waste Act and New Mexico Hazardous Waste Management Regulations (HWMR) at New Mexico Administrative Code (NMAC) 20.4.1, *Hazardous Waste Management*. The New Mexico HWMR at NMAC 20.4.1.500 and 20.4.1.900 adopt federal regulations, respectively, at 40 CFR part 264 and 40 CFR part 270, and they are identified in this Permit Renewal Application by the applicable federal citation. Pursuant to these requirements, permitted hazardous waste management facilities must submit a Permit Renewal Application that addresses the general and specific part B information requirements at 40 CFR part 264 and 40 CFR part 270 as needed to continue hazardous waste management operations under a Hazardous Waste Facility Permit.

Pursuant to NMAC 20.4.1 and Permit Condition 1.6.5, *Duty to Reapply*, the term of the Permit is ten years from the date of issuance:

> *If the Permittees intend to continue an activity regulated by this Permit after the expiration date of this Permit, the Permittees shall submit a complete application for a new permit at least 180 days before the expiration date of this Permit unless permission for a later date has been granted by the Department in compliance with 40 CFR 270.10(h) and 270.30(b).*

The Permit was effective on December 30, 2010; therefore, the Permittees’ application for permit renewal is due on or before July 1, 2020.

In this Permit Renewal Application, the Permittees seek authorization to continue to treat and store hazardous and radioactive mixed waste (hereinafter known as “hazardous waste”) in permitted hazardous waste management units authorized by the Permit. As described in Permit Condition 1.2, DOE-Triad and DOE-N3B manage and operate different permitted units, also known as hazardous waste management units. As managers of separate programs at LANL, Triad and N3B are solely responsible for operating their respective units and do not share responsibilities for these units. Under the Permit, DOE-Triad manages and operates 5 container storage units, 10 container storage/treatment units, one tank storage unit, and one stabilization treatment unit; DOE-N3B manages and operates 1 container storage unit and 9 container storage/treatment units.

Provided concurrently with this Permit Renewal Application is the Los Alamos National Laboratory General Part A Permit Application, Revision 10.0 (LANL 2020a), which includes the information required by 40 CFR §270.13, *Contents of part A of the permit application*. In addition, the Permit Renewal Application addresses the general part B information requirements of 40 CFR §270.14, *Contents of part B: General requirements,* and specific information requirements of 40 CFR §270.15, *Specific part B* *information requirements for containers;* 40 CFR §270.16, *Specific part B information requirements for tank systems*; and 40 CFR §270.23, *Specific part B information requirements for miscellaneous units*.

The Permittees do not propose to modify any of the currently permitted hazardous waste management units. However, DOE-Triad seeks approval to permit one interim status open burning unit and two interim status open detonation units. These interim status hazardous waste management units conduct treatment processes to remove the characteristic of reactivity for waste explosives and explosive-contaminated waste. To facilitate review, this Permit Renewal Application addresses these interim status units separately under Section 4, *Open Detonation Treatment*, and Section 5, *Open Burning Treatment*.

In summary, the Permittees seek approval for the following new/revised changes below:

1) Obtain permitted authorization to treat waste explosives at one interim status open burning unit and two interim status open detonation units.
2) Simplify and streamline permit text to improve clarity by removing redundant and inconsistent text.
3) Update information and organization changes to facilitate implementation, remove redundant information, and simplify and streamline text in Permit Attachment A, *Technical Area Unit Descriptions;* Permit Attachment C, *Waste Analysis Plan*; Permit Attachment D, *Contingency Plan*; Permit Attachment E, *Inspection Plan;* and Permit Attachment F, *Personnel Training Plan*.
4) Update information and streamline figures in Permit Attachment D, *Contingency Plan,* and Permit Attachment N, *Figures.*
5) Propose changes to Permit text and Attachment G, *Closure Plans,* and Attachment J, *Hazardous Waste Management Units*, as a result of the settlement in *U.S. v. Curry*, DC NM Case No. 10-01251.
6) Update information to Attachment J, *Hazardous Waste Management Units,* to remove "Interim Status Unit" from the open burning and open detonation unit designations, as well as remove for clarity dated references to unit names that are no longer valid and cannot be traced to the current unit descriptions.
7) Remove unnecessary detail that does not support a Permit requirement or is not required by the New Mexico Hazardous Waste Regulations; and
8) Minor nonsubstantive permit text changes that would qualify as a Class 1 (e.g., typographical errors, editorial, and technical edits).

The Permit Renewal Application includes proposed changes to the text of the current Permit and Permit Attachments in redline/strikeout format, so all proposed changes are clearly identified. A table with a summary of these changes with supporting justification is included as Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit.* The summary table outlines proposed changes represented in the redline/strikeout version of the Permit and/or Permit Attachments within Supplements 1-1 through 1-8. The Permit Renewal Application includes all material that is being revised from the 2010 Permit. Portions of the 2010 Permit not being changed are not being resubmitted, as they are in NMED's administrative record for the current Permit. The renewal application indicates which sections of the 2010 Permit have been revised and included with this submittal or have not been revised and are not included.

The version of the Permit used to create the renewal application is the latest version the NMED posted on its website, dated August 15, 2019.

1.1 Permit Application Overview

The Permit Renewal Application is organized as follows and includes the following required information:

- Section 1 contains an overview of the renewal application, the pre-application public meeting as needed to satisfy the requirements of 40 CFR §124.31, and Table 1-1, *Regulatory Crosswalk*, which is intended to assist the reviewer in locating relevant information in the Permit Renewal Application.
- Section 2 contains the general part B information requirements under 40 CFR §§270.14(b)(1) through (b)(20), as well as the requirements for groundwater under 40 CFR §270.14(c) and solid waste management units (SWMUs) at 40 CFR §270.14(d).
- Section 3 contains the required specific part B information requirements for permitted units, including 25 container storage units, one storage tank, and one treatment (stabilization) unit under 40 CFR §§270.15, 270.16 and 270.23. In addition, this section addresses treatment of hazardous waste (via microencapsulation or stabilization within containers) at 16 units that are primarily utilized for storage as described below.
- Section 4 contains the general and specific information requirements at 40 CFR §270.14 and 40 CFR §270.23 necessary for NMED to review treatment of hazardous waste at two open-detonation units.
- Section 5 contains all of the general and specific information requirements at 40 CFR §270.14 and 40 CFR §270.23 necessary for NMED to review approve treatment of hazardous waste at one open burning unit.
- Section 6 contains the information necessary for NMED to review changes to Permit text and Permit Attachments proposed by the Permittees for other reasons.
- Section 7 includes references to the documents referred to throughout the Permit Renewal Application.
- Section 8 provides the certification required by 40 CFR §270.11.

1.2 Pre-Application Public Meeting

In accordance with 40 CFR §124.31, a pre-application public information meeting to obtain input on the 2020 Permit Renewal Application was held on December 4, 2019, at Cities of Gold Hotel & Casino Conference Center Tribal Room in Santa Fe, New Mexico. Evidence of completion of the required forms of public notice, per 40 CFR §124.31(d), are documented in Appendix 2, *Evidence of Public Notice, Summary of Comments, and Public Comment Response for Public Information Meeting on Los Alamos National Laboratory Permit Renewal Application* and summarized as follows:

- Public notice of the pre-application meeting was provided at least 30 days prior to the meeting.
- The Permittees provided public notice in the following forms:
    - The Notice of Public Meeting was published in the following newspapers:
        - *Rio Grande SUN*, October 31, 2019;
        - *Santa Fe New Mexican*, November 1, 2019;
        - *Los Alamos Monitor*, November 3, 2019;
        - *Journal North*, November 3–9, 2019; and
        - *Taos News*, October 31–November 6, 2019.

- A "Notice of Pre-Submittal Public Meeting" sign was posted outside Los Alamos National Laboratory's Communications and Community Partnerships building.
- A broadcast media announcement was run on KRSN AM 1490, beginning November 4, 2019, and ending on November 25, 2019.
- Proof of the newspaper notices will be submitted to NMED as Appendix 2 in the Permit Renewal Application.
- Additionally, notice of the public meeting was sent to the following state and local governments via LANL's mailing list:
    - City of Espanola; Los Alamos County; NM Dept. of Game & Fish; NMED; NMED - DOE Oversight Bureau; NMED – HWB; NMED/Solid Waste Bureau; Pueblo of Tesuque, Environment Dept.; Rio Arriba Board of Cty. Commissioners; and San Juan Pueblo/Office of Envir. Affairs.
    - The Governors of the Pueblos of Cochiti, Isleta, Jemez, Kewa, Laguna, Picuris, Pojoaque, Sandia, San Felipe, San Ildefonso, San Juan, Santa Ana, Santa Clara, Santo Domingo, Taos, and Zuni.

- The required notice also included the following:
    - The date, time, and location of the meeting.
    - A statement of what would be discussed at the public meeting and the purpose of the meeting.
    - A statement to notify the contact listed on the notice, at least 72 hours before the meeting, if special assistance was needed to participate in the meeting.
    - The notice included an address, telephone number, and electronic mail (e-mail) to contact with any questions.

Evidence of completion of 40 CFR §124.31(c) is documented in Appendix 2 and summarized as follows:

- A summary of the December 4, 2019, public meeting was compiled, along with a list of the attendees.
- Comments received during the December 4, 2019, public meeting were compiled and later responded to.

Although a single public meeting was held, the Permittee's continued to encourage comments from members of the public and received two additional comments after the meeting via e-mail. Comments received on December 9, 2019 and January 21, 2020, as well as responses to those comments are included within Appendix 2. A summary of the public meeting and a list of attendees and their comments will be submitted to NMED as Appendix 2 in the Permit Renewal Application.

Table 1-1

Regulatory Crosswalk

Regulatory Citation(s) (40 CFR)	Description of Requirement	Location in this Document
270.13(a)	Activities conducted by applicant that require a permit under RCRA	General Part A
270.13(b)	Name, mailing address, and location of facility	General Part A
270.13(c)	NAICS codes for a facility	General Part A
270.13(d)	Operator's name, address, telephone number	General Part A
270.13(e)	Owner's name, address, telephone number	General Part A
270.13(f)	Whether the facility is located on Indian Lands	General Part A
270.13(g)	New or existing facility	General Part A
270.13(h)	Drawings and photographs	General Part A
270.13(i)	Description and design capacity of processes for treating, storing, and disposing of hazardous waste	General Part A
270.13(j)	Specific wastes to be treated, stored, or disposed	General Part A
270.13(k)	All permits or construction approvals received or applied for	General Part A
270.13(l)	Topographic maps	General Part A
270.13(m)	Description of the nature of the business	General Part A
270.13(n)	Hazardous waste debris categories and contaminant categories	General Part A
270.14(b)(1)	General facility description	Section 2.1
270.14(b)(2)	Chemical and physical analyses	Section 2.2 and Appendix 1, Supplement 1-3
270.14(b)(3)	Waste Analysis Plan	Section 2.2 and Appendix 1, Supplement 1-3
264.13(a-b)	Development and implementation of Waste Analysis Plan	Section 2.2 and Appendix 1, Supplement 1-3
264.13(c)	Off-site waste analysis requirements	Section 2.2 and Appendix 1, Supplement 1-3
270.14(b)(4)	Security procedures and equipment	Section 2.3
264.14	Security	Section 2.3
270.14(b)(5)	General inspection requirements	Section 2.4 and Appendix 1, Supplement 1-5
264.15	General inspection requirements	Section 2.4 and Appendix 1, Supplement 1-5

Table 1-1

Regulatory Crosswalk (continued)

Regulatory Citation(s) (40 CFR)	Description of Requirement	Location in this Document
264.174	Container inspections	Sections 2.4, and Appendix 1, Supplement 1-5
264.193(i)	Tank inspections	Section 2.4 and Appendix 1, Supplement 1-5
264.195	Overfill control inspections	Section 2.4 and Appendix 1, Supplement 1-5
264.226	Surface impoundments monitoring and inspection	Not applicable
264.254	Waste pile monitoring and inspection	Not applicable
264.273	Land treatment design and operating requirements	Not applicable
264.303	Landfill monitoring and inspection	Not applicable
264.602	Miscellaneous unit inspection	Sections 2.4, 4.4, 5.4, 5.14, and Appendix 1, Supplement 1-5
264.1033	Closed-vent systems and control device standards	Appendix 1, Supplement 1-5
264.1052	Equipment leak air-emission standards	Section 2.4 and Appendix 1, Supplement 1-5
264.1053	Compressor standards	Not applicable
264.1058	Standards for pumps, valves, pressure relief devices, flanges, and connections	Appendix 1, Supplement 1-5
264.1083	Subpart CC waste determination procedures	Section 2.2 and Appendix 1, Supplement 1-3
264.1084	Subpart CC inspection and monitoring requirements - Tank air-emission standards	Section 2.4 and Appendix 1, Supplement 1-5
264.1085	Subpart CC inspection and monitoring requirements - Surface impoundment standards	Not applicable
264.1086	Subpart CC inspection and monitoring requirements - Container standards	Section 2.4 and Appendix 1, Supplement 1-5
264.1088	Subpart CC inspection and monitoring requirements - Closed vent systems and control devices	Not applicable
270.14(b)(6)	Request for waiver from preparedness and prevention requirements of 264 Subpart C	Section 2.5
270.14(b)(7)	Contingency Plan requirements under 264 Subpart D	Section 2.6 and Appendix 1, Supplement 1-4
264, Subpart D	Contingency Plan and emergency procedures	Section 2.6 and Appendix 1, Supplement 1-4

Table 1-1

Regulatory Crosswalk (continued)

Regulatory Citation(s) (40 CFR)	Description of Requirement	Location in this Document
264.227	Surface impoundment emergency repairs; contingency plans	Not applicable
264.200	Air-emissions standards for tanks	Section 2.6 and Appendix 1, Supplement 1-4
270.14(b)(8)	Preparedness and prevention	Section 2.7
264, Subpart C	Preparedness and prevention - applicability, design and operation; required equipment, testing and maintenance of equipment; access to communications or alarm systems; required aisle space; and arrangements with local authorities	Section 2.7
264.33	Testing and maintenance of equipment	Section 2.7.4
270.14(b)(8)(i)	Prevention of hazards in unloading operations (ramps and special forklifts)	Section 2.7.1
270.14(b)(8)(ii)	Runoff prevention with berms, trenches, and dikes	Sections 2.7.2, 4.7.2, and 5.7.2
270.14(b)(8)(iii)	Prevention of contamination of water supplies	Section 2.7.3
270.14(b)(8)(iv)	Mitigation effects of equipment failure and power outages	Sections 2.7.4, 4.7.4 and 5.7.4
270.14(b)(8)(v)	Prevention of undue exposure of personnel by use of personal protective equipment	Sections 2.7.5, 4.7.5, and 5.7.5
270.14(b)(8)(vi)	Prevention of release to the atmosphere	Sections 2.7.6, 4.7.6, and 5.7.6
270.14(b)(9)	Prevention of accidental ignition or reaction	Sections 2.8, 4.8, and 5.8
264.17	General requirements for ignitable, reactive, or incompatible wastes	Sections 2.8, 4.8, and 5.15
270.14(b)(10)	Traffic pattern, volume, and controls	Sections 2.9, 4.9 and 5.9
	Identification of turn lanes	Sections 2.9, 4.9 and 5.9
	Identification of traffic/stacking lanes	Sections 2.9, 4.9 and 5.9
	Description of road surface	Sections 2.9, 4.9 and 5.9
	Description of road load-bearing capacity	Sections 2.9, 4.9 and 5.9
	Identification of type and number of traffic controls	Sections 2.9, 4.9 and 5.9
270.14(b)(11)	Facility/unit location information	Section 2.10
264.18	Location standards	Section 2.10
270.14(b)(11)(i)	Seismic standard applicability [264.18(a)]	Section 2.10.1
270.14(b)(11)(ii)	Seismic standard requirements	Section 2.10.1

Table 1-1

Regulatory Crosswalk (continued)

Regulatory Citation(s) (40 CFR)	Description of Requirement	Location in this Document
270.14(b)(11)(ii)(A)(1-4)	No fault within 3,000 feet (ft.), with displacement in Holocene time	Section 2.10.1
270.14(b)(11)(ii)(B)	If faults which have displacement in Holocene time are present within 3,000 ft., no faults pass within 200 ft. of portions of the facility where treatment, storage, or disposal will be conducted	Section 2.10.1
270.14(b)(11)(iii)	100-year floodplain standard	Section 2.10.2
270.14(b)(11)(iv)	If facility is within 100-year floodplain	Section 2.10.2
270.14(b)(11)(iv)(A-C)	Engineering analyses of hydrostatic forces expected in a 100-year flood	Section 2.10.2
270.14(b)(11)(v)	Plan to show how the facility will be brought into compliance with 264.18(b)	Not applicable
270.14(b)(12)	Personnel training program	Section 2.11 and Appendix 1, Supplement 1-6
264.16	Personnel training	Section 2.11 and Appendix 1, Supplement 1-6
270.14(b)(13)	Closure and post-closure plans	Section 2.12 and Appendix 3, Supplement 3-1, Attachments G1-G30 of the 2010 Permit
264.112	Amendment of Closure Plan	Section 2.12 and Appendix 3, Supplement 3-1, Attachments G1-G30 of the 2010 Permit
264.118	Post-closure plan; amendment of plan	Not applicable
264.178	Closure/containers	Section 2.12 and Appendix 3, Supplement 3-1, Attachments G1-G30 of the 2010 Permit
264.197	Closure/tanks	Section 2.12 and Appendix 3, Supplement 3-1, Attachments G1-G30 of the 2010 Permit
264.228	Closure/post-closure/surface impoundments	Not applicable
264.258	Closure/post-closure/waste piles	Not applicable
264.280	Closure/post-closure/land treatment	Not applicable
264.310	Closure/post-closure/landfills	Not applicable
264.351	Closure/incinerators	Not applicable

Table 1-1

Regulatory Crosswalk (continued)

Regulatory Citation(s) (40 CFR)	Description of Requirement	Location in this Document
264.601	Miscellaneous unit closure	Sections 2.12, 4.11, and 5.11
264.603	Post-closure care	Section 2.12 and Appendix 3, Supplement 3-1, Attachments G.2, G.3, and G.28
270.14(b)(14)	Post-closure notices (264.119)	Not applicable
270.14(b)(15)	Closure cost estimate (264.142)	Section 2.14
	Financial assurance (264.143)	Section 2.14
270.14(b)(16)	Post-closure cost estimate (264.144)	Section 2.14
	Post-closure care financial assurance (264.145)	Section 2.14
270.14(b)(17)	Liability insurance (264.147)	Section 2.14
270.14(b)(18)	Proof of financial coverage (264.149-150)	Section 2.14
270.14(b)(19)	Topographic map requirements	Section 2.10.3 and General Part A
270.14(b)(19)(i)	Map scale and date	Section 2.10.3 and General Part A
270.14(b)(19)(ii)	100-year floodplain	Section 2.10.3 and General Part A
270.14(b)(19)(iii)	Surface waters	Section 2.10.3 and General Part A
270.14(b)(19)(iv)	Land use	Section 2.10.3 and General Part A
270.14(b)(19)(v)	Wind rose	Section 2.10.3 and General Part A
270.14(b)(19)(vi)	Map orientation	Section 2.10.3 and General Part A
270.14(b)(19)(vii)	Legal boundaries	Section 2.10.3 and General Part A
270.14(b)(19)(viii)	Access controls	Section 2.10.3 and General Part A
270.14(b)(19)(ix)	Wells	Section 2.10.3 and General Part A
270.14(b)(19)(x)	Buildings, treatment, storage, and disposal operations	Section 2.10.3 and General Part A
	Run-on/runoff control systems	Sections 2.10.3, 4.18.2, and 5.16.2

Table 1-1

Regulatory Crosswalk (continued)

Regulatory Citation(s) (40 CFR)	Description of Requirement	Location in this Document
	Storm sewer systems	Section 2.10.3 and General Part A
	Sanitary sewer systems	Section 2.10.3 and General Part A
	Process sewer systems	Section 2.10.3 and General Part A
	Loading/unloading areas	Section 2.10.3 and General Part A
	Fire control facilities	Section 2.10.3
270.14(b)(19)(xi)	Drainage barriers	General Part A
270.14(b)(19)(xii)	Location of operational units	Section 2.10.3 and General Part A
270.14(b)(20)	Other federal laws	Section 2.15
270.3(a)	Wild and Scenic Rivers Act	Section 2.15
270.3(b)	National Historic Preservation Act	Section 2.15
270.3(c)	Endangered Species Act	Section 2.15
270.3(d)	Coastal Zone Management	Section 2.15
270.3(e)	Fish and Wildlife Coordination Act	Section 2.15
270.3(f)	Executive Orders	Section 2.15
270.14(b)(21)	Notice of extension approval for land disposal facilities	Not applicable
270.14(b)(22)	Summary of pre-application meeting	Section 1.2 and Appendix 2
270.14(c)(1-8)	Groundwater monitoring requirements	Section 2.16
270.14(d)	SWMU	Section 2.17
270.14(d)(1)(i)	Location of SWMUs on topographic map	Section 2.17
270.14(d)(1)(ii)	Types of SWMUs	Section 2.17
270.14(d)(1)(iii)	Dimensions and descriptions of SWMUs	Section 2.17
270.14(d)(1)(iv)	Dates of operation	Section 2.17
270.14(d)(1)(v)	Waste types managed at SWMU	Section 2.17
270.14(d)(2)	Information on releases from SWMUs	Section 2.17
264.101	Corrective action for SWMUs	Section 2.17
270.15	Containers	Section 3.1
270.15(a)	Description of containment system	Section 3.1

Table 1-1

Regulatory Crosswalk (continued)

Regulatory Citation(s) (40 CFR)	Description of Requirement	Location in this Document
270.15(b)	Storage areas holding wastes that do not contain free liquids	Section 3.1
264.171	Condition of containers	Section 3.1
264.172	Compatibility of waste with containers	Section 3.1
264.173	Management of containers	Section 3.1
264.175(a-c)	Containment	Section 3.1
270.15(c)	Requirements for ignitable, reactive, and incompatible wastes	Section 2.8
270.15(d)	Requirements for incompatible wastes	Section 2.8
264.176	15-meter storage buffer for ignitable or reactive wastes	Section 2.8
264.177(a)	Incompatible wastes in containers	Section 2.8
264.177(b)	Incompatible wastes in containers	Section 2.8
264.177 (c)	Incompatible wastes separation or segregation	Section 2.8
264.17 (b)	Prevention of reactions	Section 2.8
264.17(c)	Documentation of precautions for ignitable, reactive, or incompatible waste	Section 2.8
270.15(e)	Information on air-emission control equipment	2010 Permit Section 2.4 & Appendix 1, Supplement 1-5
270.27	Air-emission controls for containers	2010 Permit Section 2.4 & Appendix 1, Supplement 1-5
270.16	Tank systems	Section 3.2
270.16(a)	Written assessment of tank, structural integrity, and suitability submitted by an independent, certified, registered professional engineer	Section 3.2
270.16(b)	Dimensions and capacity of each tank	Section 3.2
270.16(c)	Feed system description	Section 3.2
270.16(d)	Piping diagram	Section 3.2
270.16(e)	External corrosion protection description	Section 3.2
270.16(f)	New tank installation	Section 3.2
270.16(g)	Detailed description of secondary containment	Section 3.2
270.16(h)	Request for variance	Not applicable
270.16(i)	Description of procedures and controls to prevent spills and overflows	Section 3.2

Table 1-1

Regulatory Crosswalk (continued)

Regulatory Citation(s) (40 CFR)	Description of Requirement	Location in this Document
270.16(j)	Description of procedures for ignitable, reactive, or incompatible wastes	Section 3.2
270.16(k)	Information on air-emission control equipment	Sections 3.2
270.17	Surface impoundments	Not applicable
270.18	Waste piles	Not applicable
270.19	Incinerators	Not applicable
270.20	Land treatment facilities	Not applicable
270.21	Landfills	Not applicable
270.22	Boilers and industrial facilities	Not applicable
270.23(a)	Description of miscellaneous unit	Sections 3.2, 4.1, and 5.1
270.23(b)	Compliance with environmental performance standards at 264.601	Sections 3.2, 4.18, and 5.16
270.23(c)	Potential pathways of exposure of humans or environmental receptors	Sections 3.2, 4.18, and 5.16
270.23(d)	Effectiveness of treatment	Sections 4.13 and 5.13
270.23(e)	Additional information necessary for evaluation of compliance with environmental performance standards of 264.601	Sections 3.2, 4.18, and 5.16
264.601(a)	Prevention of release of contaminants to groundwater	Sections 3.2, 4.18.1, and 5.16.1
264.601(a)(1)	Volume and characteristics of waste-considering potential for migration through containing structures	Sections 3.2, 4.18, and 5.13
264.601(a)(2)	Hydrologic/geologic characteristics	Sections 3.2, 4.18, and 5.16
264.601(a)(3)	Quality of groundwater, including other sources of contamination and their cumulative impact on groundwater	Sections 3.2, 4.18, and 5.16
264.601(a)(4)	Quantity and direction of groundwater flow	Sections 3.2, 4.18, and 5.16
264.601(a)(5)	Proximity to and withdrawal rates of potential groundwater users	Sections 3.2, 4.18, and 5.16
264.601(a)(6)	Regional patterns of land use	Sections 3.2, 4.18, and 5.16
264.601(a)(7)	Potential for deposition and migration of waste constituents	Sections 3.2, 4.18, and 5.16
264.601(a)(8)	Potential for health risks caused by human exposure to waste constituents	Sections 3.2, 4.18, and 5.16

Table 1-1

Regulatory Crosswalk (continued)

Regulatory Citation(s) (40 CFR)	Description of Requirement	Location in this Document
264.601(a)(9)	Potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents	Sections 3.2, 4.18, and 5.16
264.601(b)	Prevention of release of contaminants to surface water	Sections 3.2, 4.18, and 5.16
264.601(b)(1)	Volume and characteristics of the waste	Sections 4.2, 5.2, and Appendix 1, Supplement 1-3
264.601(b)(2)	Effectiveness and reliability of containment, confinement, and collection systems and structures	Sections 3.2, 4.18, and 5.16
264.601(b)(3)	Hydrologic characteristics of the unit and local area	Sections 3.2, 4.18, and 5.16
264.601(b)(4)	Regional precipitation patterns	Sections 3.2, 4.18, and 5.16
264.601(b)(5)	Quantity, quality, and direction of groundwater flow	Sections 3.2, 4.18, and 5.16
264.601(b)(6)	Proximity of the unit to surface water	Sections 3.2, 4.18, and 5.16
264.601(b)(7)	Current and potential uses of nearby surface waters and water quality standards for those waters	Sections 3.2, 4.18, and 5.16
264.601(b)(8)	Quality of surface waters and soils, including other sources of contamination and their cumulative impact on surface waters and soils	Sections 3.2, 4.18, and 5.16
264.601(b)(9)	Regional patterns of land use	Section 2.1
264.601(b)(10)	Potential for health risks caused by human exposure to waste constituents	Sections 3.2, 4.18, and 5.16
264.601(b)(11)	Potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents	Sections 3.2, 4.18, and 5.16
264.601(c)	Prevention of release of contaminants to air	Sections 3.2, 4.18, and 5.16
264.601(c)(1)	Volume and characteristics of waste, including its potential for emission	Sections 3.2, 4.18, and 5.16
264.601(c)(2)	Effectiveness and reliability of systems/structures to reduce/prevent emissions of hazardous constituents to the air	Sections 3.2, 4.18, and 5.16
264.601(c)(3)	Operating characteristics of the unit	Sections 4.12 and 5.12
264.601(c)(4)	Characteristics of the unit and the surrounding area	Sections 3.2, 4.18, and 5.16
264.601(c)(5)	Existing quality of the air, including other sources of contaminants and their cumulative impact on the air	Sections 3.2, 4.18, and 5.16

Table 1-1

Regulatory Crosswalk (continued)

Regulatory Citation(s) (40 CFR)	Description of Requirement	Location in this Document
264.601(c)(6)	Potential health risks caused by human exposure to waste constituents	Sections 3.2, 4.18, and 5.16
264.601(c)(7)	Potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents	Sections 3.2, 4.18, and 5.16
265.370	Other thermal treatment	Sections 4.12.5 and 5.12.7
265.373	Thermal treatment general operating requirements	Sections 4.12.5 and 5.12.7
265.375	Thermal treatment waste analysis	Sections 4.2, 5.2, and Appendix 1, Supplement 1-3
265.377	Thermal treatment monitoring and inspections	Section 5.12.2 and Appendix 1, Supplement 1-5
265.381	Thermal treatment unit closure	Section 2.12 and Appendix 3, Supplement 3-1
265.382	Open burning; waste explosives	Sections 4.2, 4.16, 5.2, and 5.12.2
270.24	Process vents	Not applicable
270.25	Equipment for compliance with part 264, subpart BB requirements	Not applicable
270.26	Drip pads	Not applicable
270.28	Post-closure permits	Not applicable
264.75	Biennial report	2010 Permit Section 2.12.5
264.76	Unmanifested waste report	2010 Permit Section 2.12
264.77	Additional reports	2010 Permit Section 2.12

2.0 PART B GENERAL INFORMATION REQUIREMENTS

Section 2 of the Permit Renewal Application addresses the part B general information requirements under 40 CFR §§270.14(b) through (d) for permitted hazardous waste management units under the current Permit. This section describes compliance with the part B information requirements under 40 CFR §§270.42(b)(1) through (b)(20), the requirements for groundwater under 40 CFR §270.42(c), and requirements for SWMUs at 40 CFR §270.42(d). Not included in this part are the following: (1) pre-application meeting requirements under 40 CFR §270.42(b)(22), which are addressed above in Section 1.2, *Pre-Application Public Meeting*; and (2) DOE-Triad's request to permit interim status treatment units for two open detonation units and one open burning unit, which are addressed below in Section 4, *Open Detonation Treatment*, and Section 5, *Open Burning Treatment*.

Also addressed in this Section are proposed changes to Permit text and Permit Attachments that fall within part B general information requirements. These changes are also summarized and justified in Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit,* and represented in Supplements 1-1 through 1-8.

Permit Section 1.2, *Permittees and Permitted Activity,* describes the different hazardous waste management units operated separately by DOE-Triad and DOE-N3B. The Permittees are not proposing to change these permitted units in this Permit Renewal Application. In total, the Permittees currently treat and/or store hazardous waste in 27 hazardous waste management units. DOE-Triad and DOE-N3B also treat hazardous waste (via microencapsulation or stabilization within containers) at 16 storage units managed by the Permittees.

DOE-Triad stores and/or treats hazardous waste at the following hazardous waste management units:

- Technical Area 3, Building 29, Container Storage/Treatment Unit
- Technical Area 50, Building 69, Indoor Container/Treatment Storage Unit
- Technical Area 50, Building 69, Container Storage/Treatment Outdoor Pad
- Technical Area 54 West, Building 38, Container Storage Unit
- Technical Area 54, West, Outdoor Container/Treatment Storage Unit
- Technical Area 55, Building 4, Container Storage/Treatment Unit, B40
- Technical Area 55, Building 4, Container Storage Unit, B05
- Technical Area 55, Building 4, Container Storage Unit, K13
- Technical Area 55, Building 4, Container Storage/Treatment Unit, B45
- Technical Area 55, Building 4, Container Storage Unit, B13
- Technical Area 55, Building 4, Container Storage Unit, G12
- Technical Area 55, Building 4, Container Storage Unit, Vault
- Technical Area 55, 0355 Pad, Container Storage/Treatment Unit
- Technical Area 55, Container Storage Outdoor/Treatment Pad
- Technical Area 55, Tank Storage and Stabilization (Treatment) Unit
- Technical Area 63, Transuranic Waste Facility (TWF), Container/Treatment Storage Unit

DOE-N3B stores and/or treats hazardous waste at the following hazardous waste management units:

- Technical Area 54, Area G, Pad 1, Container Storage/Treatment Unit

- Technical Area 54, Area G, Pad 3, Container Storage/Treatment Unit
- Technical Area 54, Area G, Pad 5, Container Storage/Treatment Unit
- Technical Area 54, Area G, Pad 6, Container Storage/Treatment Unit
- Technical Area 54, Area G, Pad 9, Container Storage/Treatment Unit
- Technical Area 54, Area G, Pad 10, Container Storage/Treatment Unit
- Technical Area 54, Area G, Pad 11, Container Storage/Treatment Unit
- Technical Area 54, Area G, Storage Shed 8, Container Storage Unit
- Technical Area 54, Area G, Building 33, Container Storage/Treatment Unit
- Technical Area 54, Area L, Container Storage/Treatment Unit

2.1 General Facility Description

The general information requirements at 40 CFR §270.14(b)(1) provide that a part B permit application for hazardous waste management facilities includes "a general description of the facility."

The Permittees are not proposing to change the facility description in the Permit and the LANL General Part A Permit Application, Revision 10.0 (LANL 2020a) provided concurrently with this renewal application. The central mission included within the application states as follows:

> *The central mission of Los Alamos National Laboratory is the reduction of global nuclear danger supported by research that also contributes to conventional defense, civilian, and industrial needs. This includes programs in nuclear, medium energy, and space physics; hydrodynamics; conventional explosives; chemistry; metallurgy; radiochemistry; space nuclear systems; controlled thermonuclear fusion; laser research; environmental technology; geothermal, solar, and fossil energy research; nuclear safeguards; biomedicine; health and biotechnology; and industrial partnerships.*

LANL is located in Los Alamos County in north-central New Mexico. It is approximately 60 miles north-northeast of Albuquerque and 25 miles northwest of Santa Fe. LANL's mailing address is P.O. Box 1663, Los Alamos, New Mexico, 87545. LANL is owned by DOE and is operated jointly by the DOE National Nuclear Security Administration Field Office and Triad. Additionally, the Los Alamos Legacy Cleanup Contractor, N3B, conducts corrective action and legacy waste cleanup activities on behalf of DOE's Environmental Management Los Alamos Field Office. LANL is divided into technical areas as depicted on revised Figure 2 included in Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures*. Situated on the Pajarito Plateau, LANL occupies an area of approximately 40 square miles, as well as the associated residential and commercial areas of Los Alamos County that occupy an area of approximately 109 square miles. Major roads, neighboring communities, and other surrounding land uses are located on Figures 1-3 within *Permit Attachment N, Figures*. These figures are proposed to be updated as summarized in the Attachment N portion of Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit* with updates included in Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures.*

2.2 Waste Analysis Plan

The general information requirements at 40 CFR §§270.14(b)(2) and (3) provide that the part B permit application must have a Waste Analysis Plan developed to include the "chemical and physical analysis of the hazardous waste and hazardous debris to be handled at the facility. At a minimum, this analysis shall contain all the information which must be known to treat, store, or dispose of the wastes properly in accordance with part 264 of this chapter."

A copy of the Permittees' Waste Analysis Plan is currently contained as Permit Attachment C, *Waste Analysis Plan*. The plan describes the procedures used to analyze hazardous waste received at the facility, including any waste that may be received from offsite of the facility (40 CFR §264.13(c)). The Permittees are proposing minor, nonsubstantive text changes to the Waste Analysis Plan, including typographical errors, technical edits, rearrangement of information, updates for characterization of transuranic waste, removal of repetitive information, and minor text clarifications. These changes are identified and summarized in Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit*; a revised version that meets the requirements at 40 CFR §264.13 is attached to this Permit Renewal Application within Supplement 1-3, *Permittees' Proposed Changes to Attachment C, Waste Analysis Plan*.

2.3 Security

The general information requirements at 40 CFR §270.14(b)(4) provide that the Part B permit application must include "a description of the security procedures and equipment required by 40 CFR §264.14, or a justification demonstrating the reasons for requesting a waiver of this requirement." This requirement is intended to ensure that the Permittees prevent the unknowing entry, and minimize the possibility for the unauthorized entry, of persons or livestock onto the active hazardous waste management units at LANL, in accordance with the requirements at 40 CFR §264.14.

The Permittees ensure the security at active hazardous waste management units by implementing the following measures as required by Permit Section 2.5, *Security*:

1. 24-hour surveillance system that continuously monitors and controls entry into the active hazardous waste management units at the Facility; or
2. controlled entry into the active hazardous waste management units at all times via gates, stations, or other means (e.g., attendants, locks, and prohibited or controlled roadway access).

The Permittees maintain all security fences, entry gates, and entry stations surrounding the active hazardous waste management units as required by the Permit. Figures that represent security features at each of the units are included in Permit Attachment N, *Figures* and have been updated in this Permit Renewal Application. Applicable figures include newly numbered, revised, and added Figures 3-13 in Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures*.

The Permittees propose minor nonsubstantive changes to the access and security description within Permit Attachment A, *Technical Areas Unit Descriptions* of the Permit. The updates include removal of references to security fences or entry gates at Technical Area (TA) 50 that are not relevant for the active hazardous waste management units at TA-50, Building 69 (TA-50-69). These changes are also summarized in Appendix 1, *Summary Table of Proposed Changes to 2010 the Los Alamos National*

Laboratory Hazardous Waste Facility Permit and included in Supplement 1-1, *Permittees' Proposed Changes to Permit Parts 1-11.*

2.3.1 Warning Signs

Per the requirements stipulated in 40 CFR §264.14(c) and Permit Section 2.5.1, *Warning Signs*, warning signs are posted at each active hazardous waste management unit. In Supplement 1-2, *Permittees' Proposed Changes to Attachment A, Technical Area Unit Descriptions*, the Permittees propose to remove the warning sign requirement from the individual permit sections within Permit Attachment A, *Technical Area Unit Descriptions,* which address warning sign requirements at hazardous waste management units. The requirement in individual sections is duplicative and, in some cases, inconsistent with the warning sign requirements in Permit Section 2.5.1. Warning signs will still be posted at hazardous waste management units.

2.4 Inspections

The general information requirements at 40 CFR §270.14(b)(5) stipulate a part B permit application to include "a copy of the general inspection schedule as required by §264.15(b), and, where applicable, the inspection schedule must address the requirements at §§264.174, 264.193(i), 264.195, 264.226, 264.273, 264.303, 264.602, 264.1052, 264.1053, 264.1084, 264.1086 and 264.1088 of this part."

A copy of the Permittees' inspection plan is included as Permit Attachment E, *Inspection Plan.* A revised version is attached to this Permit Renewal Application as Supplement 1-5, *Permittees' Proposed Changes to Permit Attachment E, Inspection Plan*, to meet the requirements of 40 CFR §270.14(b)(5). Permit Section 2.6, *General Inspection Requirements,* requires the Permittees to conduct inspections in compliance with the 2010 Permit. The plan addresses the inspection requirements for all hazardous waste management units to meet applicable requirements under 40 CFR Part 264.

The Permittees propose minor, nonsubstantive changes to the 2010 Permit, including updates to the arrangement of the inspection plan and to the inspection forms. These changes are identified and justified in Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit,* and are included within Supplement 1-5, *Permittees' Proposed Changes to Permit Attachment E, Inspection Plan*.

2.5 Waivers for Preparedness and Prevention

The general information requirements at 40 CFR §270.14(b)(6) stipulate that a part B permit application include "a justification for any request to waive the preparedness and prevention requirements of part 264, subpart C."

No waivers of the preparedness and prevention requirements under Part 264, subpart C are being sought by the Permittees.

2.6 Contingency Plan

The general information requirements at 40 CFR §270.14(b)(7) stipulate the part B permit application to include a "copy of the Contingency Plan to meet the requirements of 40 CFR Part 264, Subpart D and, as applicable, the requirements of 40 CFR §§264.227, 264.255, and 264.200."

The Permittees do not manage hazardous waste in waste piles, surface impoundments, land treatment units, or landfills. Therefore, the requirements from §§264.227, 264.254, 264.273, and 264.303 are not applicable.

Permit Section 2.10, *Preparedness and Prevention*, requires the Permittees to develop and have ready for implementation a Contingency Plan that describes the actions carried out by the Permittees to (1) ensure appropriate response to any threat to human health and the environment as a result of fire, explosion, or any unplanned sudden or nonsudden release of hazardous waste or hazardous waste constituents to the air, soil, or surface water and (2) that the threat is mitigated. A copy of the revised Permit Attachment D, *Contingency Plan,* is included in this Permit Renewal Application in Supplement 1-4, *Permittees' Proposed Changes to Attachment D, Contingency Plan*, to meet the requirements of 40 CFR §270.14(b)(7). The Permittees do not propose any substantive changes to the plan. Changes are associated with the general rearrangement of the plan, updating terminology associated with emergency preparedness activities, updating to modern emergency communication technology, and making organizational changes to facilitate implementation, provide clarity, and remove redundant information. The plan includes information on internal local response activities in accordance with 40 CFR §264.52 as well as arrangements with outside emergency response personnel and services in the area to meet the requirements of 40 CFR §264.37. Required emergency equipment located at the Facility and at the individual hazardous waste management units is listed within Permit Attachment D, *Contingency Plan,* at the proposed reorganized Tables D-3 through D-15. This equipment is referenced by and maintained in accordance with Permit Section 2.10 and the requirements at 40 CFR Part 264, Subpart C, *Preparedness and Prevention*. There are no proposed changes to the actions to be taken in the event of an emergency or reductions in the emergency equipment available at any of the active hazardous waste management units. Evacuation plans are developed for each of the hazardous waste management units for which evacuation may be necessary, as required by Permit Section 2.11.2(6).

2.7 Hazards Prevention

The following sections discuss how the Permittees perform prevention and preparedness under requirements within 20 CFR Part 264, Subpart C, and the application requirements from 40 CFR §§270.14(8)(i-vi).

2.7.1 Waste Handling and Preventing Hazards in Unloading/Loading

The general information requirements for 40 CFR §270.14(8)(i) stipulate that the part B permit application contains a description of procedures, structures, or equipment used at the Facility to "prevent hazards in unloading operations (for example, ramps, special forklifts)."

The following is a description of the procedures used to manage hazardous waste containers in a manner that minimizes risks to the containers and workers in the waste management units. Small containers (e.g., boxes, bags, plastic buckets, and cardboard containers) of waste are handled manually or with hand trucks or a dolly. Light drums may be handled manually or with a dolly. The use of proper handling equipment, appropriate to a container's size and weight, helps prevent hazards while moving containers. Forklift operators may use an auxiliary boom, if necessary, to improve handling capabilities. For larger containers, personnel can use a boom or, at TA-50-69 and various locations at TA-54 and TA-55, personnel can use bridge cranes or mobile cranes. At TA-54, waste containers (e.g., fiberglass reinforced plywood crates, drums, and large boxes) are generally handled with forklifts, overhead cranes, or frictionless air pallets. Only a single crane is used at one time. Trained spotters may assist with container movement during forklift or crane operations. To protect the integrity of waste containers received, only equipment designed for moving waste containers is used. Where necessary, each hazardous waste management unit is equipped with structures and equipment to facilitate safe loading, unloading, and movement of waste containers.

Flatbed trucks, trailers, forklifts, or other appropriate vehicles may be used to transport waste containers to and from the hazardous waste management units at LANL. When receiving waste at the hazardous waste management units, waste containers are inspected to ensure that (1) there is no damage or leaking material and that (2) they are properly labeled. For transport, the containers of waste are secured. Wastes are transported to and from hazardous waste management units by appropriately trained and authorized personnel in an appropriate vehicle. Qualified personnel unload waste from the vehicle and place it in an unloading area or directly into storage at the unit. Visual examination is conducted after unloading to ensure that containers are not damaged or leaking and are otherwise in good condition and that no waste remains in the transport vehicle. Waste management personnel are trained for safe-handling operations in accordance with Section 2.11, *Personnel Training,* of this Permit Renewal Application.

2.7.2 Control of Runoff

The general information requirements for 40 CFR §270.14(8)(ii) stipulate the part B permit application to describe procedures and controls used to "prevent runoff from hazardous waste handling areas to other areas of the facility or environment, or to prevent flooding (for example, berms, dikes, trenches)."

The Permittees propose no change in the manner in which runoff is prevented from leaving the hazardous waste management units to the facility or environment where applicable, or to prevent flooding as described in the Permit Section 3.12.2, *Preventing Runon and Runoff*, and within Attachment A, *Technical Area Unit Descriptions*, proposed renumbered Sections A.6.1 (and subsections), A.6.5 (and subsections), A.7, and A.8.8 within Supplement 1-2, *Permittees' Proposed Changes to Attachment A, Technical Area Unit Descriptions*.

2.7.3 Preventing Water Supply Contamination

The general information requirements for 40 CFR §270.14(b)(8)(iii) stipulate the part B permit application to "describe procedures to prevent contamination of water supplies."

The hazardous waste management units are located, designed, constructed, operated, and maintained in a manner that ensures the prevention of water supply contamination. No hazardous waste disposal activities will occur at the site. Waste storage involving any potential liquids occurs only with secondary containment and under cover, if outdoors. A stated above, hazardous waste management units at the facility are designed or operated to minimize runoff from the waste storage areas. In the event of a spill or contamination, the provisions of Permit Section 3.12.2, *Preventing Runon and Runoff* and the provisions of the *Contingency Plan*, included as Supplement 1-4, *Permittees' Proposed Changes to Permit Attachment D, Contingency Plan*, and the *Inspection Plan*, included as Supplement 1-5, *Permittees' Proposed Changes to Permit Attachment E, Inspection Plan*, will provide protection to prevent potential contamination from reaching potable water supplies. Water supply lines at LANL are under pressure and are equipped with backflow prevention devices to prevent potential contamination of potable water supplies.

2.7.4 Mitigate the Effect of Equipment Failure and Power Outages

The general information requirements for 40 CFR §270.14(b)(8)(iv) stipulate the part B permit application to describe procedures to "mitigate equipment failure and power outages."

The Permit addresses the required mitigation procedures at Permit Section 2.10.1, *Required Equipment,* and Permit Section 2.10.2, *Testing and Maintenance of Equipment*. Permit Section 2.10.1 requires that "at permitted units where equipment is necessary to mitigate the effects of a power outage, batteries, generators, or some other form of backup power supply capable of operating equipment including evacuation alarms, emergency communication equipment, automatic fire suppression system, and emergency lights."

The Permittees propose one minor change to Permit Section 2.10.2, *Testing and Maintenance of Equipment*. If during an inspection a system, device, or equipment is found in need of maintenance, repair, or replacement, the situation may be mitigated until such time as the equipment is returned to normal operating conditions, in addition to the options currently included in Permit Section 2.10.2. Mitigation could include use of substitute equipment, fire watch, or limiting operations in the immediate area. The proposed change to the LANL 2010 Permit within Section 2.10.2, *Testing and Maintenance of Equipment,* is to allow for other mitigating measures when equipment is found to be out of service or requires maintenance or replacement. Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit,* and Supplement 1-1, *Permittees' Proposed Changes to Permit Parts 1-11*, includes the specific changes requested to the 2010 Permit.

2.7.5 Preventing Undue Exposure of Personnel

The general information requirements for 40 CFR §270.14(b)(8)(v) stipulate the part B permit application to describe procedures to "prevent undue exposure of personnel to hazardous waste (for example, protective clothing)."

To prevent undue exposure of personnel to hazardous or mixed waste at the permitted and interim status hazardous waste management units, workers follow LANL-wide and facility-specific safety procedures. Prevention and control measures include administrative as well as active controls at the sites.

Administrative controls are maintained at all hazardous waste management units to control entry at the units, and to limit the number of personnel present during waste management and/or treatment activities. Worker exposure to potential hazardous and mixed waste is mitigated by containers being kept closed while in storage, most treatment activities being conducted in containment, or treatment outdoors being conducted remotely. See operations information included in Permit Application Sections 4 and 5 for specific information regarding pre-treatment and day of treatment protocols related to worker safety for open detonation and open burning hazardous waste management units.

Worker education, training, and involvement in planning activities also provide safety measures. Along with the facility-wide safety program established at LANL during hazardous waste management activities, operations at hazardous waste management units have safety requirements associated with safety in radiological or nuclear facilities (all currently permitted units) and at the open burning and open detonation units explosives safety and fire protection requirements which are discussed in detail in Permit Application Sections 4 and 5. All personnel involved in waste treatment activities will be required to have training appropriate for their work. Training requirements are presented in Permit Attachment F, *Personnel Training Plan*. Personnel will also be required to review job hazards prior to performing waste management or treatment activities. Additionally, hazard control plans (that address monitoring equipment), and work authorizations will be required, in accordance with LANL safety procedures.

Personal protective equipment (PPE) appropriate for use during the waste management and treatment activities will be worn by all on-site personnel. Hard hats, safety shoes or boots, safety glasses, hearing protection and gloves will be used, as appropriate based on Occupational Safety and Health Administration (OSHA) requirements depending on the associated work hazards identified in job-specific hazard control plans. The PPE will be compatible with the hazards present. The need for Personal Contamination Monitors (PCM, e.g., dosimeter, Draeger™ Tubes) will be established using the job hazard review process. All personnel that use PPE are trained and qualified to use the equipment properly.

Together, the established safety program, required training, plans, and work authorizations will help to prevent undue exposure to personnel~~The Permittees propose no change in the manner in which they prevent undue exposure of personnel to hazardous waste. Permit Attachment D, *Contingency Plan*, requires personnel protection equipment (PPE) by LANL workers to prevent undue exposure of personnel when handling waste. In addition, LANL personnel are required to meet applicableDOE Standard, *Industrial Hygiene Practices*, DOE-STD-6005-2001 (DOE 2001), which incorporates Occupational Safety and Health Administration requirements for PPE to prevent undue exposure of personnel when handling hazardous waste. Entry requirements exist at each of the active hazardous waste management units that are designed to present the minimum protection for entry at a hazardous waste management unit.~~.

2.7.6 Preventing Releases to the Atmosphere

The general information requirements for 40 CFR §270.14(b)(8)(vi) stipulate the part B permit application to "describe the procedures to prevent releases to the atmosphere."

The Permittees do not propose any changes in the manner in which they prevent releases to the atmosphere for waste stored in tanks or containers, or treatment activities at the permitted hazardous waste management units. Permit Parts 3, 4, 7, and 8 all have provisions that containers, tanks, or other treatment activities are kept closed during handling and storage, or contained while being treated (through glovebox operations or other containment).

In addition, this requirement is met through inspections as required by Permit Section 2.6 and Permit Attachment E, *Inspection Plan*. In summary, inspections are conducted to ensure the integrity of all stored containers and tanks. Hazardous waste stored in containers or tanks must meet requirements of 40 CFR Part 264, Subpart CC, *Air Emission Standards for Tanks, Surface Impoundments, and Containers,* ensuring that containers of hazardous waste be covered so that there are no detectable emissions of volatile organic compounds to the air. Compliance inspection and monitoring associated with container and tank monitoring are described in Permit Attachment E, *Inspection Plan*.

Because the three interim status units proposed for permitting in this Permit Renewal Application are open air treatment units, they will comply with the provisions of 40 CFR § 264, 40 CFR § 264.601 and § 270.14 by proper operation of the units in compliance with the terms of a Resource Conservation and Recovery Act (RCRA) permit issued by NMED~~releases to the atmosphere are inherently not prevented~~. Precautions and evaluations of the impact to the atmosphere by the operations at these units are included in Sections 4.7.6, *Preventing Releases to the Atmosphere,* and 5.7.6, *Preventing Releases to the Atmosphere,* of this Permit Renewal Application.

The Permittees monitor many different pathways in order to assess their impact on workers, the public, animals, and plants. The air around the Laboratory is monitored to ensure all operations at LANL are not affecting the air of nearby communities. The Permittees expects to emit certain chemical substances to the air based on the materials that are used at each facility. Like similar facilities, LANL has the potential to emit carbon monoxide, sulfur dioxide, nitrogen oxides, volatile organic compounds, and suspended particulate matter.

For more than a decade, monitoring reports have confirmed that the Lab is releasing no air emissions higher than regulations allow. The purpose of AIRNET, LANL's ambient air monitoring network, is to monitor locations where people live or work. The community of Los Alamos is downwind from LANL, so there are many monitoring stations in and around the town. Ambient monitoring is the systematic, long-term assessment of pollutant levels by measuring the quantity and types of certain pollutants in the surrounding, outdoor air. AIRNET stations monitor 24 hours a day, 365 days of the year. Particulates are collected on a filter and analyzed every two weeks for identification of analytes and assessment of the potential impact on the public.

The Permittees operate under several air emission permits issued by the New Mexico Environment Department Air Quality Bureau as well as under approvals issued by the U.S. Environmental Protection Agency for construction of new facilities or operations involving radionuclide emissions. These permits and approvals have federally enforceable emission limits and require specific pollution-control devices, monitoring of emissions from stacks, and detailed recordkeeping and reporting.

LANL is authorized to use materials and operate equipment that produce some air pollutants under the conditions defined in our Title V Operating Permit. Our permitted emission sources include a steam plant, a combustion turbine, boilers and heaters, emergency generators, beryllium operations, chemical use, degreasers, data destruction (paper shredder), evaporative sprayers, and a small asphalt batch plant. Each source type has its own emission limits for criteria air pollutants and hazardous air pollutants. The Title V Operating Permit also includes facility-wide emission limits for criteria and hazardous air pollutants. As part of compliance with the Title V Operating Permit, emissions are reported and monitoring records are provided from the permitted sources twice a year to the New Mexico Environment Department, which inspects the Laboratory periodically for compliance.

Particulate matter consists of smoke, dust, and other material that can be inhaled. Generally, it is not radioactive. Particulate matter can be harmful in high concentrations. The total amount of respirable particulate matter is monitored at two locations: near the intersection of New Mexico State Road 4 and Rover Boulevard in White Rock, and at the Los Alamos Medical Center in Los Alamos. During 2020, the particulate matter concentrations remained well below the U.S. Environmental Protection Agency standard of 35 micrograms per cubic meter for particulate matter smaller than 2.5 micrometers. Typical concentrations (>95 percent of the time) were less than 10 micrograms per cubic meter. The highest concentrations occurred during the spring from windblown dust and during the summer from wildfires.

Both open burning and open detonation activities at LANL fall well below the insignificant activity thresholds for Title V permitting under the New Mexico Administrative Code for Air Quality Operating Permits (20.2.70 NMAC). In Section 20.2.70.7.Q for Definitions, "insignificant activity" thresholds means those activities which have been listed by the department and approved by the administrator as insignificant based on size, emissions or production rate. The determination of insignificant activities for operating permits is based on the descriptions and methodology outlined in the List of Insignificant Activities provided by NMED- Air Quality Bureau for the Operating Permit Program dated March 24, 2005. Specifically open burning and open detonation determinations for emissions were evaluated based on Subsection D.6 of 20.2.70.300 NMAC (1.a and 1.b) as described in the NMED List of Insignificant Activities.

2.8 Ignitable, Reactive, and Incompatible Waste Precautions

The general information requirements for 40 CFR §270.14(b)(9) stipulate the part B permit application to describe procedures to "prevent accidental ignition or reaction of ignitable, reactive, and incompatible wastes."

Permit Section 2.8, *Ignitable, Reactive, and Incompatible Waste*, addresses the requirements to prevent accidental ignition or reaction of ignitable, reactive, and incompatible hazardous wastes as required to demonstrate compliance with 40 CFR §264.17, including the requirements of 40 CFR §§264.17, 264.176, 264.177, 264.198, and 264.199. Documentation associated with the precautions taken for ignitatable, reactive, or incompatible waste at the Facility is kept I accordance with Permit Section 2.12.2, *Facility Operating Record*, and as required by 40 CFR §264.17(c).

Permit Section 2.8 requires precautions to be in place at hazardous waste management units to prevent reactions during the treatment or storage of ignitable or reactive waste, and the mixing of incompatible waste. Permit Section 2.8.1 requires ignitable, reactive, or incompatible waste to be separated and protected from sources of ignition or reaction, including but not limited to the following: open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, or mechanical), spontaneous ignition (e.g., from heat-producing chemical reactions), and radiant heat. The Permittees recommend three changes to the requirements in Permit Section 2.8.1. The changes are summarized in Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit,* and detailed in Supplement 1-1, *Permittees' Proposed Changes to Permit Parts 1-11*.

The proposed changes are associated with the use of nonsparking processes when nonsparking tools are not available, a clarification to the requirements for compatibility of a fire-suppression system, and the addition of the requirement to add "No Smoking" signs at a permitted unit where ignitable, reactive, or incompatible wastes are treated or stored. This change is suggested for completeness and to better mirror the language within the regulations.

Nonsparking tools are used for waste management operations wherever possible. If nonsparking tools are not available or are impractical for the activity, the activity will be evaluated and a "nonsparking process" will be planned and utilized. The Permittees propose the addition of this text to Permit Section

2.8.1(4). These practices have been successfully employed in the past in specific situations such as the addition of filters to mixed transuranic waste containers with nitrate salt waste. Careful evaluation will be conducted to ensure the safe management of any handling or opening of waste containers that hold ignitable and/or reactive waste.

The fire suppression system compatibility clarification is proposed to be added at Permit Section 2.8.1(9) and is also included in Supplement 1-1, *Permittees' Proposed Changes to Permit Parts 1-11*. The added language associated with fire suppression systems is necessary to allow for mitigation when a waste is determined to be incompatible with the fire suppression system.

2.9 Traffic Pattern, Estimated Volume, and Control

The general information requirements for 40 CFR §270.14((b)(10) stipulate the part B permit application to describe "traffic patterns, estimated volume (number, type of vehicles) and control (for example, show turns across traffic lanes and stacking lanes (if appropriate); describe access road surfacing and load bearing capacity; show traffic control signals)."

This section has been updated to address current traffic patterns, estimated volume, and controls. Traffic pattern information presented in this section is general in nature for the traffic at LANL and generally focuses around the hazardous waste management units.

The rugged topography of alternating mesas and canyons at LANL limits traffic circulation to only a few major arterial roads. Approximately 100 miles of paved roads are present within LANL. The major roads are shown on Figures 1 and 2 of Permit Attachment N, *Figures*. Revised versions of these figures are included in Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures*. There are approximately 19 miles of highway, 22 miles of TA access roads, and 44 miles of roads within TAs at LANL.

The main access route to LANL is State Road 502; the majority of traffic to LANL approaches from the east on State Road 502 and East Jemez Road. Alternate access routes are available from the south and west on State Roads 4 and 501 (West Jemez Road). All persons entering LANL property must show identification in the form of a LANL-issued badge, valid federal- or state-issued identification, or be vouched for by an accompanying person who is a LANL badge holder or a person with other acceptable identification.

The pattern of east-west trending canyons at LANL prohibits north-south automobile travel in nearly all portions of LANL, with the exception of Diamond Drive and part of West Jemez Road. Los Alamos Canyon is spanned at Diamond Drive by an 820-ft.-long steel-arch bridge that was completed in 1951 and improved in 1993 and 2014. This bridge provides the main access between LANL facilities located on either side of Los Alamos Canyon.

Approximately 12,000 people are currently employed at LANL (including full-time, part-time, casual LANL personnel, and subcontractors). Roughly 6,000 people commute to LANL daily from communities outside Los Alamos County.

Hazardous waste is generated at TAs throughout LANL. Small quantities of waste are generally accumulated in containers at central accumulation areas or satellite accumulation areas and then packed in containers, such as drums, boxes, or crates, for transport to storage or treatment areas, as necessary. Bulk liquid waste is contained primarily in drums or tanks. Because hazardous waste may be generated throughout LANL, waste transport may occur on nearly all roads within LANL. Offsite wastes may be received at LANL on a limited basis, as described in Permit Section 2.2.1, *Hazardous Waste from Off-Site Sources*.

2.9.1 Routes of Travel

Primary travel routes to and from hazardous waste management units are minimized when possible. Containers received at units are also moved minimal distances on road surfaces along the routes.

TA-3-29 is located on Diamond Drive; however, waste delivered to and from the unit is not generally routed on Diamond Drive. Primary traffic routes used to transport hazardous waste to or from the TA-3-29 hazardous waste management unit include Pajarito Road, Pecos Drive, and State Road 502. Lesser-used traffic routes may include State Road 501 and Mesita del Buey Road (see Figures 1 and 2 in Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures*).

Hazardous waste management units at TA-50, TA-54, TA-55, and TA-63 are located along the Pajarito corridor. Pajarito Road is a primary thoroughfare at LANL; the TAs located along this corridor include the following: TA-3, TA-18, TA-36, TA-48, TA-51, TA-54, TA-55, TA-63, and TA-66. Most of the Pajarito corridor is closed to the public. The units located along the corridor cannot be directly accessed via Pajarito Road, and other roads, as shown on Figures 1 and 2 in Permit Attachment N, are used for access to the units. Pajarito Road is a two-lane road built for 55-mile-per-hour traffic with no vehicle size restrictions, with only limited heavy truck and fuel-truck traffic prohibitions. Roads along Pajarito Road that might be used to transport hazardous waste to and from the hazardous waste management units along the Pajarito corridor include the following:

- Pecos Drive and Mesita del Buey Road at TA-50,
- Mesita del Buey Road at TA-54,
- Puye Road at TA-63, and
- Pecos Drive at TA-55.

As discussed in Section 2.7.1, *Waste Handling and Preventing Hazards in Unloading/Loading,* of this Permit Renewal Application, waste transportation may occur using flatbed trucks, trailers, forklifts, or other appropriate vehicles. Loading and unloading activities will be conducted in designated areas at each of the units. It is anticipated that forklifts will be the primary vehicle traffic at each of the units, with the only other vehicle traffic within the unit footprints (at outdoor storage units) being semi-trucks (for occasional placement and removal of characterization equipment/trailers), delivery trucks with specialty gases (for characterization and radiation protection equipment), and snow removal equipment. Snow removal equipment such as blade-equipped all-terrain vehicles may also be used. Snow removal equipment such as snow plows may be used for heavy snows, but those vehicles would not be used near waste containers stored outside. If snow removal within the vicinity of any stored waste containers is needed, snow shovels or a snow blower will be used. Other vehicles or equipment that may be required to perform maintenance at the units will also be escorted and speeds will be limited around waste operations in the area.

2.9.2 Traffic Volumes

Pajarito Road has an average daily traffic volume of approximately 4,000 vehicles per 24-hour day (LANL 2008). This road has since been closed to the public and only badge holders are permitted on the corridor. This includes vehicles traveling both northwest and southeast. Vehicle types include cars, light- and medium-duty trucks, and vans. Anticipated traffic volumes at each of the outdoor storage hazardous waste management units will be from one to several waste shipments by truck to or from loading/unloading areas per day, forklift traffic within the units, occasional delivery trucks for analytical gases and other supplies, and (rarely) waste characterization trailer movement (at applicable units). All parking areas are located well away from the location of hazardous waste management units.

2.9.3 Traffic Control Signals

Applicable traffic control signals at each of the hazardous waste management units are shown on site maps included within new renumbered Figures included in Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures*.

2.9.4 Road Surfacing and Load-Bearing Capacity

Roads at LANL are generally two-lane roads with asphaltic concrete surfaces. Load-bearing capacity for these roads is 32,000 pounds per axle. These roads are typically constructed with a 6-inch-thick base course overlain with a 3-inch-thick asphaltic concrete surface. These roads were designed and constructed to meet Specification HS-20 of the American Association of State Highway and Transportation Officials.

2.10 Facility Location Information

The general information requirements for 40 CFR §270.14(b)(11) stipulate the part B permit application to describe compliance with the follow standards:

- the seismic standard;
- the floodplain requirements for 40 CFR §§270.14(b)(11) and 264.18; and
- the topographic map requirements at 40 CFR §270.14(b)(19).

2.10.1 Seismic Standard

The general information requirements for 40 CFR §270.14(b)(11) stipulate the part B permit application to address the seismic standard for 40 CFR §264.18(a) under certain circumstances. Proposed new or enlarged units are required to demonstrate compliance with the seismic location standard of 40 CFR 264.18(a) and 270.14(b)(11)(ii). 40 CFR §270.14(b)(11) requires Applicants to identify the political jurisdiction (e.g., county, township, or election district) in which the Facility is proposed to be located and, if the Facility is proposed to be located in an area listed in Appendix VI of part 264, the owner or operator shall demonstrate compliance with the seismic standard for 40 CFR §264.18(a). The seismic standard requires that portions of new facilities where treatment, storage, or disposal of hazardous waste will be conducted must not be located within 61 meters (200 feet) of a fault that has experienced displacement in Holocene time.

LANL is located in Los Alamos County, New Mexico, which is a political jurisdiction listed in Appendix VI of part 264. Therefore, the seismic standard for 40 CFR §264.18(a) is applicable.

The Permittees demonstrated compliance with 40 CFR §264.18(a) for each of their permitted units. As required by 40 CFR §270.14(b)(11)(ii), this demonstration was made using either published geologic data or data obtained from field investigations carried out by the Permittees.

The Permittees are not proposing any new or enlarged units. The three interim status units (TA-16-388 Flash Pad, TA-36-8, and TA-39-6) the Permittees include in this Permit Renewal Application are exempt from the seismic standards in 40 CFR §§ 270.14(b)(11) and 264.18(a). The units have been in use since the 1940s; therefore, the units existed before the promulgation of the hazardous waste regulations. Consistent with the criteria provided in 40 CFR §§ 270.14(b)(11)(i) and 264.18(a), the hazardous waste management units at TA-16-388, TA-36-8, and TA-39-6 are not new units; thus, the seismic standard is not applicable. At the request of the NMED-HWB, seismic location standard information for the three interim status units (TA-16-388 Flash Pad, TA-36-8, and TA-39-6) is included as part of the Permittees' response to a letter received from the NMED-HWB on January 25, 2022 (LANL, 2022). The seismic investigation demonstrates that there has been no direct evidence observed for Holocene faulting within the noted radius of the facility.

2.10.2 Floodplain Standard

The general information requirements for 40 CFR §270.14(b)(11)(iii) stipulate the part B permit application to "identify whether the facility and hazardous waste management units are located within a 100-year floodplain."

None of the hazardous waste management units making up the LANL hazardous waste facility lie within a 100-year floodplain as defined in 40 CFR §264.18(b)(2)(i) and as regulated under §264.18(b)(1). Figures 2-1 and 2-2 within this Permit Renewal Application depict the 100-year floodplains at LANL and the locations of hazardous waste management units.

2.10.3 Topographic Maps

The general information requirements for 40 CFR §270.14(b)(19) (i) – (xii) stipulate a part B permit application to include topographic maps, figures, and drawings to meet the requirements of 40 CFR §§270.14(b)(19) and 270.13(l). For large facilities, the use of other scales is allowed on a case-by-case basis. The maps show the map scale, the date of preparation, and a north arrow. The maps and figures used to fulfill these regulatory requirements include the following:

- 100-year floodplain maps showing the location of each of the hazardous waste units at LANL is provided as Figures 2-1 and 2-2 of this Permit Renewal Application.
- Maps showing surface waters, including intermittent streams, near each of the hazardous waste management units are included on the TA-specific topographic maps within the concurrent submittal of the LANL General Part A Permit Application, Revision 10.0 (LANL 2020a).
- Surrounding land uses (e.g., residential, recreational) are depicted on updated Figures 1 and 3 within Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures*.
- Wind roses for LANL are shown on Figure 2-3.
- A topographic map showing the legal boundaries of LANL is included within the concurrent submittal of the LANL General Part A Permit Application, Revision 10.0 (LANL 2020a).

- The access control features (fences, gates) applicable for each of the hazardous waste management units are shown on newly numbered Figures 3 through 13 in Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures*.
- A map that includes supply wells, monitoring wells, test wells, springs, and surface-water sampling stations at LANL is included as Map 3 within the concurrent submittal of the LANL General Part A Permit Application, Revision 10.0 (LANL 2020a).
- The locations of buildings and structures, the hazardous waste management units, and the terrain for a distance of at least 1,000 feet beyond each of the hazardous waste management units are all shown on the topographic maps for each of the TAs that house hazardous waste management unit that are included within the concurrent submittal of the *LANL General Part A Permit Application, Revision 10.0* (LANL 2020a).
- The locations of the Clean Water Act National Pollutant Discharge Elimination System discharge structures are included within Map 2 within the concurrent submittal of the *LANL General Part A Permit Application, Revision 10.0* (LANL 2020a).
- Storm, sanitary, and process sewer systems at LANL are shown on Map 2 within the concurrent submittal of the *LANL General Part A Permit Application, Revision 10.0* (LANL 2020a).
- Drainage control features, where appropriate, located at each of the hazardous waste management units are shown onsite maps included within the concurrent submittal of the *LANL General Part A Permit Application, Revision 10.0* (LANL 2020a).
- Natural surface drainages near the active hazardous waste management units are shown on the TA-specific topographic maps within the concurrent submittal of the *LANL General Part A Permit Application, Revision 10.0* (LANL 2020a).
- Fire stations serving LANL and the County of Los Alamos are shown on Figure D-2 within the revised Permit Attachment D, *Contingency Plan,* included as Supplement 1-4, *Permittees' Proposed Changes to Attachment D, Contingency Plan*.
- All existing wells and boreholes at LANL are shown on Map 3 in the concurrent submittal of the *LANL General Part A Permit Application, Revision 10.0* (LANL 2020a).

Contour lines on all topographic maps are at intervals sufficient to detail natural drainage at LANL. As provided in 40 CFR §270.14(b)(19), LANL has submitted the maps to the NMED-HWB at these scales and contour intervals due to the size of the units, the extent of the LANL Facility, and the topographic relief in the area.

2.11 Personnel Training

The general information requirements for 40 CFR §270.14(b)(12) stipulate that the part B permit application have an "outline of both the introductory and continuing training programs by owners and operators to prepare persons to operate or maintain a hazardous waste management facility in a safe manner as required to demonstrate compliance with 40 CFR §264.16. A brief description of how training will be designed to meet actual job tasks in accordance with the requirements of 40 CFR §264.16(a)(3)."

A copy of the Permittees' personnel training program is included in the Permit as Permit Attachment F, *Personnel Training*, and a revised version of that plan attached to this Permit Renewal Application as Supplement 1-6, *Permittees' Proposed Changes to Attachment F, Personnel Training Plan*. The Training Plan is required for hazardous waste management activities or activities that have the potential to have contact with waste containers in a hazardous waste management unit in compliance with the requirements of 40 CFR §264.16. The Permittees are proposing minor, nonsubstantive changes to the plan that include updates to reflect revised terminology, updated standards, and deletion of repetitive language. These changes are summarized in Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit,* and are included as Supplement 1-6, *Permittees' Proposed Changes to Permit Attachment F, Personnel Training Plan*.

2.12 Closure Plan

The general information requirements for 40 CFR § 270.14(b)(13) stipulate that the part B permit application have a "copy of the Closure Plan and, where applicable, the post-closure plan required by 264.112, 264.118, and 264.197. Include, where applicable, as part of the plans, specific requirements in 264.178, 264.197, 264.228, 264.258, 264. 280, 264.310, 264. 351, 264.601, and 264.603."

A copy of the Closure Plan for each of the 27 permitted hazardous waste management units is included in Permit Attachments G.1–G.30. Proposed changes to existing closure plans and additional closure plans are summarized in Appendix 3, *Summary Table of Proposed Changes to Hazardous Waste Management Unit Closure Plans,* and are included Supplement 3-1, *Permittees' Proposed Changes to Attachments G.1 through G.30 Closure Plans*, to meet the requirements of 40 CFR §§270.14(b)(13) and 264.112. All the plans within the 2010 Permit were approved in accordance with 40 CFR §§264.110 through 264.116, 264.178, 264.197, 264.601, and 265.381. In addition, the Permittees are proposing specific changes to closure plans in Permit Attachments G.1 through G.30, in accordance with the Settlement Agreement reached in *U.S. v. Curry*, DC NM Case No. 10-01251 (see Section 6.0, Permit Changes). These proposed changes to the closure plans are also summarized in Appendix 3.

Addition of closure plans are discussed in Sections 4.11 and 5.11 of this document.

2.13 Closure for Hazardous Waste Disposal Units

The general information requirements for 40 CFR §270.14(b)(14) stipulate that the part B permit application include "for hazardous waste disposal units that have been closed, documentation that notices required under 264.119 have been filed."

The Permittees do not have active hazardous waste disposal units under the Permit. Therefore, no notices required by 264.119 have been filed.

2.14 Cost Estimates, Insurance, Financial Mechanisms

The general information requirements for 40 CFR §§270.14(b)(15) – 270.14(18) stipulate that the part B permit application include, where appropriate, the most recent closure and post-closure cost estimate for the facility; a copy of insurance policy; and proof of coverage by a State's financial mechanism.

LANL is a federally owned facility and is exempt from the financial assurance requirements of 40 CFR subpart H, including cost estimates, liability insurance, financial mechanisms ,and proof of financial coverage under 40 CFR §§270.14(b)(15) – 270.14(18), incorporating the requirements of 40 CFR §§264.142-.150.

2.15 Other Federal Law

The general information requirements for 40 CFR § 270.14(b)(20) stipulate that a part B permit application include such information as necessary to enable the applicable regulator to carry out duties under other federal laws as required under 40 CFR §270.3 to be given consideration when applying for a hazardous waste facility permit. When any of these laws are applicable, its procedures must be followed:

The Wild and Scenic Rivers Act (16 United States Code [USC] 1273 et seq.). This act provides for a national wild and scenic rivers system and prohibits construction of any waterway that would have a direct adverse effect on the values for which a wild and scenic river was established.

The National Historic Preservation Act of 1966 (16 USC 470 et seq.). This act establishes a program to preserve historic properties throughout the country. The act has provisions that require mitigation of adverse effects to registered properties.

The Endangered Species Act of 1973 (16 USC 1531). This act provides for the conservation of endangered and threatened species of fish, wildlife, and plants. The act prohibits any action that would jeopardize the continued existence of any endangered or threatened species or adversely affect its critical habitat.

The Migratory Bird Treaty Act (16 U.S.C. 703-712). This act makes it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid Federal permit. Migratory bird species protected by the Act are listed in 50 CFR 10.13.

The Coastal Zone Management Act of 1972 (16 USC 1451 et seq.). This act establishes national policy for the management, use, protection, and development of land and water resources of the nation's coastal zones. Section 307(c) of the act and implementing regulations prohibit the EPA from issuing a permit for activity affecting coastal zone land or water without the certification from the applicant that the activity is in compliance with the state's Coastal Zone Management Program.

The Fish and Wildlife Coordination Act of 1934, as amended (16 USC 661 et seq.). This act promotes the conservation of wildlife, fish, and game and integrates this conservation with water resource projects. Certain provisions of the act require that permits proposing or authorizing the impoundment, diversion, or other control or modification of any body of water be considered by the appropriate state agency for impacts to wildlife resources.

Because LANL has ongoing programs in support of the National Historic Preservation Act, the Endangered Species Act, and the Fish and Wildlife Coordination Act, consideration was given to all these federal laws.

The National Historic Preservation Act is administered by the Advisory Council on Historic Preservation, appointed by the President, along with the New Mexico State Historic Preservation Office. Section 106 of the Act requires DOE to consider the effects of its actions on historic properties and provide the Council with a reasonable opportunity to comment on those actions and the manner in which DOE takes historic properties into account in their decisions. DOE accomplishes this through consultation with the State Historic Preservation Office whenever a project may potentially impact a historic property. At

LANL, historic properties include prehistoric and historic archaeological sites, historic Manhattan Project and Cold War-era buildings, and associated artifacts. LANL may prepare a Historic Building Survey Report assessing the eligibility of a historic building dating from the Manhattan Project and early Cold War periods (1943 to 1956) for the National Register of Historic Places and evaluating the impacts of the proposed actions. The consultation process was formalized in April 2000 through a Programmatic Agreement between DOE, the Council, and the State.

For any undertaking on DOE land that may directly or indirectly impact threatened and endangered species or their habitat, DOE must consult with the U.S. Fish and Wildlife Service, as provided under Section 7 of the Endangered Species Act. Similarly, DOE must consult with the U.S. Fish and Wildlife Service for projects that would impound, divert, or otherwise control or modify a body of water, as required by the Fish and Wildlife Coordination Act.

For Endangered Species Act compliance, LANL may prepare a Biological Assessment to document the presence of threatened and endangered species and to evaluate the impacts of a project on a listed species or its habitat. DOE will then request in writing that the U.S. Fish and Wildlife Service concurs with DOE’s findings in the Biological Assessment. In 2000, DOE and LANL streamlined the consultation process by preparing a threatened and endangered Species Habitat Management Plan. This plan fulfills the provisions of the Endangered Species Act that require federal agencies to carry out programs for the conservation of threatened and endangered species and their habitat. The U.S. Fish and Wildlife Service approved this plan in February 1999.

For Migratory Bird Treaty Act compliance, LANL ensures that operations and activities do not cause the take (including killing, capturing, selling, trading, and transport) of any migratory bird, including eggs and nestlings in an active nest.

Provisions in the Wild and Scenic Rivers Act and the Coastal Zone Management Act are not applicable to LANL's activities.

Consideration will be given to Executive Orders, issued by the President, that are relevant to waste management activities at LANL. When any of these Orders is applicable, its provisions will be followed. Requirements for Executive Orders are reserved in 40 CFR §270.3(f).

2.16 Groundwater Monitoring

The general information requirements for 40 CFR §§270.14(c)(1) – 270.14(c)(8) stipulate that a part B Permit Renewal Application include additional information regarding groundwater protection for regulated units. The three regulated units at LANL are located at TA-54. They are Material Disposal Areas (MDAs) G, H, and L.

The requirements of 40 CFR §§270.14(c)(1 through 8) for regulated units are met by LANL Interim Facility-Wide Groundwater Monitoring Plan for the 2020 Monitoring Year, October 2019-September 2020 (IFGMP) (LANL 2020b), Section 5-*Technical Area 54 Monitoring Group*. As described in Section II.C of the Consent Order (New Mexico 2005), the monitoring conducted under this program meets the requirements of 40 CFR §§270.14(c)(1 through 8) for the Permittee’s groundwater, detection and compliance monitoring programs, as well as the required corrective action program.

“(c) ***Additional information requirements.*** The following additional information regarding protection of groundwater is required from owners or operators of hazardous waste facilities containing a regulated unit, except as provided in § 264.90(b) of this chapter:

> **(1)** A summary of the groundwater monitoring data obtained during the interim status period under §§ 265.90 through 265.94, where applicable.”

The Permittees have not collected groundwater data under interim status.

> **“(2)** Identification of the uppermost aquifer and aquifers hydraulically interconnected beneath the facility property, including groundwater flow direction and rate, and the basis for such identification (i.e., the information obtained from hydrogeologic investigations of the facility area).”

There has been no change in the identification of the uppermost aquifer or aquifers hydraulically connected beneath the LANL facility property, as detailed in the most recent version of the IFGMP.

> “**(3)** On the topographic map required under paragraph (b)(19) of this section, a delineation of the waste management area, the property boundary, the proposed “point of compliance” as defined under § 264.95, the proposed location of groundwater monitoring wells as required under § 264.97, and, to the extent possible, the information required in paragraph (c)(2) of this section.”

There is no change to the delineation of the waste management area, the property boundary, the point of compliance as defined under §264.95, or the location of groundwater monitoring wells as required under §264.97. The information required in paragraph (c)(2) of this section (i.e., identification of the uppermost aquifer and aquifers hydraulically interconnected beneath the facility property, including groundwater flow direction and rate) is provided in detail in the most recent version of the IFGMP, including Figure 5.1-1.

> **“(4)** A description of any plume of contamination that has entered the groundwater from a regulated unit at the time that the application was submitted that:
>
> > **(i)** Delineates the extent of the plume on the topographic map required under paragraph (b)(19) of this section;”

No plume of contamination has entered the groundwater from the regulated units at TA-54. Groundwater monitoring results for the regulated units are reported in the Annual Periodic Monitoring Report for the TA-54 Monitoring Group.

> > “**(ii)** Identifies the concentration of each Appendix IX, of part 264 of this chapter, constituent throughout the plume or identifies the maximum concentrations of each Appendix IX constituent in the plume.”

No plume of contamination has entered the groundwater from the regulated units at TA-54. Groundwater monitoring results for the regulated units are reported in the Annual Periodic Monitoring Report for the TA-54 Monitoring Group.

> “**(5)** Detailed plans and an engineering report describing the proposed groundwater monitoring program to be implemented to meet the requirements of § 264.97.”

The detailed plans and an engineering report describing the proposed groundwater monitoring program for the regulated units are included in the most recent version of the IFGMP.

> "**(6)** If the presence of hazardous constituents has ***not*** been detected in the groundwater at the time of permit application, the owner or operator must submit sufficient information, supporting data, and analyses to establish a detection monitoring program that meets the requirements of § 264.98. This submission must address the following items specified under § 264.98:"

Hazardous constituents have been detected above applicable standards in groundwater in the vicinity of the regulated units (MDAs G, H, and L) at TA-54 in the most recent groundwater monitoring sampling event. Groundwater monitoring results for the regulated units are reported in the Annual Periodic Monitoring Report for the TA-54 Monitoring Group. The IFGMP includes the detection monitoring program that has been established to meet the requirements within Section II.C of the 2016 Consent Order (New Mexico 2016) and hence §264.98 for regulated units.

> "**(i)** A proposed list of indicator parameters, waste constituents, or reaction products that can provide a reliable indication of the presence of hazardous constituents in the groundwater;"

The indicator parameters, waste constituents, and reaction products that provide a reliable indication of the presence of hazardous constituents in the groundwater are listed in the most recent version of the IFGMP, Section 5 - Technical Area 54 Monitoring Group.

> "**(ii)** A proposed groundwater monitoring system;"

The Permittees' groundwater monitoring system is detailed in the most recent version of the IFGMP, Section 5 - Technical Area 54 Monitoring Group.

> "**(iii)** Background values for each proposed monitoring parameter or constituent, or procedures to calculate such values; and"

There has been no change to the background values for each proposed monitoring parameter. The applicable background or screening levels used for each analyte are listed in Appendix B of the most recent version of the IFGMP.

> "**(iv)** A description of proposed sampling, analysis, and statistical comparison procedures to be utilized in evaluating groundwater monitoring data."

The Permittees' sampling, analysis, and statistical comparison procedures to be utilized in evaluating groundwater monitoring data are detailed in the most recent version of the IFGMP, Table 1.7-2.

> "**(7)** If the presence of hazardous constituents has been detected in the groundwater at the point of compliance at the time of the permit application, the owner or operator must submit sufficient information, supporting data, and analyses to establish a compliance monitoring program that meets the requirements of § 264.99. Except as provided in § 264.98(h)(5), the owner or operator must also submit an engineering feasibility plan for a corrective action program necessary to meet the requirements of § 264.100, unless the owner or operator obtains written authorization in advance from the Regional Administrator to submit a proposed

permit schedule for submittal of such a plan. To demonstrate compliance with § 264.99, the owner or operator must address the following items:

(i) A description of wastes previously handled at the facility.

(ii) A characterization of the contaminated groundwater, including concentrations of hazardous constituents.

(iii) A list of hazardous constituents for which compliance monitoring will be undertaken in accordance with §§ 264.97 and 264.99.

(iv) Proposed concentration limits for each hazardous constituent, based on the criteria set forth in § 264.94(a), including a justification for establishing any alternate concentration limits.

(v) Detailed plans and an engineering report describing the proposed groundwater monitoring system, in accordance with the requirements of § 264.97.

(vi) A description of proposed sampling, analysis, and statistical comparison procedures to be utilized in evaluating groundwater monitoring data."

Hazardous constituents ([1,4-]dioxane and bis(2-ethylhexyl)phthalate) have been detected above applicable standards in groundwater in the vicinity of the regulated units (MDAs G, H, and L) at TA-54 in the most recent groundwater monitoring sampling event. Groundwater monitoring results for the regulated units are reported in the Annual Periodic Monitoring Report for the TA-54 Monitoring Group. The IFGMP establishes the requirements for the compliance monitoring program, as described in § 264.99 for the regulated units at TA-54. The informational requirements to items (i) through (vi) are provided in the most recent version of the IFGMP and the Annual Periodic Monitoring Report for the TA-54 Monitoring Group.

"**(8)** If hazardous constituents in the groundwater have been measured that exceed the concentration limits established under § 264.94 Table 1, or if groundwater monitoring conducted at the time of permit application under 265.90 through 265.94 at the waste boundary indicates the presence of hazardous constituents from the facility in groundwater over background concentrations, the owner or operator must submit sufficient information, supporting data, and analyses to establish a corrective action program that meets the requirements of § 264.100. However, an owner or operator is not required to submit information to establish a corrective action program if he or she demonstrates to the Regional Administrator that alternate concentration limits will protect human health and the environment after considering the criteria listed in § 264.94(b). An owner or operator who is not required to establish a corrective action program for this reason must instead submit sufficient information to establish a compliance monitoring program that meets the requirements of § 264.99 and paragraph (c)(6) of this section. To demonstrate compliance with § 264.100, the owner or operator must address, at a minimum, the following items:

(i) A characterization of the contaminated groundwater, including concentrations of hazardous constituents.

(ii) The concentration limit for each hazardous constituent found in the groundwater, as set forth in § 264.94.

(iii) Detailed plans and an engineering report describing the corrective action to be taken.

(iv) A description of how the groundwater monitoring program will demonstrate the adequacy of the corrective action.

(v) The permit may contain a schedule for submittal of the information required in paragraphs (c)(8) (iii) and (iv), provided the owner or operator obtains written authorization from the Regional Administrator before submitting the complete permit application."

Hazardous constituents ([1,4-]dioxane and bis(2-ethylhexyl)phthalate) have been detected above applicable standards in groundwater in the vicinity of the regulated units (MDAs G, H, and L) at TA-54 in the most recent groundwater monitoring sampling event. Groundwater monitoring results for the regulated units are reported in the Annual Periodic Monitoring Report for the TA-54 Monitoring Group. The Consent Order and the IFGMP meet the corrective action program requirements of § 264.100. The informational requirements to items (i) through (v) are provided in the most recent version of the IFGMP and the Annual Periodic Monitoring Report for the TA-54 Monitoring Group.

2.17 Solid Waste Management Units

The general information requirements at 40 CFR §270.14(d) stipulate that a part B permit application contains information regarding each SWMU at the Facility. This information includes location, designation, descriptions, operation, and all wastes managed at the unit. Furthermore, information is required for releases of hazardous wastes or hazardous constituents from these units.

The Permittees conduct limited corrective actions for releases from SWMUs or Areas of Concern (AOCs) under the Permit rather than under the Consent Order, under the following circumstances:

1. New releases and newly discovered releases of hazardous waste or hazardous constituents from hazardous waste management units at the Facility.
2. The closure and post-closure care requirements of 40 CFR Part 264, Subpart G, as they apply to hazardous waste management units at the Facility.
3. Implementation of controls, including long-term monitoring, for any SWMUs or AOCs listed in Permit Attachment K (Listing of SWMUs and AOCs), Table K-2 (Corrective Action Complete with Controls).
4. Any corrective action conducted to address releases of hazardous waste or hazardous constituents that occur or are discovered after the date on which the Consent Order terminates.
5. Newly created SWMUs and AOCs from nonpermitted operations.

The Permittees coordinate all corrective action conducted under the current Permit with corrective action conducted under the Consent Order, in accordance with the requirements for 40 CFR §264.101. Corrective action for releases from hazardous waste management units that commingle with releases originating from other sources are conducted under the Consent Order and represent the bulk of the corrective actions undertaken. If corrective action for a SWMU or an AOC is not subject to corrective action under the Consent Order, the corrective action will be performed under the Permit.

2.17.1 Summary Tables of SWMUs and AOCs

Tables 2.1 through 2.8 herein provide summaries of all SWMUs and AOCs located within or in close proximity to the RCRA Permitted units. The Table provides

- the SWMU Number (current or former number),
- the location of the unit,
- the type of unit,
- the SWMU and AOC general dimensions and structural description,
- operational dates (if known),
- the type(s) of waste managed at the unit and release information, and
- the unit's current status (active or inactive and NMED status).

The documents used to prepare this Table are cited in the Reference List within Section 7, *References,* of this Permit Renewal Application.

Note that where applicable, references below to SWMU and AOC listings on the LANL Hazardous Waste Facility Permit Table K-1 may not be reflective of the investigative status of the SWMU/AOC, as the Permittees plan to propose adjustments to the LANL Hazardous Waste Facility Permit Tables K-1, K-2, and K-3 through permit modification requests apart from this reapplication.

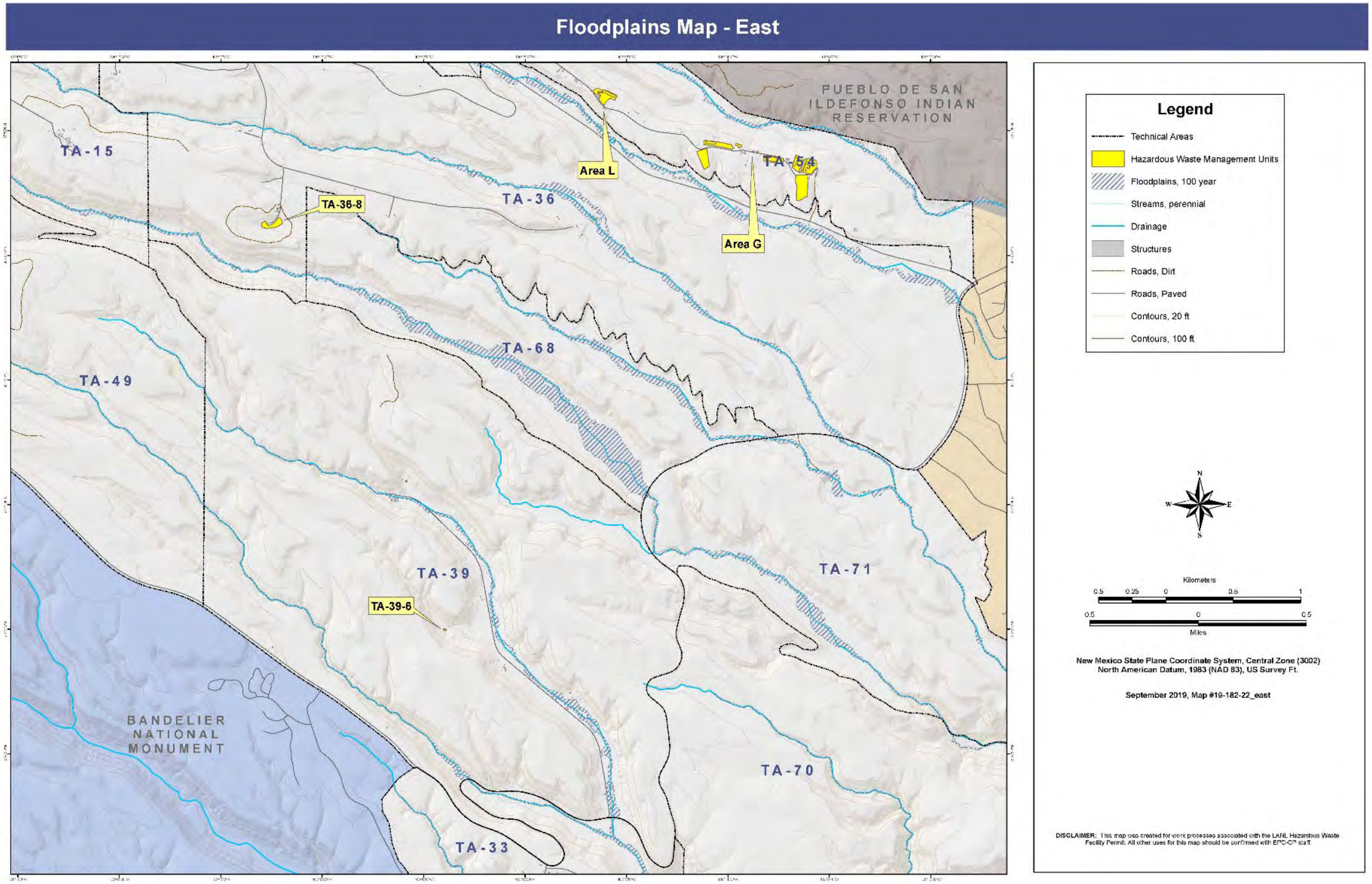

Figure 2-1. LANL floodplains (East)

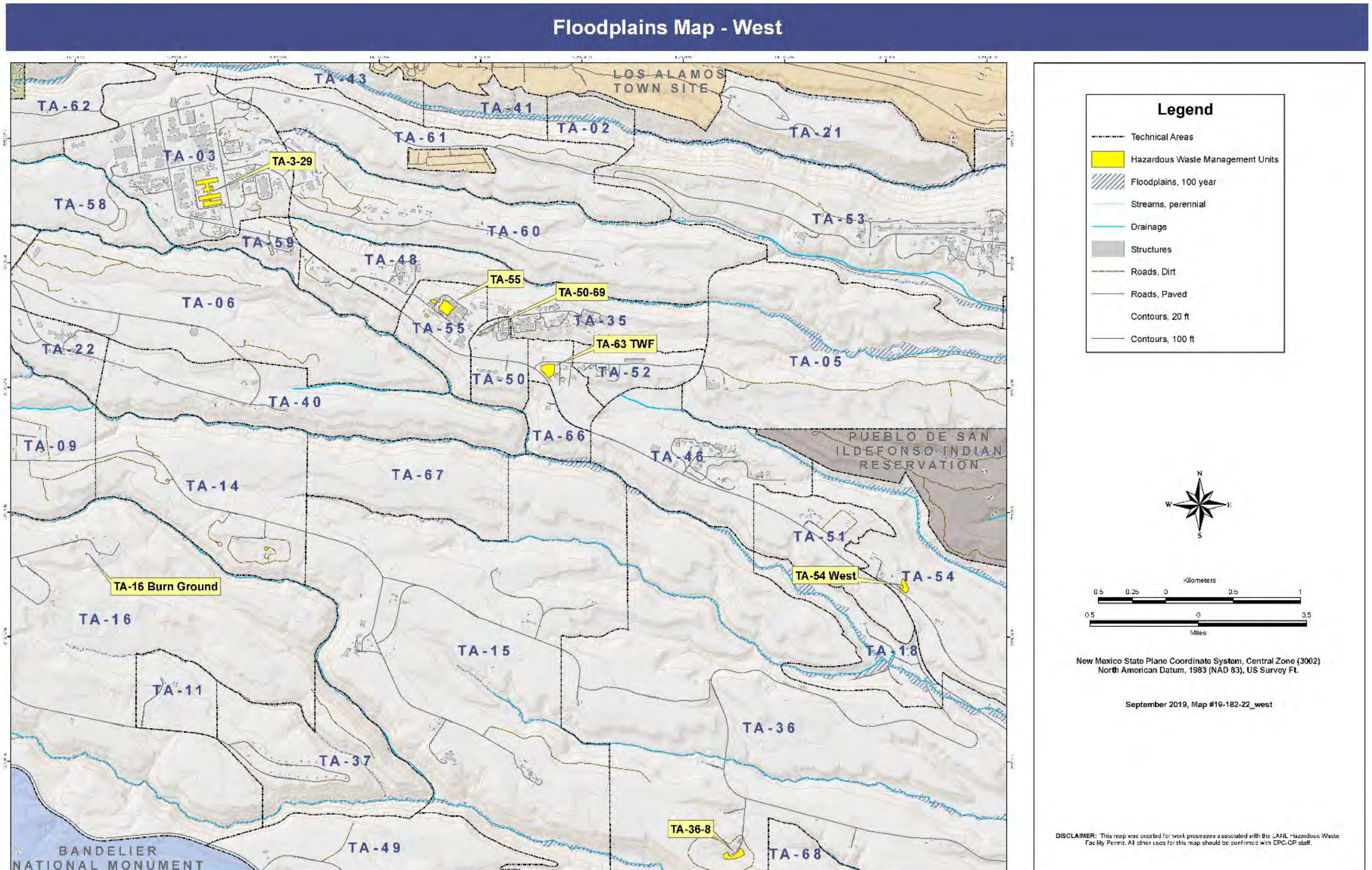

Figure 2-2. LANL floodplains (West)

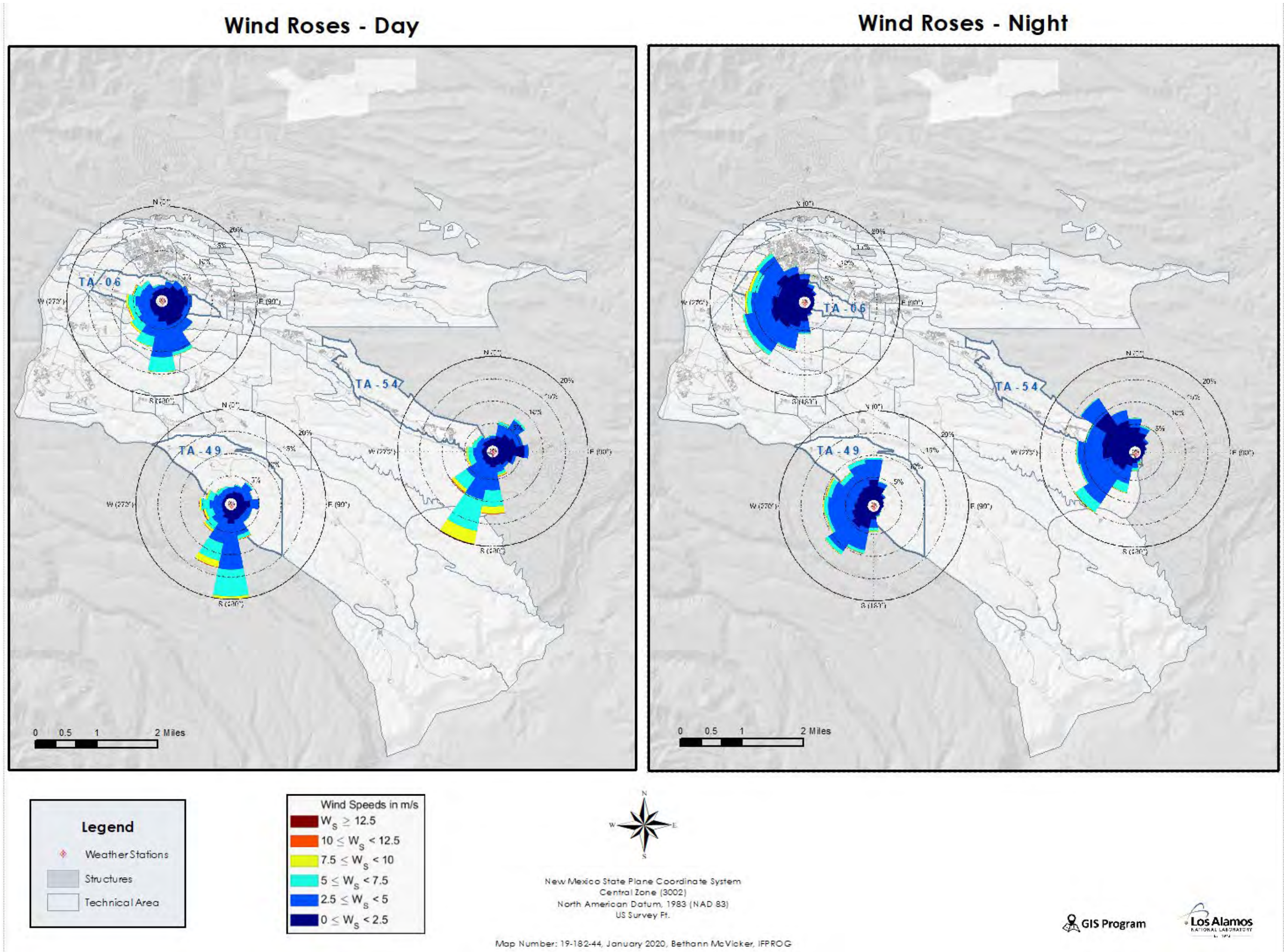

Figure 2-3. Wind Roses (day and night averaged for the 365 days of 2018)

Table 2-1. TA-3 SWMU Descriptions

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
03-025(b)	TA-03 (building 03-102)	Sumps	Active sump: 40 inches x 24 inches x 30 inches; this unit is positioned on the concrete basement floor within an 8-inch-high concrete berm. Inactive sump: 0.25-inch-thick welded steel box contained in a concrete sump in the sub-floor; wastewater flows from floor, show and sink drains in 03-102 through sumps to the radioactive liquid waste line to the radioactive liquid waste treatment facility at TA-50.	Unknown to present	Radiological wastewater, oil; no investigations have been conducted to date. However, available information indicates a very low likelihood of release of contaminants.	Active. Site is deferred per the Consent Order. This SWMU is included on the LANL Hazardous Waste Facility Permit Table K-1.
03-050(d)	TA-03 (south side of building 03-102)	Soil contamination	Approximately 20-ft. x 6-ft. area of potential soil contamination from deposition of contaminants from exhaust emissions from a baghouse air-pollution control device.	1957-1992	Radioactive air emissions; radiological field survey results showed no detectable activity on the concrete pad or surrounding soil.	Inactive. Investigation in progress; SWMU is on the LANL Hazardous Waste Facility Permit Table K-1
03-051(b)	TA-03 (southwest corner of building 03-102)	Soil contamination	Two areas of soil contamination associated with former location of two air compressors; each area measures approximately 12 ft. x 12 ft.	Unknown to 1992	Lightweight mineral oil, polychlorinated biphenyls (PCBs); wipe samples collected from two compressors previously located in this location showed PCB concentrations ranging from 9.4 ug/100 sq. cm to 17 ug/100 sq. cm; a concrete slab now extends from the former compressor locations to the fence line south of building 03-0102; there is no evidence of staining on the concrete.	Inactive. Investigation in progress; AOC is on the LANL Hazardous Waste Facility Permit Table K-1.

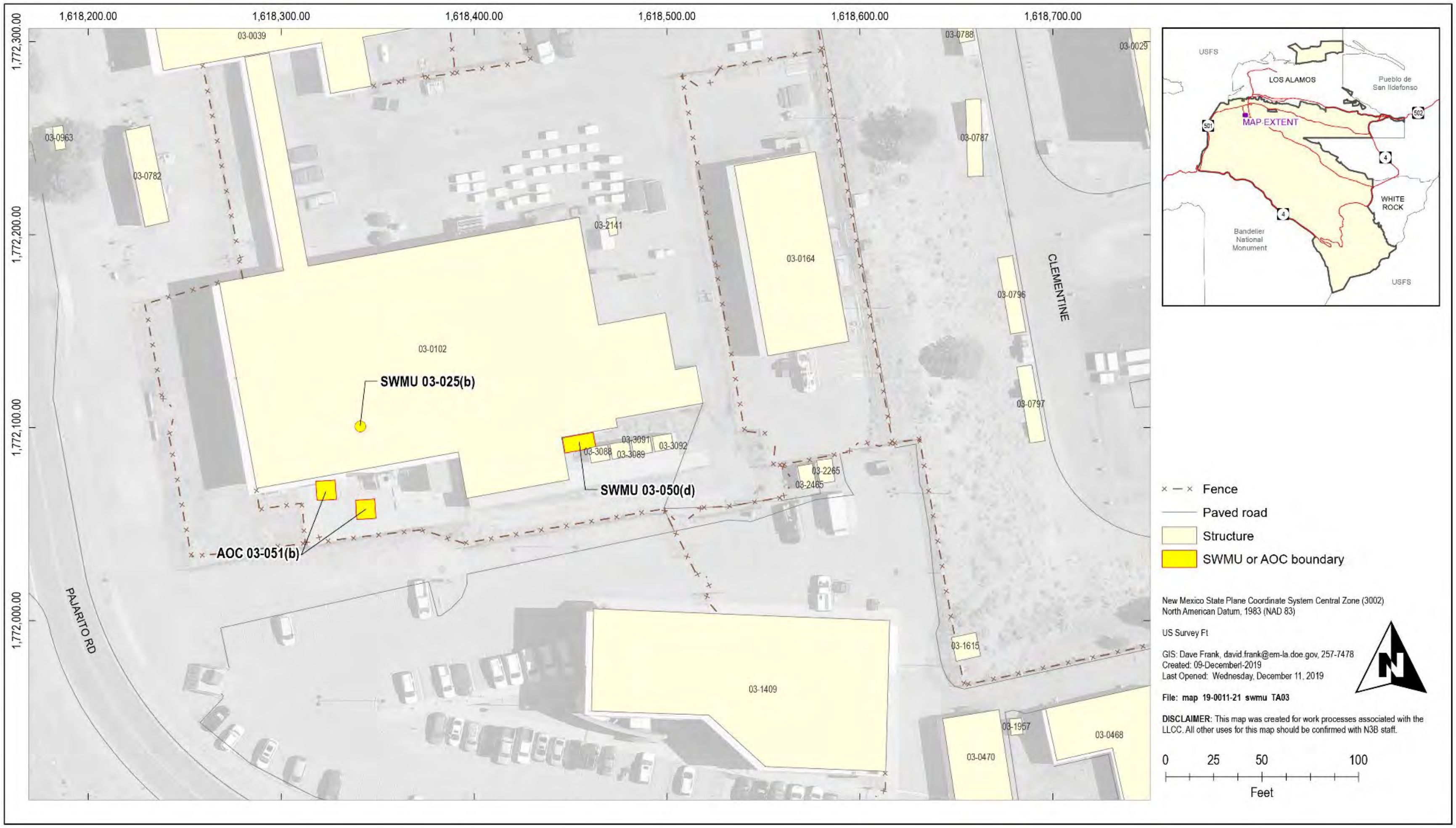

Figure 2-4. TA-03 SWMUs and AOCs

Table 2-2. TA-16 SWMU Descriptions

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
16-010(c)	TA-16-388	Flash Pad/Burn Tray	Former burn tray converted to an enclosed 100-ft x 100-ft. concrete pad and 16-ft. x 4-ft. metal tray situated 2 ft .above ground surface. The current unit consists of a 22-ft. x 22-ft. concrete pad set on secondary containment and surrounded on three sides by a concrete wall. The current burn tray consists of a stainless-steel kettle that is 30 inches in diameter and 24 inches in height. Propane burners are used to treat HE-contaminated liquid wastes at the burn tray. The entire assembly, which can be covered with a retractable cover, is provided with secondary containment.	1950s to present	HE, metals, and dioxins/furans were all known to have been used onsite; periodic soil monitoring is conducted as part of operational conditions.	Active RCRA unit; not subject to the Consent Order.
16-010(d)	TA-16-399 (Burning Ground)	Burn Tray	100 sq. ft. enclosed area consisting of a concrete pad and burn table situated 2 ft. above the ground surface and a 16 ft. x 4 ft. metal tray.	1950s to present	HE and metals were known to have been used onsite; no soil sampling has been performed under the Consent Order at SWMU 16-010(d).	Inactive; currently undergoing RCRA closure; anticipated for clean closure approval.
C-16-001	TA-16 (NE Corner) 16-384	Building – Former Aboveground Platform	This elevated platform was situated above three HE wastewater troughs that exited former building 16-390. Wash water originally flowed to HE filter beds and then to metal	1951-1970	HE; no documented releases or management of solid or hazardous wastes is associated with this AOC.	Inactive; will be recommended for corrective action complete; included on LANL Hazardous Waste Facility Permit Table K-1

Table 2-2. TA-16 SWMU Descriptions (continued)

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
			pressure filter vessels. The T-shaped platform was constructed of steel and measured 8.5 ft. x 3 ft. x 4 ft.			
16-010(h)/16-010(h)-99	TA-16 (NE Corner)	Former Basket Wash House (Building 16-390)	Former basket wash facility used to clean filters from site-wide HE sumps and directed filtered wash water to troughs. The former basket-wash house measured approximately 25 ft. x 25 ft.	1951-1966	HE and metals; suspected lead and HE releases.	Inactive; investigation in progress; included on LANL Hazardous Waste Facility Permit Table K-1
16-010(j)/16-010(h)-99	TA-16 (NE Corner)	Former Filter Bed/Burn Tray	Unknown	1951-1966	HE, oils, and solvents; soil sampling confirmed presence of contaminants, including HE, inorganic chemicals, organic chemicals, and in some cases uranium	Inactive; no longer subject to the Consent Order; no further action approved.
C-16-070	TA-16 Burning Ground 50 ft. NE of structure 16-390	Underground Tank (propane)	24. ft. x 5 ft., 3063 gallons. The tank contained a manhole cover to access tank valves and a 6-inch corrugated metal drain from the manhole tank. The tank stored propane that was used to heat and dry the filtering material (sand) in the Burning Ground's two filter tanks. Sand was burned to remove residual HE.	1951-1970	HE; tank was never used to manage RCRA solid or hazardous waste and survey results show no HE or rad contamination.	Inactive; investigation in progress; included on LANL Hazardous Waste Facility Permit Table K-1.
C-16-061	TA-16, 80 feet east of structure 16-390	Soil Contamination (former latrine)	Wood frame latrine 4 ft. x 4 ft. x 7.5 ft. with no plumbing	1951-1968	Never used to manage RCRA solid or hazardous waste. No hazardous materials are associated with this structure.	Inactive; investigation in progress; included on LANL Hazardous Waste Facility Permit Table K-1.
16-010(n)/16-010(h)-99	TA-16 (NE Corner), east of 16-399	Former Trough Structure 16-1136	Approximately 10 ft. wide by 275 ft. long	1951-1966	Uranium and HE; HE found above soil	Inactive; investigation in progress; included on

Table 2-2. TA-16 SWMU Descriptions (continued)

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
					screening levels in shallow subsurface.	LANL Hazardous Waste Facility Permit Table K-1.
16-005(g)/16-010(h)-99	TA-16 (NE Corner)	Soil Contamination from Former Filter Bed Treatment Unit Structure 16-393	Approximately 150 ft. long, 10 ft. wide	1951-1966	HE; HE releases	Inactive; investigation in progress; included on LANL Hazardous Waste Facility Permit Table K-1.
16-010(m)/16-010(h)-99	TA-16 (NE Corner), east of 16-399	Former Trough Structure 16-1135	Approximately 10 ft. wide by 350 ft. long (based on drawing estimates). This trough carried wash water from the bucket wash facility to a filter bed (16-393) and later a filter vessel.	1951-1966	HE; HE found above soil screening levels in shallow subsurface.	Inactive; investigation in progress; included on LANL Hazardous Waste Facility Permit Table K-1.
16-010(i)/16-010(h)-99	TA-16 (NE Corner)	Burn Pad Structure 16-392	Approximately 400 ft. long by 10 ft. wide	1951-1966	Uranium contaminated objects; likely release.	Inactive; investigation in progress; included on LANL Hazardous Waste Facility Permit Table K-1.
16-010(k)/16-010(h)-99	TA-16 (NE Corner)	Former Trough Structure 16-1129	This former steel trough was open at the top and elevated 3 ft. off the ground surface; this structure measured approximately 370 feet long and extended south from structure 16-390.	1951-1966	HE; HE and lead found above soil screening levels in soil.	Inactive; investigation in progress; included on LANL Hazardous Waste Facility Permit Table K-1.
16-010(l)/16-010(h)-99	TA-16 (NE Corner)	Former Trough Structure 16-1134	This former steel trough was open at the top and elevated 3 ft. off the ground surface; this structure measured approximately 370 feet long and extended south from structure 16-390.	1951-1966	HE; HE found above soil screening levels in shallow subsurface.	Inactive; investigation in progress; included on LANL Hazardous Waste Facility Permit Table K-1.

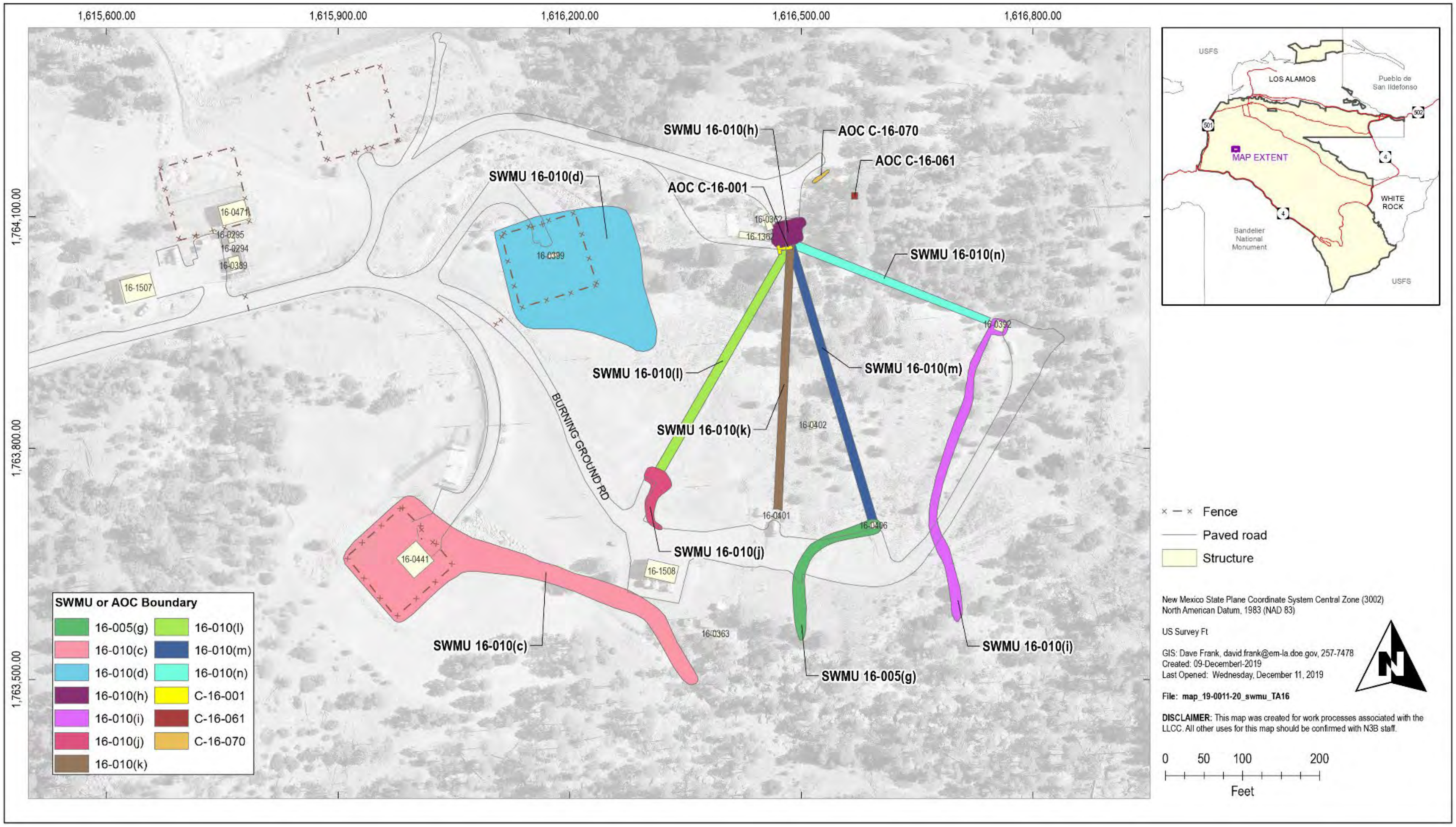

Figure 2-5. TA-16 SWMUs and AOCs

Table 2-3. TA-36 SWMU Descriptions

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
36-004(c)	TA-36 near the head of Fence Canyon, approximately 800 ft south of AOC 36-004(b)	Firing Site	This site consists of the firing point, a control bunker (building 36-8), a make-up building (36-7), a firing platform, and an x-ray house.	1950s to present	DU, beryllium, lead, copper, iron, barium, aluminum, steel, and various plastics; samples collected in the downgradient drainage show no migration of potential contaminants.	Active firing site; investigation deferred under the Consent Order; included on LANL Hazardous Waste Facility Permit Table K-1.
36-005	TA-36 near the head of Fence Canyon between AOCs 36-004(b) and 36-004(c)	Surface Storage Area	260 ft. x 300 ft. undeveloped storage area is largely covered with grass and ponderosa pine.	1950s to present	Radioactive constituents, metals, and VOCs; some release; nature and extent not defined at the area.	Inactive; investigation in progress; does not pose a potential unacceptable risk or dose under the industrial, construction worker, and residential scenarios; poses no unacceptable ecological risk; included on LANL Hazardous Waste Facility Permit Table K-1.

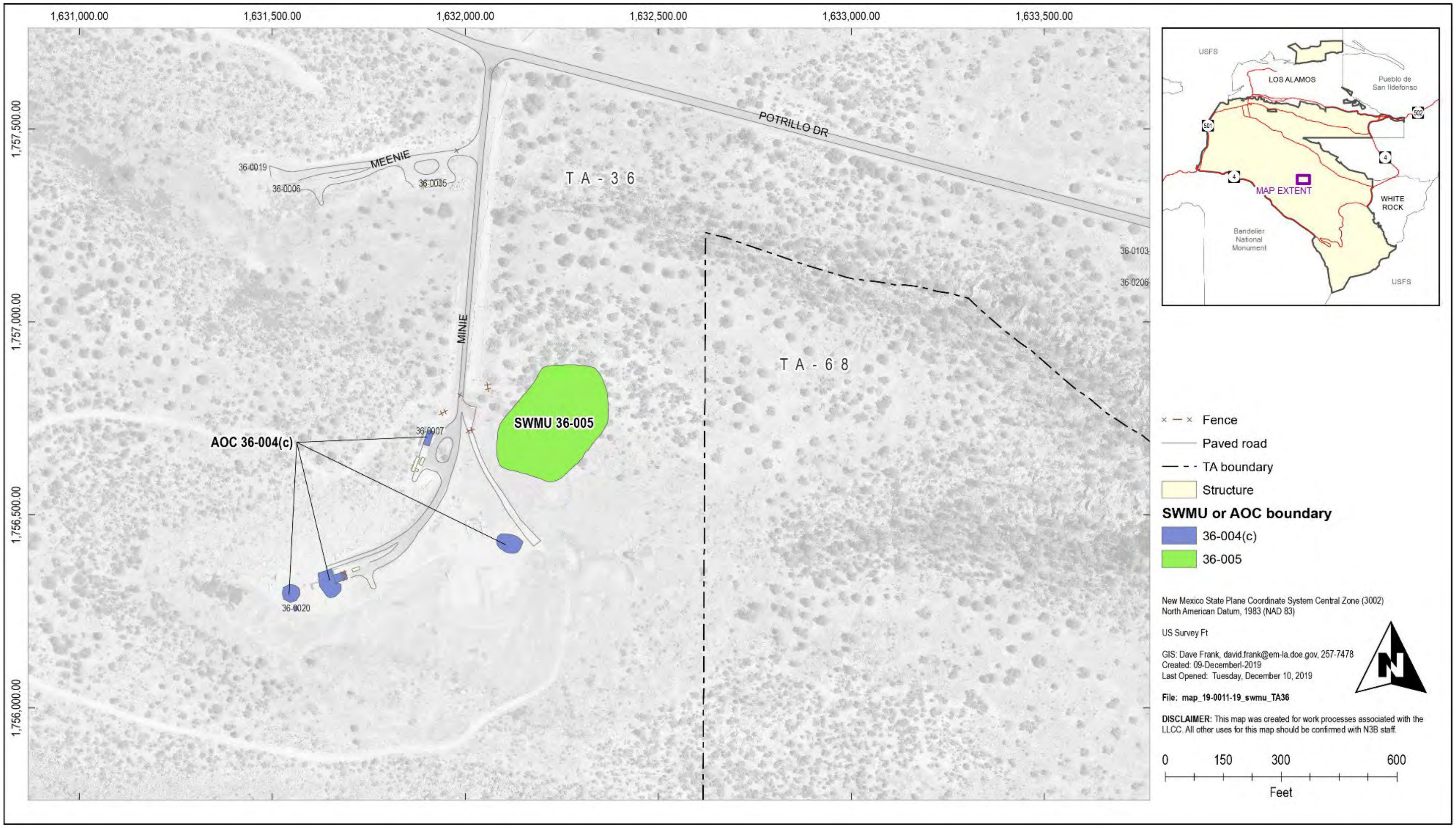

Figure 2-6. TA-36 SWMUs and AOCs

Table 2-4. TA-39 SWMU Descriptions

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
39-004(a)	TA-39	Firing Site Structure 39-7	Approximately 1000 sq. ft. (based on SWMU/AOC map)	1953-present	HE and metals; samples collected in the downgradient drainage show no migration of potential contaminants.	Active; investigation is deferred under the Consent Order; included on LANL Hazardous Waste Facility Permit Table K-1.
39-004(d)	TA-39	Firing Site Structure 39-57	Approximately 1000 sq. ft. (based on SWMU/AOC map)	1953-present	HE and metals; samples collected in the downgradient drainage show no migration of potential contaminants.	Active; investigation is deferred under the Consent Order; included on LANL Hazardous Waste Facility Permit Table K-1.
39-002(d)	TA-39	Container Storage Area	5 ft. x 5 ft. x 4 ft.	1980s to 1990s	Photographic wastes, cloth, and paper contaminated with various substances (acetone, ethanol, transformer oil, trichloroethane, vacuum grease, and copper sulfate); no known or documented releases.	Inactive; certificate of completion received without controls from NMED; listed on the LANL Hazardous Waste Facility Permit Table K-1.

Figure 2-7. TA-39 SWMUs and AOCs

Table 2-5. TA-50 SWMU Descriptions

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
50-001(a)	Building 50-1	Radioactive Liquid Waste Treatment Facility (RLWTF)	System of drain lines and tanks	1963 to present	RLW, sludge, and potentially hazardous constituents; no information on unintentional releases.	Active; included on LANL Hazardous Waste Facility Permit Table K-1; deferred investigation per Consent Order.
50-001(b)	TA-50	Waste Lines and Manholes	A manhole (structure 50-72) is the central collection area for most incoming liquid waste. Three lines feed into manhole 50-72; all manholes that transport wastewater to Building 50-1 are monitored continuously. Four other waste lines run from TA-55 to Building 50-1 through structure 50-106 to tanks in an underground vault (structure 50-66). Three of the lines are 1.5-inch stainless-steel lines, each encased in 3-inch PVC.	1963 to present	RLW and potentially hazardous constituents; potential releases west and north of the tank farm.	Active; included on LANL Hazardous Waste Facility Permit Table K-1; deferred investigation per Consent Order.
50-002(a)	Building 50-2	Tank Farm	A reinforced concrete vault that houses six flow-through process tanks, an equipment room, and associated waste transfer lines; floor 17 ft. below ground surface; incoming raw-waste tanks (25,000 gallons and 75,000 gallons) and two 25,000-gallon tanks used to store treated waste for reuse; fifth tank (capacity 25,000 gallons) flows into the 75,000-gallon tank and was previously used to	1963 to present	RLW, sludge, and potentially hazardous constituents; in July and September 1974, two separate, unintended operational releases occurred from the overflow of a sump in Building 50-2. Both releases caused untreated wastewater to be discharged to waste lines 55 and 67 (the waste lines for treated effluent) and into the outfall area at the head of Ten Site Canyon [see SWMU 50-	Active; included on LANL Hazardous Waste Facility Permit Table K-1; deferred investigation per Consent Order.

Table 2-5. TA-50 SWMU Descriptions (continued)

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
			store waste during D&D activities; currently, this tank receives waste from chemistry labs in the building; The sixth tank (capacity 30,000 gallons) originally functioned as a holding tank for low-level sludge.		006(a)]. In February 1975, waste line 67 was plugged at its outfall.	
50-002(b)	30 ft. west of the southwest corner of Building 50-1	Underground Storage Tank Structure 50-67	Concrete vault measures 18 ft. x 16 ft. x 14 ft. deep	Unknown to present	RLW and potentially hazardous waste; no documented releases.	Active; included on LANL Hazardous Waste Facility Permit Table K-1; deferred investigation per Consent Order.
50-002(c)	30 ft. west of the southwest corner of Building 50-1	Underground Storage Tank Structure 50-68	Concrete vault measures 18 ft. x 16 ft. x 14. ft. deep	Unknown to present	RLW and potentially hazardous waste; no documented releases.	Active; included on LANL Hazardous Waste Facility Permit Table K-1; deferred investigation per Consent Order.
50-002(d)	Building 50-1 adjacent to room 63D	Aboveground Storage Tank Structure 50-5	Decommissioned aboveground, 5000-gallon, stainless-steel tank used for nitric acid storage	1964 to 1996	Unused product storage only; no documented releases.	Active; included on LANL Hazardous Waste Facility Permit Table K-1; deferred investigation per Consent Order.
50-003(a)	Building 50-1, Room 59 along the northwest wall	Container Storage Unit	Approximately 2-ft. x 19-ft. area	Unknown	Mixed waste; no documented releases.	Inactive; in November 2004, NMED approved this RCRA interim status unit for clean closure.
50-004(a)	RLWTF	Historical Waste Lines	Decommissioned RLW and industrial waste lines routed to the RLWTF from LANL TAs located along Pajarito Road.	1963 to 1989	RLW and potentially hazardous constituents; release of radionuclides; area remediated to meet ALARA levels in 1975.	Inactive; site meets residential and ecological risk levels and is recommended for corrective action complete without controls; included on LANL Hazardous Waste Facility Permit Table K-1.
50-004(b)	RLWTF	Underground Vault Structure 50-3	Decommissioned underground concrete vault that housed three stainless-steel-lined concrete storage tanks (1,000–4,500 gallons) used to collect and store	1963 to 1989	RLW and potentially hazardous constituents; no elevated concentration were detected during decommissioning in 1989.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; site meets residential and ecological risk levels and is recommended for corrective action

Table 2-5. TA-50 SWMU Descriptions (continued)

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
			wastewater from the Omega Reactor.			complete without controls.
50-004(c)	RLWTF	Soil Contamination from Historical Waste Lines and Manholes	13 industrial waste lines and three manholes that discharged to the decommissioned underground vault	Most 1963 to 1989; line #56 still in service	RLW and potentially hazardous constituents; field screening for radionuclides confirmed ALARA levels met.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; site meets residential and ecological risk levels and is recommended for corrective action complete without controls.
50-006(a)	RLWTF pump house	Operational Release	Outfall area at the head of Ten Site Canyon	1963 to present	RLW and potentially hazardous constituents; approximately 0.72 cubic yards of radioactively-contaminated soil was excavated and removed from release area.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; site meets residential and ecological risk levels and is recommended for corrective action complete without controls.
50-006(c)	TA-50	Operational Release	Surface Soil contamination from historical stack emissions; unknown dimensions; seven stacks.	1963 to present	Soil contaminated with radioactive and potentially hazardous constituents; release of metals, PAHs, and radionuclides.	Active; included on LANL Hazardous Waste Facility Permit Table K-1; requesting certificate of completion.
50-006(d)	Mortandad Canyon	Effluent Discharge	Drain line and National Pollutant Discharge Elimination System-permitted Outfall 051 in Mortandad Canyon; 6-inch-diameter iron discharge pipe that was rerouted in 1983.	1963 to present	Soil contaminated with a variety of chemicals, radionuclides, and heavy metals.	Active Permitted outfall; no discharges since 2010; included on LANL Hazardous Waste Facility Permit Table K-1; investigation and remediation complete; plan to ask for a certificate of completion.
50-007	In Rooms 112 and 115 at TA-50-37	Former Incinerator Complex	An incinerator, various waste feed components, two waste feed tanks; maximum inventory of 600 gallons.	1975 to 1987	Hazardous and mixed waste; radioactively contaminated PCBs; slightly elevated plutonium detected in nearby soils.	Inactive; EPA issued a permit for the incineration of PCBs in 1984, and NMED included the incinerator in a 1989 HWFP; operation of the incinerator was discontinued in 1987 to

Table 2-5. TA-50 SWMU Descriptions (continued)

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
						allow for system upgrades; removed and underwent RCRA closure in 1998 included on LANL Hazardous Waste Facility Permit Table K-1.
50-008	Inside Rooms 102 and 103 at TA-50, Building 69	Reduction Site	Container storage unit inside Rooms 102 and 103	1982 to 1991	Mixed waste; radionuclide release in nearby soils.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; investigation in progress
50-009	North side of Pajarito Road at TA-50	MDA C	11.8 acres and consists of 7 pits and 108 shafts; depths of the 7 pits at MDA C range from 12 to 25 ft. below the original ground surface, and the depths of the 108 shafts range from 10 to 25 ft. below the original ground surface.	1948 to 1974	Radioactive, mixed, hazardous, and solid waste; release of VOCs and potentially tritium.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; corrective action path forward in progress; vapor monitoring ongoing.
50-010	Room 34 B of the RLWTF	Decontamination Facility	An inactive vehicle decontamination area.	1963 to 1999	Radioactive and potentially hazardous waste; no known releases.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; deferred investigation per Consent Order.
50-011(a)	South end of RLWTF	Soil Contamination associated with Septic System	Influent line from TA-50-1, septic tank, manhole, a sanitary distribution system, and a seepage pit; removed in 1983.	1964 to 1983	Sanitary waste; known releases of radionuclides remediated to meet ALARA levels.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; deferred investigation per Consent Order.
50-011(b)	RLWTF	Lift Stations	Two active sanitary wastewater lift stations (TA-50-91 and TA-50-92) and approximately 400 ft. of piping that transport sanitary wastewater.	1983 to present	Sanitary waste; Permitted outfall releases.	Active; included on LANL Hazardous Waste Facility Permit Table K-1; deferred investigation per Consent Order.
50-003(d)	Against the south wall of the east wing of Building 1	Container Storage Unit	Canvas building about 12-ft. wide and 14-ft. deep, whose floor had an inflatable berm; the second structure is a modular 9 ft. x 24 ft.	Unknown	Hazardous and mixed waste; no documented releases.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-3; no further action approved.

Table 2-5. TA-50 SWMU Descriptions (continued)

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
			steel shed set on a concrete pad			
50-005	Inside building 50-1	Waste Treatment Facility	Closed 500-gallon pressure vessel and associated processing components.	Unknown	Hazardous waste; no known release.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-3; no further action approved.
C-50-001	East of building 50-0001	Former Transformer	PCB transformer was situated on a 20 ft. x 10 ft. concrete pad.	1963-1994	PCB oil; one release described as a minor seep of PCB oil is documented from this AOC in 1989.	Inactive; Consent Order investigation in progress; listed in the LANL Hazardous Waste Facility Permit Table K-1.

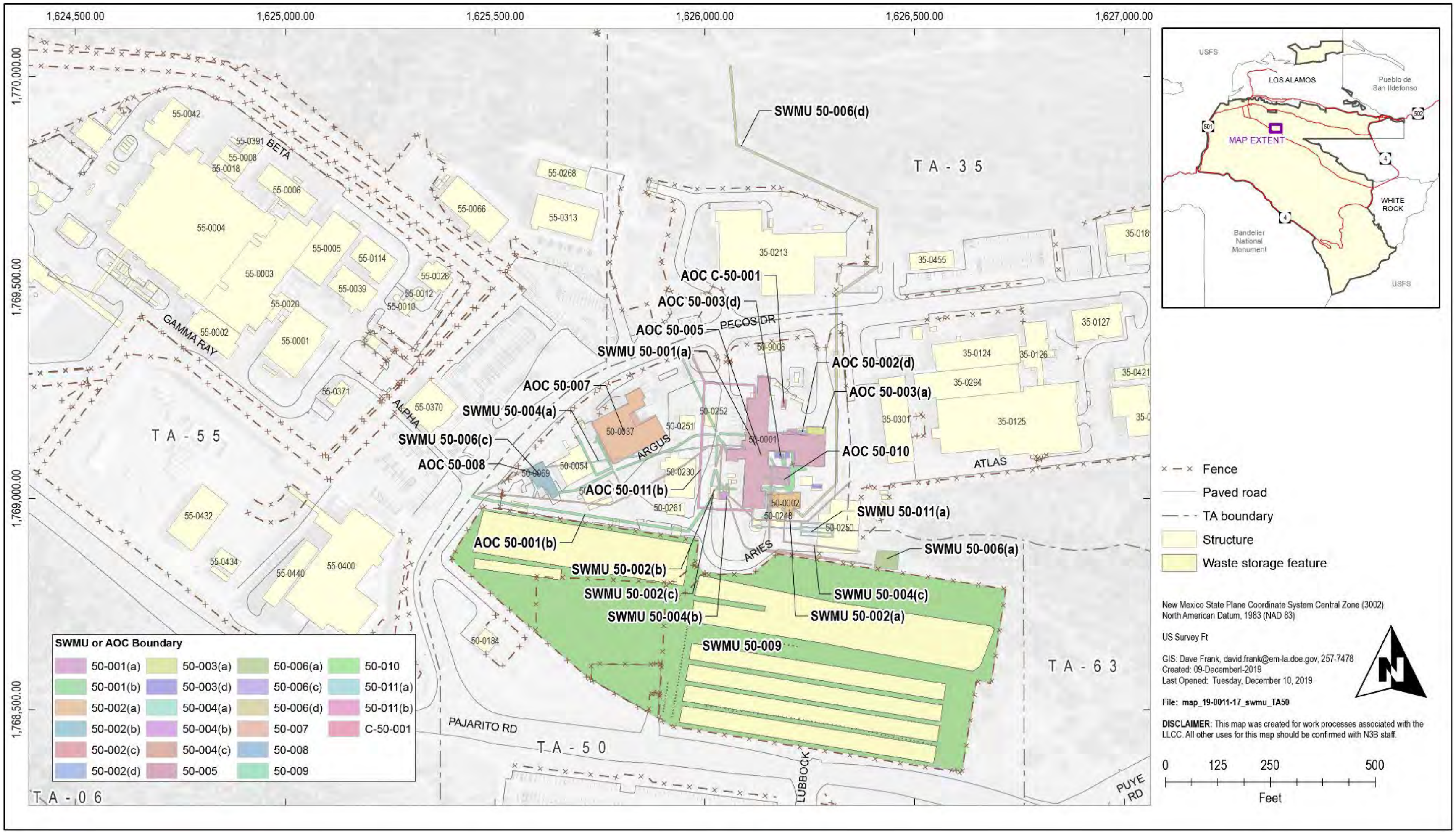

Figure 2-8. TA-50 SWMUs and AOCs

Table 2-6. TA-54 SWMU Descriptions

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
54-001(a)	Structure 54-215, Area L	Storage Area	150-ft. x 40-ft. bermed paved storage area	Unknown to present	Mixed waste and hazardous waste; VOC release.	Active; VOC monitoring; no longer subject to the Consent Order.
54-002	TA-54, Area L (eastern portion)	Container Storage Area	1950-gallon-capacity area	Unknown to present	Mixed, solid, and hazardous waste.	Active; no further action approved; no longer subject to the Consent Order.
54-004	TA-54, Area H	Material Disposal Area MDA H	0.3-acre site, containing 9 shafts	1960 to 1986	Classified waste; nonhazardous and hazardous wastes, depleted uranium, fuel elements, plutonium, HE; VOC release.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; to undergo corrective action.
54-005	TA-54, Area J	Material Disposal Area MDA J, Pits 1-5, Shafts 1-4	5.5-acre site containing 6 pits and 4 shafts	1961 to 2001	Barium sand and administratively controlled waste; no known release.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; post-closure monitoring complete.
54-006	TA-54, Area L	Material Disposal Area MDA L, all subsurface units such as Pit A; Impoundments B, C, D; Shafts 1-28 and 29-34	2.5-acre fenced area that includes MDA L, which consists of 1 inactive subsurface disposal pit (pit A); 3 inactive subsurface treatment and disposal impoundments (impoundments B, C, and D); and 34 inactive disposal shafts (shafts 1 through 34).	1959 to1985	Uncontainerized chemical wastes and liquids; VOC release.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; VOC monitoring.
54-007(a)	Structure 54-16, Area G	Former Septic System	1000-gallon concrete septic tank (54-16), concrete distribution box, and VCP drain lines.	Unknown to 1998	Sanitary wastes and potentially radioactive constituents; septic tank releases determined not to be of concern.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; certificate of completion without controls received from NMED.
54-007(c)/54-007(c)-99	TA-54 West	Former Septic System	Consisted of a fiberglass tank 4 ft. in diameter and 12 ft. in length, a drain line, and a drain field formed by three parallel-buried lines of slotted PVC pipe,	1960s to 1992	Sanitary wastewater; Septic tank releases detected in soil not of human health or ecological concern.	Inactive; VCA completed; included on LANL Hazardous Waste Facility Permit Table K-3; no further action approved.

Table 2-6. TA-54 SWMU Descriptions (continued)

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
			approximately 4 ft. below ground surface.			
54-007(e)/54-007(c)-99	TA-54 West	Former Septic System	1500-gal. concrete septic tank and a 4-inch PVC drain line connected to a drain field formed by two parallel lines of 4-inch slotted PVC pipe	1960s to 1992	Sanitary wastewater; septic tank releases detected in soil not of human health or ecological concern.	Inactive; VCA completed; included on LANL Hazardous Waste Facility Permit Table K-3; no further action approved.
54-012(b)	TA-54-82, Area L	Drum Crusher	Drum compactor in the central portion of Area L	Unknown to present	Radionuclides, organics, and metals; suspected release.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; to undergo corrective action.
54-013(b)/54-013(b)-99	TA-54, Area G	MDA G, Vehicle Monitoring/Decontamination Area	Exact dimensions unknown	Unknown	Radiological wash water; releases of radiological constituents and metals.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; to undergo corrective action.
54-014(a)	TA-54, Area L (northwest corner)	MDA L, Storage Shafts	Shaft 36 is 30 inches x 27.5 feet, shaft 37 is 48 inches by 35.75 feet, each has a storage capacity of 300 gallons; each shaft is constructed of CMP and equipped with a 1-ft. thick concrete plug at the bottom and a steel cap and concrete shielding block	Mid-1980s to 2004	Steel rods filled with irradiated lead and concrete; no known releases.	Active; included on LANL Hazardous Waste Facility Permit Table K-1; currently operated under RCRA interim status requirements for storage of mixed waste.
54-014(b)/54-013(b)-99	TA-54, Area G	MDA G, Pit 9	30 ft. wide by 400 ft. long by 20 ft. deep	1974 to1978	Retrievable TRU and mixed TRU waste; releases of radiological constituents and metals.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; to undergo corrective action.
54-001(b)	TA-54, building 54-31 (inside)	Storage Area	13.5 ft. x 14.5 ft. (440 gallons) with a paved, sealed and bermed floor	Unknown to present	Mixed wastes; no releases have been identified.	Active; no further action approved; no longer subject to the Consent Order.
54-001(d)	TA-54, Area L	Storage Area	17 ft. x 59 ft. constructed of a bermed concrete floor	Unknown to present	PCBs; no releases have been identified.	Active; no further action approved; no longer subject to the Consent Order.

Table 2-6. TA-54 SWMU Descriptions (continued)

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
54-001(e)	TA-54, Area L	Container Storage Area	15.5 ft. x 116.5 ft. (17,220 gallons) constructed of a bermed, sealed concrete pad divided into six cells, each equipped with secondary containment sump	1987 to present	Mixed waste; no releases have been identified.	Active permitted container storage area; no further action approved; no longer subject to the Consent Order.
54-007(d)	TA-54, north of Pajarito Road	Former Septic System	972-gallon concrete septic tank, distribution box, 4-inch drain line and two 60-ft. x 4-inch diameter drain lines.	1962 to 1970	Radiological constituents, VOC, SVOCs, PCBs, pesticides, inorganic chemicals; VCA conducted in 2000 showed no elevated gross radiation screening levels and no VOCs or SVOCs above screening levels.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; certificate of completion without controls received from NMED.
54-009	TA-54, Area L	Former Aboveground Tanks	Four carbon steel tanks each with a capacity of 1660 gallons measuring 9 ft. (diameter) x 3.5 ft.	1988 to1993	Ammonium bifluoride, barium; o releases have been identified.	Inactive; closure certification report for these tanks was submitted to NMED in October 2006; no further action approved; not subject to the Consent Order.
54-014(c)/54-013(b)-99	TA-54, Area G	MDA G, Shafts 200-233	1 ft. in diameter, 18 ft. deep; they are lined with concrete and contain TRU waste	1978 to 1987	TRU waste and tritium; releases of radiological constituents and metals.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; to undergo corrective action.
54-014(d)/54-013(b)-99	TA-54, Area G	MDA G, Trenches A-D	Trenches A, B, and C vary in size from 219 ft. to 262.5 ft. long by 13 ft. wide by 6 ft. to 8 ft. deep; Trench D is 60 ft. long x 13 ft. wide x 6 ft. deep	1974 to unknown	TRU and mixed LLW; releases of radiological constituents and metals.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; to undergo corrective action.
54-015(a)	TA-54, Area G	Storage Area	15 ft. x 40 ft. x 12 ft. metal shed	Unknown to present	Mixed waste, TRU waste.	Active; no further action approved; not subject to Consent Order.

Table 2-6. TA-54 SWMU Descriptions (continued)

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
54-015(b)	TA-54, Area G	Storage Area	Approximately 30 ft. in diameter	Unknown to 1992	TRU and LLW retrievable waste; investigations not conducted to date.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; to be closed under MDA G closure.
54-015(c)	TA-54, Area G	Low-Level Waste (LLW) Storage Area	Three levels of subsurface storage totaling 960,000 gallons	Unknown to present	LLW and TRU retrievable waste; investigations not conducted to date.	Active permitted container storage unit; no further action approved; not subject to the Consent Order.
54-015(d)	TA-54, Area G	Storage Area	Six levels of subsurface, retrievable waste storage totaling 430,000 gallons	1974 to present	Retrievable TRU waste; investigations not conducted to date.	Inactive; no further action approved; not subject to the Consent Order.
54-015(e)	TA-54, Area G	Storage Area	Three levels of subsurface retrievable waste storage totaling 300,000 gallons	1974 to present	TRU retrievable waste; investigations not conducted to date.	Active permitted storage unit; no further action approved; not subject to the Consent Order.
54-015(f)	TA-54, Area G	Storage Area	Approximately 40 ft. x 290 ft.; six levels of retrievable waste storage totaling 970,000 gallons	1974 to present	TRU retrievable waste; investigations not conducted to date.	Active permitted storage unit; no further action approved; not subject to the Consent Order.
54-015(j)	TA-54, Area G	Storage Area	Bermed storage area approximately 60 ft. x 450 ft.	Unknown to present	Mixed waste; investigations not conducted to date.	Active permitted storage unit; no further action approved; not subject to the Consent Order.
54-015(k)/54-013(b)-99	TA-54, Area G	MDA G, Layer of Retrievable TRU Waste	Layer of retrievable TRU waste in cement-filled sections of corrugated pipe located inside a mound of fill material within the top of pit 29	Unknown	TRU and mixed TRU; releases of radiological constituents and metals.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; to undergo corrective action.
54-016(b)	TA-54, Area G	Sump	Dimensions unknown	Unknown to present	TRU waste drum (corrosion inhibitor); investigations not conducted to date.	Active; included on LANL Hazardous Waste Facility Permit Table K-1; investigation will be performed when the structure 54-33 is removed.
54-017/54-013(b)-99	TA-54, Area G	MDA G, Disposal Pits 1-8, 10, 12, 13, 16-22, and 24	19 pits ranging in area from approximately 20	1959 to 1980	Radioactive mixed and TRU waste; releases of	Inactive; included on LANL Hazardous Waste

Table 2-6. TA-54 SWMU Descriptions (continued)

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
			ft. x 450 ft. to 100 ft. x 600 ft.		radiological constituents and metals.	Facility Permit Table K-1; to undergo corrective action.
54-018/54-013(b)-99	TA-54, Area G	MDA G, Disposal Pits 25-33 and 35-37	12 pits ranging in area from approximately 100 ft. x 300 ft. to 100 ft. x 600 ft.	1979 to 1980	Radioactive mixed and TRU waste; releases of radiological constituents and metals.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; Pit 29 has been proposed to undergo closure/post-closure in accordance with alternative requirements, as allowed by 20.4.1 NMAC §264.110(c) [6-14-00], to meet post-closure care requirements.
54-019/54-013(b)-99	TA-54, Area G	MDA G, Disposal Shafts 1-20, 24-34, 38-92, 96, 109-112, and 150	Range in size from 1 ft. to 6 ft. in diameter and 25 ft. to 60 ft. deep and are located primarily in the northeast quadrant of Area G	1966 to 1980	LLW and hazardous and mixed waste; releases of radiological constituents and metals.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; to undergo corrective action.
54-020/54-013(b)-99	TA-54, Area G	MDA G, Disposal Shafts C1-C10, C12, C13, 22, 35-37, 93-95, 99-108, 114, 115, 118-136, 138-140, 151-160, 189-192, and 196	Range in size from 1 ft to 8 ft. in diameter and 0.25 ft. to 65 f.t deep, and are located throughout the eastern portion of Area G	1970 to early 1990s	PCB residues, LLW, hazardous and mixed waste; releases of radiological constituents and metals.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; Shaft 124 has been proposed to undergo closure/post-closure in accordance with alternative requirements, as allowed by 20.4.1 NMAC §264.110(c) [6-14-00], to meet post-closure care requirements.
54-021	TA-54, MDA L	Six Aboveground Oil Storage Tanks (former location)	Six former aboveground fiberglass storage tanks; four had capacities of 771 gallons, one had a capacity of 5650 gallons and one had a capacity of 5086 gallons	1987 to 1989	PCB and solvent-contaminated waste oil; no known releases.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-3; no further action approved.

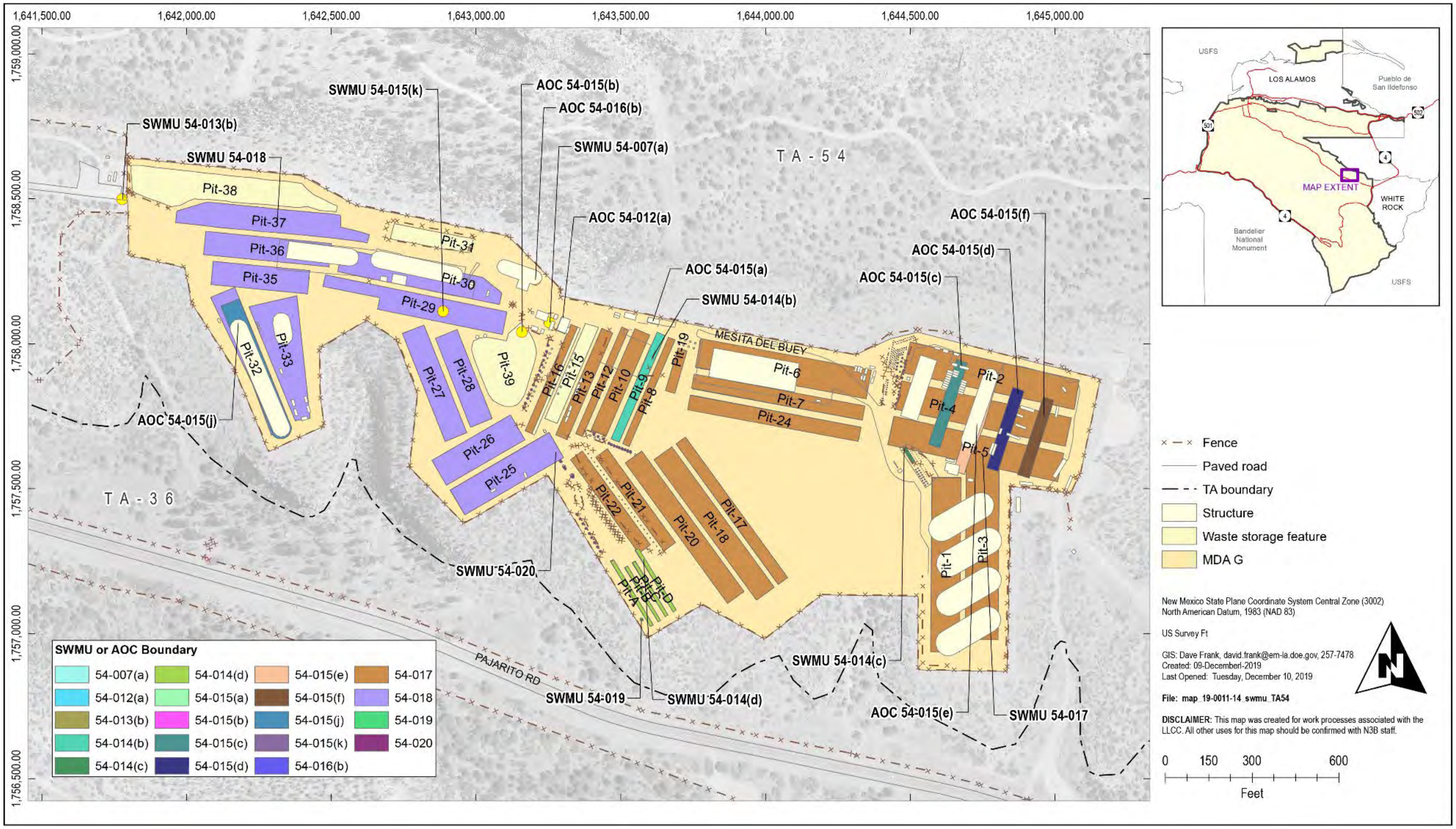

Figure 2-9. TA-54 Area G SWMUs and AOCs

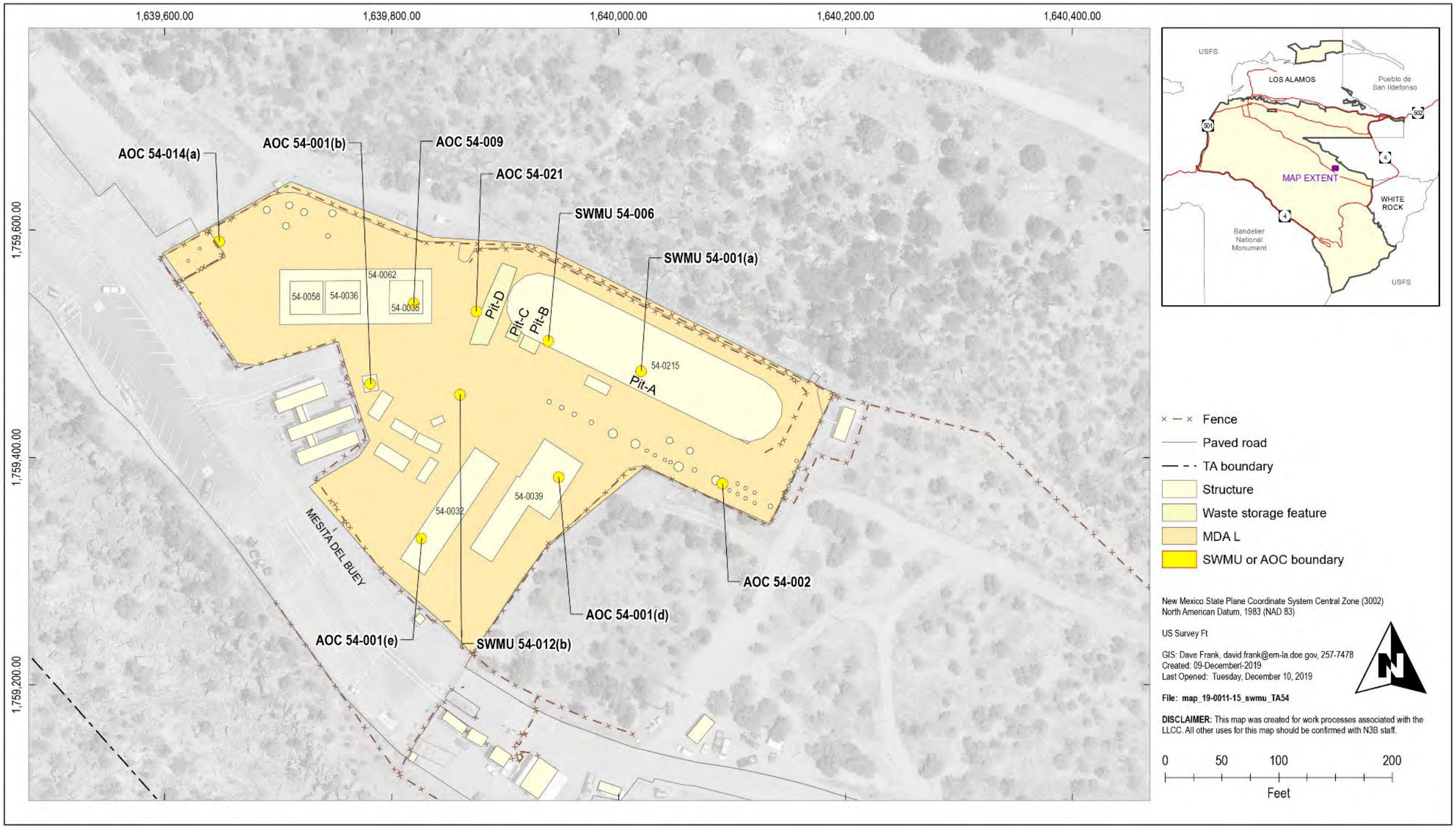

Figure 2-10. TA-54 Area L SWMUs and AOCs

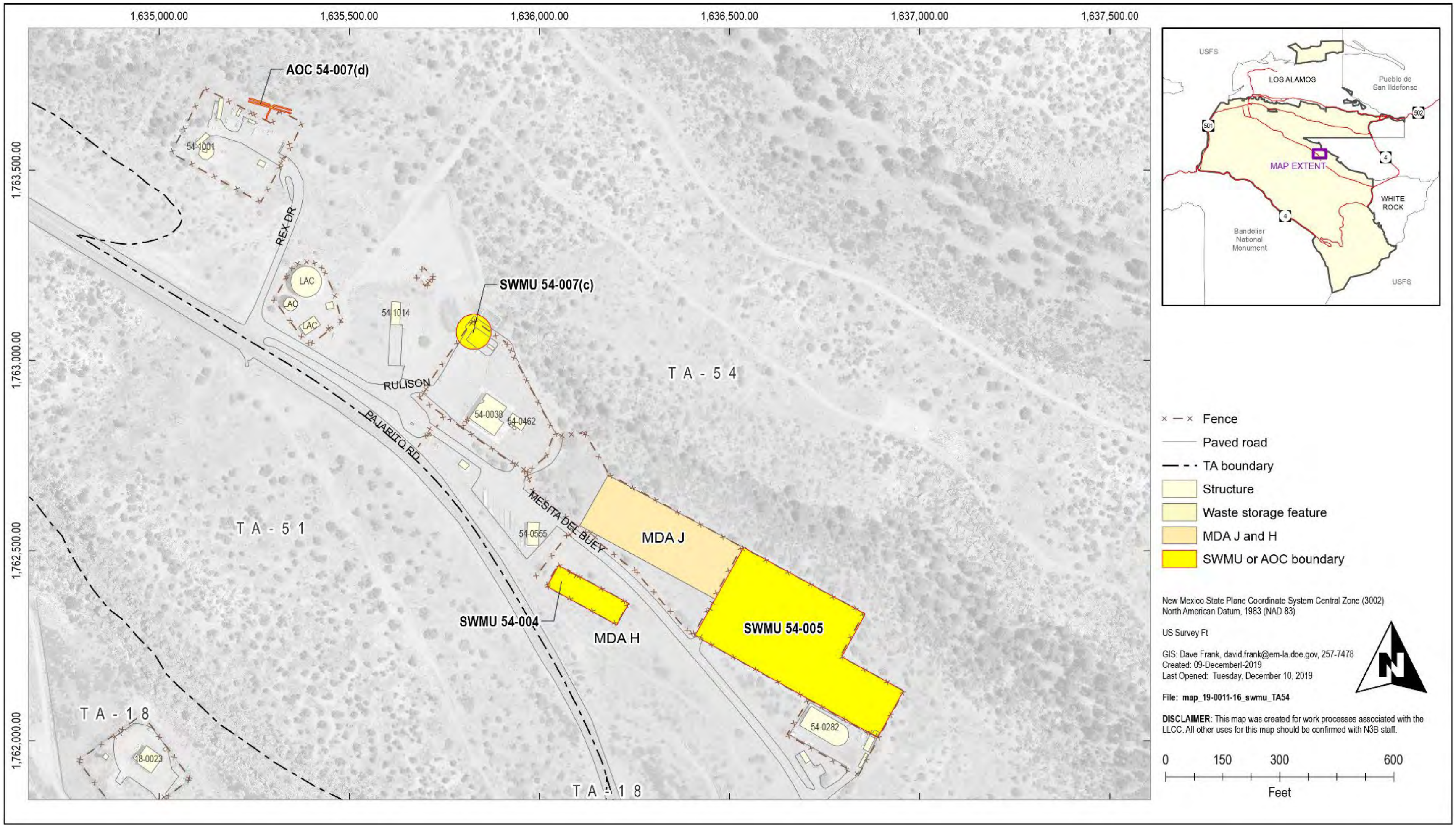

Figure 2-11. TA-54 West SWMUs and AOCs

Table 2-7. TA-55 SWMU Descriptions

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
42-001(a)/42-001(a)-99	North of former building 42-1 (removed by 1978) within TA-55	Soil Contamination from Former Incinerator Building 42-1	Designed to burn radioactive-contaminated waste in a cylindrical chamber with a throughput between 45.5 and 90.8 kilograms per hour; combustion products passed through an off-gas treatment system before being released through an exhaust stack, the off-gas system consisted of a Venturi scrubber, filter bank, and an ash separator	1951 to 1952	Radioactive-contaminated waste; releases from the incinerator are currently below residential and ecological risk levels.	Inactive; listed on the LANL Hazardous Waste Facility Permit Table K-1; site meets residential and ecological risk levels and is recommended for corrective action complete without controls.
42-001(b)/42-001(a)-99	Structure 42-2 located at former building 42-1 within TA-55	Soil Contamination from Former Ash Storage Tank	Tank was 22 ft. in diameter and approximately 13 ft. high, with a volume of 37,000 gallons	1951 to unknown	Radioactive-contaminated waste; no known releases at this tank.	Inactive; listed on the LANL Hazardous Waste Facility Permit Table K-1; site meets residential and ecological risk levels and is recommended for corrective action complete without controls.
42-001(c)/42-001(a)-99	Structure 42-3 located at former building 42-1 within TA-55	Soil Contamination from Former Ash Storage Tank	Tank was 22 ft. in diameter and approximately 13 ft. high, with a volume of 37,000 gallons	1951 to unknown	Radioactive-contaminated waste; no known releases at this tank.	Inactive; listed on the LANL Hazardous Waste Facility Permit Table K-1; site meets residential and ecological risk levels and is recommended for corrective action complete without controls.

Table 2-7. TA-55 SWMU Descriptions (continued)

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
42-002(b)/42-001(a)-99	West of former building 42-1 within TA-55	Soil Contamination from Former Decontamination Area	Unknown	1956 to 1969	Radioactive-contaminated waste; releases in this area are currently below residential and ecological risk levels.	Inactive; listed on the LANL Hazardous Waste Facility Permit Table K-1; site meets residential and ecological risk levels and is recommended for corrective action complete without controls.
42-003/42-001(a)-99	Site of former building 42-1 within TA-55	Soil Contamination from Former Septic System	565-gallon tank structure 42-4, drain line, filter trench, tile leach field, and outfall to Mortandad canyon removed in 1978	1951 to 1978	Sanitary sewage; septic tank may have overflowed in 1973; radiological contamination found and removed in 1978.	Inactive; listed on the LANL Hazardous Waste Facility Permit Table K-1; site meets residential and ecological risk levels and is recommended for corrective action complete without controls.
42-004	TA-42/TA-55	Canyon Disposal	Approximately 200 ft. x 100 ft.	1950s	Unknown constituents; no apparent releases based onsite soil sampling.	Inactive; listed on LANL Hazardous Waste Facility Permit Table K-3; no further action approved.
55-008	Building 55-4 basement	Sumps and Tanks	Six sumps/pumps, each with a capacity of 3 cubic ft., collect spills and mop-water generated in the building.; our 8-inch-diameter x 4-ft.-long condensate tank pumps and eight 8-inch-diameter x 4-ft.-long blowdown tanks receive condensate from cooling coils	1973 to present	Possibly small amounts of hazardous and/or radioactive constituents; no known releases to the environment.	Active; listed on LANL Hazardous Waste Facility Permit Table K-1; deferred site investigation per Consent Order.

Table 2-7. TA-55 SWMU Descriptions (continued)

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
55-009	Structure 55-263	Concrete Enclosure	9-ft. x 9-ft. x 6-ft.-deep concrete-lined pit; walls and floor of the monitoring station consist of 6-inch-thick reinforced concrete	1973 to unknown	Hazardous wastes were not generated, treated, stored, or disposed at the site, and radioactivity was never detected in the waste stream.	Inactive; listed on LANL Hazardous Waste Facility Permit Table K-3; no further action approved.

Figure 2-12. TA-55 SWMUs and AOCs

Table 2-8. TA-63 SWMU Descriptions

SWMU/AOC Number	Location	Type of Unit	General Dimensions and Structural Description	Operation Dates	Wastes Managed at the Unit and Release Info	Unit Status
63-001(a)	TA-6 structure 63-12	Septic System	1000-gallon tank with associated seepage pit and drain line	Unknown	Sanitary wastewater; no documentation of spills, releases, or incidents at TA-63 has been found.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; certificate of completion without controls received from NMED.
63-001(b)	TA-63 structure 63-14 at Building 1	Septic System	920-gallon tank with associated seepage pit and drain lines; seepage pit 4 ft. by 50 ft. dep	Unknown	Sanitary wastewater; no documentation of spills, releases, or incidents at TA-63 has been found.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-1; certificate of completion without controls received from NMED.
63-002	Fenced yard east of the north parking area at TA-63	Container Storage Area	Unknown	Unknown	Solvents; no identified releases.	Inactive; included on LANL Hazardous Waste Facility Permit Table K-3; NFA approved.

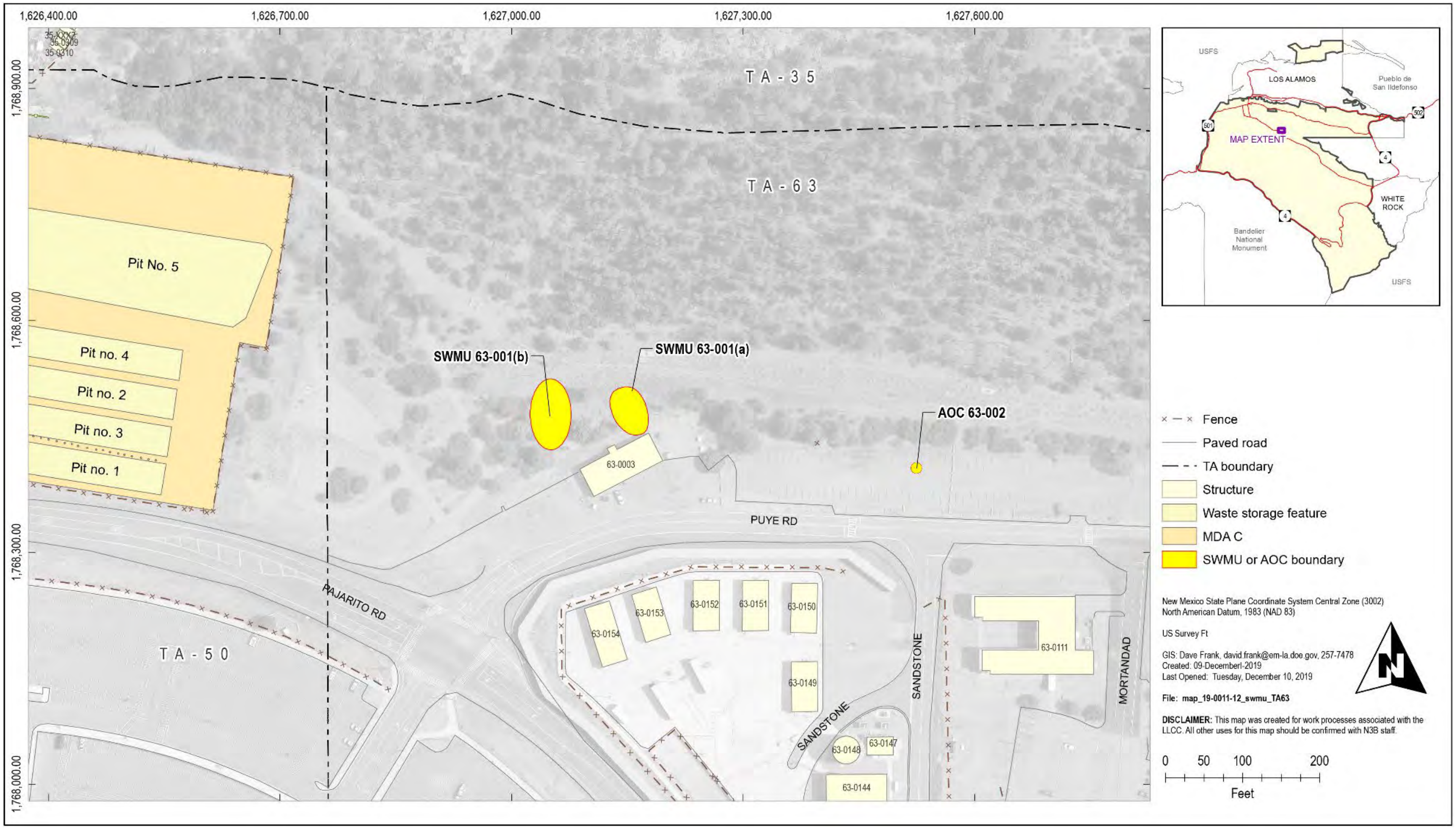

Figure 2-13. TA-63 SWMUs and AOCs

3.0 SPECIFIC UNIT INFORMATION REQUIREMENTS

This section of the Permit Renewal Application addresses the stipulated specific part B information requirements for permitted units, including 25 container storage units, one storage tank, and one treatment (stabilization) unit under 40 CFR §§270.15, 270.16 and 270.23. The Permittees are also authorized to treat hazardous waste (via microencapsulation or stabilization within containers) at 16 units primarily utilized for storage as described below.

The Permittees do not propose any changes to these permitted units. However, as described below, DOE-Triad has proposed one minor change to delete permit text at Permit Section 3.10.2. Information associated with the addition of three treatment units conducting open detonation and open burning under 40 CFR Subpart X are included in Sections 4.0 and 5.0 of this Permit Renewal Application.

3.1 Storage in Containers

Permit Part 3, *Storage in Containers,* includes requirements for active hazardous waste management units used for container storage. The Permittees propose no substantive changes to the hazardous waste management units used for storage of waste in containers. All the requirements within 40 CFR Part 264, Subpart I, are included within Permit Part 3 of the current LANL Hazardous 2010 Permit.

Under the Permit, DOE-Triad manages and operates container storage units at the following locations:

- Technical Area 3, Building 29, Container Storage Unit
- Technical Area 50, Building 69, Indoor Container Storage Unit
- Technical Area 50, Building 69, Outdoor Pad
- Technical Area 54 West, Building 38, Container Storage Unit (TA-54-38)
- Technical Area 54, West, Outdoor Container Storage Unit
- Technical Area 55, Building 4, Container Storage Unit, B40
- Technical Area 55, Building 4, Container Storage Unit, B05
- Technical Area 55, Building 4, Container Storage Unit, K13
- Technical Area 55, Building 4, Container Storage Unit, B45
- Technical Area 55, Building 4, Container Storage Unit, B13
- Technical Area 55, Building 4, Container Storage Unit, G12
- Technical Area 55, Building 4, Container Storage Unit, Vault
- Technical Area 55, 0355 Pad
- Technical Area 55, Outdoor Storage Pad
- Technical Area 63, TWF

Under the Permit, DOE-N3B manage and operate container storage units at the following locations:

- Technical Area 54, Area G, Pad 1, Container Storage Unit
- Technical Area 54, Area G, Pad 3, Container Storage Unit
- Technical Area 54, Area G, Pad 5, Container Storage Unit
- Technical Area 54, Area G, Pad 6, Container Storage Unit
- Technical Area 54, Area G, Pad 9, Container Storage Unit
- Technical Area 54, Area G, Pad 10, Container Storage Unit

- Technical Area 54, Area G, Pad 11, Container Storage Unit
- Technical Area 54, Area G, Storage Shed 8, Container Storage Unit
- Technical Area 54, Area G, Building 33, Container Storage Unit
- Technical Area 54, Area L, Container Storage Unit

The Permittees propose minor change to remove Permit Section 3.10.2, *Secondary Containment,* regarding the storage of hazardous waste in Technical Area 3, Building 29. Containers with free liquids stored within the hazardous waste management unit at TA-3-29 are managed on secondary containment pallets, as required by Permit Section 3.7.2, *Containers with Free Liquids*. Permit Section 3.10.2 indicates that the epoxy that coats the floor within the unit is utilized as part of the unit's containment system. Although the epoxy is chemical-resistant, it is not designed to operate as containment per the requirements of 40 CFR §264.175. The Permittees maintain the epoxy flooring as part of general facility management; however, secondary containment requirements are met by using secondary containment pallets. A summary table of changes summarized Appendix 1, *Summary Table of Changes to the Los Alamos National Laboratory Hazardous Waste Facility Permit,* and is included in Supplement 1-1, *Permittees' Proposed Changes to Permit Parts 1-11*.

3.2 Storage in Tanks and Mixed Waste Stabilization

Permit Part 4, *TA-55 Storage in Tanks and Treatment by Stabilization,* includes the requirements for active hazardous waste management units used for storage in tanks and stabilization by cementation at Technical Area 55. The Permittees propose no changes to these hazardous waste management units. All applicable requirements within 40 CFR Part 264, Subpart J and Subpart X, are included within Permit Part 4 of the most recent Permit. It should be noted that while the application requirements utilized to permit the mixed waste stabilization units are located in Subpart X of 40 CFR Part 264, the unit process code is T04, for "Other Treatment" in the LANL General Part A Permit Application, Revision 10.0 (LANL 2020a).

3.3 ~~Stabilization~~ Treatment in Containers

Permit Part 7, *~~Stabilization~~Treatment in Containers,* includes the Permit conditions associated with the treatment of hazardous waste in ~~a~~ contained environments at Technical Area 50, Building 69; TA-54, Area G, Pad 9, Dome 231 Perma-Con; and TA-54, Area G, Pad 1, Building 412. The Permittees propose no changes to the operations at these~~this~~ hazardous waste management units.

3.4 Treatment by Macroencapsulation

Macroencapsulation is an EPA-approved immobilization technology that includes the application of surface coating materials such as polymeric organics (e.g., resins and plastics) or use of a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media. Permit Part 8, *Treatment by Macroencapsulation,* includes the Permit conditions associated with the treatment of hazardous waste debris and radioactive lead solids by macroencapsulation. The Permittees propose no changes to this treatment process and may conduct this treatment at the following hazardous waste management units:

- TA-3-29, up to 3,441 gallons/day
- TA-50-69 Outdoor Pad, up to 275 gallons/day

- TA-54 Area G Pad 1, up to 23,160 gallons/day
- TA-54 Area G Pad 3, up to 23,160 gallons/day
- TA-54 Area G Pad 5, up to 23,160 gallons/day
- TA-54 Area G Pad 6, up to 23,160 gallons/day
- TA-54 Area G Pad 9, up to 23,160 gallons/day
- TA-54 Area G Pad 10, up to 23,160 gallons/day
- TA-54 Area G Pad 11, up to 23,160 gallons/day
- TA-54 Area G TA-54-33, up to 23,160 gallons/day
- TA-54 Area L Outdoor Pad, up to 23,160 gallons/day
- TA-54-38 West Outdoor Pad, up to 3,441 gallons/day
- TA-55-4, B40, up to 3,441 gallons/day
- TA-55-4, B45, up to 3,441 gallons/day
- TA-55-4 Outdoor Storage Pad, up to 3,441 gallons/day
- TA-55-355 Pad, up to 3,441 gallons/day
- TA-63 Transuranic Waste Facility, up to 23,160 gallons/day

4.0 OPEN DETONATION TREATMENT

This section, in conjunction with the appendices and supplemental materials referenced herein, sets forth the operational, human health and environment and regulatory rationale to include two long-standing open detonation waste management units under the umbrella of the LANL Hazardous Waste Facility Permit. Including the open detonation waste management units in the Permit will incrementally intensify scrutiny and regulation of the units by NMED-HWB.

Open detonation at TA-36 and TA-39 has been conducted since the 1950's. Two small open detonation units at TA-36 and TA-39 have been subject to regulation under the RCRA as interim status hazardous waste treatment units since November 1980 (41+ years). These interim status open detonation waste management units have been inspected annually by NMED-HWB and/or USEPA. None of these inspections has resulted in any allegation of noncompliance with any applicable RCRA regulations. Furthermore, environmental testing of soils, surface water, groundwater and air quality in the vicinity of the interim status open detonation units and intensive risk analysis show no evidence that an unacceptable or actionable level of any hazardous constituent has come to exist after 70+ years of operation. Consequently, continued operation of the open detonation waste treatment units under the Permit will be fully protective of human health and the environment.

To continue operating the open detonation waste management units in their proven historically safe and environmentally protective manner, LANL is seeking the approval of NMED to include the units under the intensified regulation umbrella of the LANL Hazardous Waste Facility Permit. Action by NMED to include the open detonation waste management units in the Permit will not increase the capacity of waste treatment relative to past practice. Such inclusion will, however, increase the level of scrutiny and regulation of the OD treatment units to ensure continued operation in a manner protective of human health and the environment.

This section also addresses the~~ outlines the application~~ requirements in 40 CFR §270.14 (Contents of ~~P~~part B: General r~~R~~equirements) and 40 CFR §270.23 (Specific r~~R~~equirements for ~~M~~miscellaneous u~~U~~nits) for permitting the specific treatment processes conducted in the two open detonation units at TA-36 and TA-39. ~~The open detonation units are currently interim status units, and the Permittees propose for these units to be permitted. As required~~Furthermore, this section describes the operating steps and requirements in place to ensure full compliance with the applicable requirements of 40 CFR §§ 264.601, .602 and .603. Compliance with these rules, in essence, guarantees the protection of human health and the environment via safe and effective waste treatment ~~events~~ of small quantities of intermittently generated explosives waste and explosives-contaminated waste~~ at the open detonation units~~.

Proposed changes to the current 2010 Permit to facilitate incorporation of the open detonation treatment ~~addition of these~~ units under the Permit umbrella are summarized and included Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit,* and Supplements 1-1 through 1-8, within the following Permit parts and attachments:

- Permit Part 1, *General Permit Conditions*
- Permit Part 5, *(Reserved)*
- Attachment A, *Technical Area Unit Descriptions*
- Attachment C, *Waste Analysis Plan*

- Attachment D, *Contingency Plan*
- Attachment E, *Inspection Plan*
- Attachment G, addition of closure plans, *Attachment G.2 Technical Area 36-8 Open Detonation Unit Closure Plan, and Attachment G.3 Technical Area 39-6 Open Detonation Unit Closure Plan*
- Attachment J, *Hazardous Waste Management Units*
- Attachment N, *Figures*.

4.1 Open Detonation Facility Background and Descriptions

Since the 1950s, the LANL has conducted treatment of solid and liquid explosive waste and explosive-contaminated waste by open detonation operations at TA-36-8, known as the Minie Site, and TA-39-6, known as Point 6. These sites are interim status units proposed by the DOE and Triad's predecessor (Los Alamos National Security, LLC) to be permitted through a Class 3 permit modification request submitted to NMED in July 2011. This Permit Renewal Application incorporates by reference this Class 3 modification request (LANL 2011).

Construction of the TA-36 Minie Firing Site was completed in 1950. The site has been used extensively to conduct armor-piercing experiments, in which penetrator jets are directed at targets at the canyon wall to the west of the site. Metal plates are placed behind the targets to stop the penetrators. The Minie Firing Site has also been used for open detonation of excess high explosives determined to be reactive RCRA waste. In addition, emergency detonation of leaking gas cylinders has also been performed, but on a very infrequent basis.

The TA-39 Point 6 site was established and began use as a test firing site in 1953. The site is located in the southernmost western tributary of Ancho Canyon at the canyon bottom between an ephemeral stream and steep hill slopes to both the north and the south. The site is used for explosives experiments and for treating reactive hazardous waste by open detonation. The experiments conducted at this firing site are designed to expend all high explosives in the device. The open detonation units are used to treat only solid and liquid hazardous explosive waste. The open detonation units are used to open air detonate waste-excess explosives and explosive-contaminated combustible waste to remove the characteristic of reactivity. The wastes treated by open detonation cannot be safely disposed through other modes of treatment, and open detonation treatment leaves any treatment residuals of the reactive hazardous waste safe to handle and dispose.

The types of hazardous listed waste treated at the open detonation units include the following EPA Hazardous Waste Numbers: D001, D003, D005, D008, D030, and F003. The waste categories treated at the open detonation units fall under several general categories: excess explosives; explosives-contaminated debris; detonators, initiators, and mild detonating fuses; shaped charges and test assemblies; projectiles and munitions larger than 50 caliber; pressing molds; small-caliber ammunition; and black powder or gunpowder. The treated waste streams consist of many different components, but they generally consist of waste contaminated with high explosives, such as off-specification high explosive powders, filters, filter cartridges, fiber drums, gun test debris, gun targets, prep room debris, shrapnel, plastic bags, vials, plastics, cellulosic material (e.g., wipes, swabs, paper), wood, tape, gloves, brass casings, magazines, steel canisters, and excess experimental energetics. Data from 2006 through 2014 demonstrate that the Facility's waste minimization program reduced the amount of waste treated by open detonation from more than 2,553.66 pounds over 20 events in 2006 to 6.49 pounds in one event in 2014. The largest treatment shot over those years was approximately 685 pounds. Through careful planning, the Facility established other uses for explosives that used to be considered waste and required treatment at the open detonation units. Now, there are efforts that use the explosives as fuel for training, sanitization, or experimental purposes, which is why in the short term there is not a regular need for these units. However, as buildings are decommissioned, areas are closed, and demolition activities are conducted to reduce the LANL facility footprint, explosives and explosives-containing materials will be found that cannot be used for their intended purposes and the open detonation units will need to be used to safely treat the material.

4.1.1 Open Detonation Permitting History

Since 1980, LANL has operated TA-36-8 and TA-39-6 open detonation units under the "interim status" requirements of the New Mexico Hazardous Waste Act and 40 CFR Part 265, Subpart P. Interim status is a designation given to facilities in existence before 1980 and contain requirements that apply until issuance of a final permit. The TA-36-8 and TA-39-6 units are classified as "thermal treatment hazardous waste management units" because they are used to treat explosive hazardous wastes; the units must meet requirements applicable to "miscellaneous units" under 40 CFR 264, Subpart X.

The permitting process for the TA-36-8 and TA-39-6 open detonation units has taken several decades. In November 1988, DOE and the University of California (the predecessor to the current contractor, Triad) submitted a permit application for hazardous waste treatment, including these two open detonation units. In January 1991, a Part A application for mixed waste units at LANL was submitted to NMED and included the units. The units were also included in Revision 1.0 and Revision 2.0 of the Part A permit application for mixed waste submitted to NMED in September 1993 and September 1994, respectively. In accordance with direction from NMED, a unit-specific Part A permit application (LANL, 1996b) for the units was submitted in 1996 (referred to as the OB/OD Part A), along with a unit-specific Part B as separate document. Prior to the issuance of the 2010 Permit, the most recent permit application for TA-36-8 was September 1999 and for TA-39-6 the most recent permit application was February 2000.

A Class 3 Permit Modification request was submitted July 19, 2011, as required by the 2010 Permit. The application was determined to be administratively complete on February 14, 2012. NMED issued a Notice of Deficiency on March 27, 2012, regarding two of the technical documents (the air-modeling report and the human-health risk assessment) included within the Permittees' 2011 application. The technical documents for which comments were provided have been updated and replaced herein as the following supplemental documents within Appendix 4, *Open Detonation and Open Burning Information*:

- Supplement 4-3, *Screening Level Air-Modeling Analysis and Risk Evaluation for Open Detonation Operations*
- Supplement 4-7, *Open Detonation Unit at Technical Area 36 Human Health and Ecological Risk Screening Assessments*
- Supplement 4-8, *Open Detonation Unit at Technical Area 39 Human Health and Ecological Risk Screening Assessments*

The units treat only explosives waste streams. The open detonation units are used to open air detonate waste-excess explosives and explosive-contaminated combustible waste.

4.1.2 Open Detonation Facility Descriptions

The two open detonation units at LANL are located at TA-36 and TA-39. The descriptions provided below meet the application requirements for 40 CFR §§270.14(b)(1) and 270.23(a).

4.1.2.1 Technical Area 36 Open Detonation Unit

Located in the east central portion of LANL, TA-36 is spread over several mesa tops between a branch of Pajarito Canyon to the north and Water Canyon to the south. Mesa-top elevations at TA-36 range from approximately 6,380 to 7,120 ft. above mean sea level. TA-36 contains an open detonation unit, several other firing sites, and supporting offices where research is conducted with various types of explosives. The location of the unit is depicted on revised Figure 2 included within Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures*.

The TA-36-8 open detonation unit is located in the southern portion of TA-36. The unit consists of an irregularly shaped area near Building TA-36-8 (the control building), as shown on newly included Figure 6 within Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures*, and on the TA-36 topographic map included with the updated *Los Alamos National Laboratory General Part A Permit Application, Revision 10* (LANL 2020a). The TA-36-8 open detonation unit is a sand- and grass-covered area that measures approximately 500 ft. east to west and 300 ft. north to south. The western portion is relatively flat; the eastern portion is concave to minimize fragment dispersion. Because the unit consists simply of an area on soil-covered tuff, an engineering drawing for structures cannot be developed for the unit. The topography and extent of the TA-36-8 open detonation unit are shown on the aerial figure included in the *Los Alamos National Laboratory General Part A Permit Application, Revision 10* (LANL 2020a). The TA-36-8 open detonation unit has a maximum treatment capacity of 2,000 pounds of explosive waste per detonation and an annual treatment limit of 15,000 pounds. The unit is used primarily for non-treatment-related experimental test detonations and is occasionally used to treat explosive hazardous waste. Operations at the unit require post-detonation visual surveys as soon as practical for materials not consumed by the detonation. This practice minimizes the potential for precipitation contacting untreated hazardous waste, if any is generated.

4.1.2.2 Technical Area 39 Open Detonation Unit

TA-39 is located in the southern portion of LANL (revised Figure 2 within Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures*) and includes much of the mesa between Water Canyon to the north and Ancho Canyon to the south. Mesa-top elevations at TA-39 range from approximately 6,500 to 7,000 ft. above mean sea level. The area was established in 1959 to test explosive materials and has been used continuously for that purpose. TA-39 contains a number of structures located in the north fork of Ancho Canyon; however, these structures are not routinely occupied and are only used during firing site operations or maintenance activities.

The TA-39-6 open detonation unit is associated with Building TA-39-6 (the control building). The location of the unit is shown on newly included Figure 7 of Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures,* and on the TA-39 topographic map in the updated LANL General Part A Application, Revision 10 (LANL 2020a). The TA-39-6 open detonation unit is a relatively flat, sand-covered area and measures approximately 40 ft. by 40 ft., and is located near the canyon bottom. Steep canyon walls that rise to heights of 100 ft. or more in the immediate vicinity of the TA-39-6 open detonation unit serve to attenuate the force of the detonations. Additionally, the area recently has been reconfigured to have a retaining wall in front of the canyon wall roughly forming a semicircle around the unit, which also provides attenuation of the detonation force. Building TA-39-6 (the control building) is a reinforced concrete structure that partially extends beneath the detonation area. An engineering drawing cannot be developed for the unit because it consists simply of an open area on sand-covered tuff. The topography and aerial extent of the unit are shown on the figure included in the LANL General Part A Application, Revision 10 (LANL 2020a). The TA-39-6 open detonation unit has a maximum waste treatment capacity of 1,000 pounds of explosive waste per detonation and an annual treatment limit of 15,000 pounds. The unit is used primarily for non-treatment-related experimental test detonations and is also occasionally used to treat hazardous explosive waste. Operations require post-detonation visual surveys as soon as practical for materials not consumed by the detonation. This practice minimizes the potential for precipitation contacting untreated hazardous waste, if any is generated.

4.2 Waste Characterization and Acceptance

The explosives waste and explosives-contaminated waste treated by open detonation typically consists of off-specification explosives wastes, excess explosives waste, and other explosives-contaminated solid wastes (e.g., rags, glass, and wood). These wastes exhibit the characteristic of reactivity, as defined in 40 CFR §261.23. Open detonation treatment of these wastes involves a detonation that chemically transforms the high explosives component of the waste faster than the speed of sound and renders the waste nonreactive.

Waste characterization and analysis requirements for explosives and explosives-contaminated waste treated by open detonation at LANL must be included within Permit Attachment C, *Waste Analysis Plan*. These waste streams include homogeneous and heterogeneous wastes. Open detonation operations are necessary for hazardous waste treatment to remove the characteristic of reactivity. Treatment by open detonation renders hazardous waste nonreactive and any potential remaining residue amenable to handling and dispositioning. Solid and liquid hazardous explosives waste may be treated (i.e., open detonated) at the units. Proposed changes to the Permit necessary to include these treatment operations are incorporated within the revised Permit Attachment C, *Waste Analysis Plan,* within Appendix 1, Supplement 1-3, *Permittees' Proposed Changes to Attachment C, Waste Analysis Plan,* of this Permit Renewal Application.

Waste characterization, acceptance, authorized wastes, and plans for waste analysis prior to treatment and after treatment (if needed) are outlined in Appendix 1, Supplement 1-3, in accordance with the requirements under 40 CFR §§264.13(a-c), 265.375, 265.382, and 270.14(b)(2-3). The changes include information specific to waste analysis and acceptance at the open detonation units. The Waste Analysis Plan was developed to ensure that all hazardous waste streams treated at the hazardous waste management units are properly characterized and any hazardous constituents that might contain or that are released through treatment are sufficiently identified.

The process of generating, reviewing, and approving a waste stream profile includes a certification by the generator that the characterization is complete, a review by hazardous waste characterization subject matter experts, and a review by an environmental professional that the waste meets waste acceptance criteria and can be treated by open detonation. The final check occurs when the waste is picked up from storage/accumulation and a visual inspection of the waste is conducted to ensure that the waste picked up is consistent with the waste described in the waste stream profile.

4.3 Security

At LANL, the Permittees prevent the unknowing entry and minimize the possibility for the unauthorized entry of persons or livestock onto the active hazardous waste management units, in accordance with the requirements from 40 CFR §§264.14 and 270.14(b)(4). Security is of paramount importance to safe and successful operations at LANL.

Access to the isolated and security-controlled locations of the open detonation units at TA-36 and TA-39 is maintained through both administrative controls and physical barriers. Entry into each of the firing sites or high explosives exclusion areas are controlled through an industrial fence with access granted through an access control station or a locked access gate. Access into the security area through the fence can only be gained by persons possessing an appropriate security clearance and site-specific training. Entry into the secured area is controlled via a combination of an entry station that is manned by LANL security personnel or by badge readers on gates 24 hours per day. Unescorted access to the appropriate firing site or high explosives exclusion area is granted only to persons possessing appropriate security clearance and meeting site-specific training requirements. Visitors must check in at the appropriate access control station to be added to the site-specific badge-reader system to gain access to the area. Proposed changes to the Permit to update descriptions of security measures at the open detonation units are included to Attachment A, *Technical Area Unit Descriptions*, within this Permit Renewal Application in Supplement 1-2, *Permittees' Proposed Changes to Attachment A, Technical Area Unit Descriptions*.

4.4 Inspection Schedules and Procedures

Per the requirements at 40 CFR §§ 270.14(b)(5) and 264.602, inspections at the open detonation units are conducted and documented as outlined in Permit Section 2.6, *General Inspection Requirements*. Permit Attachment E, *Inspection Plan,* with a revised inspection plan that includes the requirements for inspections at the open detonation hazardous waste management units, can be found in Supplement 1-5, *Permittees' Proposed Changes to Permit Attachment E, Inspection Plan,* of this Permit Renewal Application. No changes to Permit Section 2.6 are associated with the addition of these hazardous waste management units.

4.5 Waivers for Preparedness and Prevention

The information requirements for 40 CFR §270.14(b)(6) stipulate that a part B permit application include "a justification for any request to waive the preparedness and prevention requirements of Part 264, subpart C." No waivers of the preparedness and prevention requirements under Part 264, subpart C, are being sought by the Permittees.

4.6 Contingency Plan

As required by 40 CFR §270.14(b)(7), the Contingency Plan meets the requirements for 40 CFR Part 264, Subpart D, *Contingency Plan and Emergency Procedures*. Information on emergency response resources and release prevention/mitigation are included in the current 2010 Permit Attachment D, *Contingency Plan*. A copy of the revised Contingency Plan that includes updates for the inclusion of the open detonation units is included in this Permit Renewal Application as Supplement 1-4, *Permittees' Proposed*

Changes to Permit Attachment D, Contingency Plan. The revised plan incorporates the emergency equipment located at the open detonation units at TA-36-8 and TA-39-6.

4.7 Hazards Prevention

The following sections present how operations at the open detonation units comply with the preparedness and prevention requirements of 40 CFR Part 264, Subpart C, and the application requirements for 40 CFR §§270.14(8)(i-vi), where they differ from those presented in Section 2.7, *Hazards Prevention,* of this Permit Renewal Application. Health and safety procedures are followed by site personnel during routine operations.

4.7.1 Waste Handling at Open Detonation Units

All waste-handling operations at the open detonation treatment units are conducted as discussed in Section 2.7.1, *Waste Handling and Preventing Hazards in Unloading/Loading*, of this Permit Renewal Application, thus meeting the requirements of 40 CFR §270.14(8)(i).

4.7.2 Control of Runon/Runoff

Prevention of runoff from the hazardous-waste-handling areas per the requirements for 40 CFR §270.14(8)(ii) is described in Section 4.18.2, *Protection of Surface Water/Wetlands/Soil Surface,* of this Permit Renewal Application.

4.7.3 Preventing Water Supply Contamination

The water supply at LANL is as described in Section 2.7.3, *Preventing Water Supply Contamination,* of this Permit Renewal Application.

4.7.4 Mitigate the Effect of Equipment Failure and Power Outages

There are no special requirements at the open detonation units required to mitigate equipment failure and power outages, per the requirements of 40 CFR §270.14(b)(8)(iv). The description of required equipment and testing maintenance of that equipment follow the permit conditions referenced in Section 2.7.4, *Mitigate the Effect of Equipment Failure and Power Outages,* of this Permit Renewal Application with the proposed permit changes as described within the section.

4.7.5 Preventing Undue Exposure of Personnel

The requirements at the open detonation units to prevent undue exposure of personnel, per the requirements at 40 CFR §270.14(b)(8)(v), are as described in Section 2.7.5, *Preventing Undue Exposure of Personnel,* of this Permit Renewal Application.

4.7.6 Preventing Releases to the Atmosphere

The requirements of 40 CFR §270.14(b)(8)(vi) reflect the standards promulgated in 40 CFR §264.601, which is applicable to the open detonation waste management units. 40 CFR §264.601 requires that "A miscellaneous unit must be located, designed, constructed, operated, maintained, and closed in a manner that will ensure protection of human health and the environment. Permits for miscellaneous units are to contain such terms and provisions as necessary to protect human health and the environment, including, but not limited to, as appropriate, design and operating requirements, detection and monitoring requirements, and requirements for responses to releases of hazardous waste or hazardous constituents from the unit. Permit terms and provisions must include those requirements of subparts I through O and subparts AA through CC of this part, part 270, part 63 subpart EEE, and part 146 of this chapter that are appropriate for the miscellaneous unit being permitted. …" Protection of human health and environment will respect to the air and the atmosphere includes, but is not limited to:

> "(c) Prevention of any release that may have adverse effects on human health or the environment due to migration of waste constituents in the air, considering:
> (1) The volume and physical and chemical characteristics of the waste in the unit, including its potential for the emission and dispersal of gases, aerosols and particulates;
> (2) The effectiveness and reliability of systems and structures to reduce or prevent emissions of hazardous constituents to the air;
> (3) The operating characteristics of the unit;
> (4) The atmospheric, meteorologic, and topographic characteristics of the unit and the surrounding area;
> (5) The existing quality of the air, including other sources of contamination and their cumulative impact on the air;
> (6) The potential for health risks caused by human exposure to waste constituents; and
> (7) The potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents."

The open detonation units will comply with the provisions of 40 CFR § 264, 40 CFR § 264.601 and § 270.14 by proper operation of the units in compliance with the terms of a RCRA permit issued by NMED. The Permittees' historic interim status compliance at the open detonation treatment units is unsurpassed and an indication of superior prospective compliance with any NMED issued RCRA permit conditions.

The *RCRA 40 CFR Part 264, Subpart X Permit Writers Technical Resource Document* (EPA 1997), specifies that the destruction and removal efficiency of open detonation units ranges from "99.98% to 99.9996%." These extremely high destruction and removal efficiencies ensure the prevention of any release that may have adverse affects on human health or the environment due to migration of waste constituents in the air. Data discussed in Section 4.18.3, *Protection of Atmosphere,* and included in Supplement 4-3, *Screening Level Air Modeling Analysis Risk Evaluation for Open Detonation Operations,* shows that any potential emissions from operation of the open detonation waste management units will not exceed any regulatory level established to protect human health or the environment. ~~Releases to the atmosphere resulting from treatment activities at the open burning and open detonation treatment units cannot be prevented as required by 40 CR §270.14(b)(8)(vi). However, assuming~~ The very conservative scenarios for assumed for the treatment activities modeled at each of the units both overestimates quantities of waste expected to be treated at the units and the types of waste that will be treated at the units. Efforts to minimize the quantity and toxicity of the waste that must be treated by open detonation have net positive impacts for the frequency of needed treatment at the units. ~~(as discussed in Section 4.18.3, *Protection of Atmosphere,* and included in Supplement 4-3, *Screening Level Air Modeling Analysis and Risk Evaluation for Open Detonation Operations*), the estimated resulting emissions will not exceed regulatory levels for health-based protection.~~ Therefore, such emissions will not adversely affect human health or the environment and thereby will meet and comply with the requirements of 40 CFR § 264, 40 CFR § 264.601(c) and 40 CFR § 270.14(b)(8)(vi).

Specifically, a~~A~~ir-monitoring data collected in 2011 during treatment events at the open detonation units is included as Supplement 4-4, *Air Sampling at Open Detonation Units,* of this Permit Renewal Application. Each sample was collected as close to the treatment unit as possible and downwind of the shot. The data indicate that much of the measurable air contaminants can be attributed to air entrainment of soil, rather than emissions from the treatment processes. Finally, the entirety of Section 4.18 is incorporated into this Section 4.7.6 by reference.

4.8 Ignitable, Reactive, and Incompatible Waste Precautions

The application requirements for 40 CFR §270.14(b)(9) are included in Section 2.8, *Ignitable, Reactive, and Incompatible Waste Precautions,* of this Permit Renewal Application. There are no changes required to Permit Section 2.8, *Ignitable, Reactive, and Incompatible Waste*, for the inclusion of the open detonation units within 2010 Permit. The treatment of wastes by open detonation is an appropriate treatment method under RCRA. It is necessary to mitigate the ignitable and/or reactive hazards associated with explosives waste streams and is the preferred waste management practice for health and safety concerns.

4.9 Traffic

In accordance with the requirements of 40 CFR §270.14(b)(10), the primary traffic routes used to transport hazardous waste to the TA-36-8 open detonation unit include West Jemez Road (State Road 501), Anchor Ranch Road, R Site Road, and Potrillo Drive. The primary traffic routes used to transport hazardous waste to the TA-39-6 open detonation unit are within TA-39. Ancho Road is a nonpublic road within TA-39 (see Figures 1 and 2 in Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures*). Additional discussion of traffic at LANL is included in Section 2.9, *Traffic Pattern, Estimated Volume, and Control*.

4.10 Location and Facility-Wide Information

Facility location information to meet the requirements for 40 CFR §270.14(b)(11) is included within this Permit Renewal Application within Section 2.10, *Facility Location Information*. Additionally, the information requirements for 40 CFR §§270.14(b)(12, 14, 15, 16, 17, 18, 19, 20, 21, and 22) and 270.14(c & d) are covered for the LANL facility within Sections 1 and 2 of this Permit Renewal Application. There are no additional information requirements necessary to add the open detonation units to the 2010 Permit.

4.11 Closure Plan

Copies of the closure plans for each of the open detonation units as required by 40 CFR §270.14(b)(13) are included within Supplement 3-1, *Permittees' Proposed Changes to Attachments G.1 through G.30, Closure Plans,* of this Permit Renewal Application.

4.12 Design, Construction, Materials, and Operation

Open detonation completely removes the characteristic of reactivity from explosives waste and explosives-contaminated waste. However, these wastes may also exhibit RCRA toxicity characteristics or contain listed wastes. In some cases, open detonation is effective in removing these other characteristics and destroying listed waste associated with organic hazardous constituents (e.g., 2,4-dinitrotoluene and solvents). This is not the case when it comes to high explosives contaminated with RCRA-regulated metals. However, untreated explosives waste and explosives-contaminated waste do not usually contain metals in high enough concentrations to be considered hazardous.

The open detonation units are used to treat solid and liquid explosive hazardous waste. Descriptions of waste streams that might be treated by open detonation at the unit are discussed in Section 2.2, *Waste Analysis Plan,* of this Permit Renewal Application.

The TA-36-8 open detonation unit has a maximum treatment capacity of 2,000 pounds of explosive waste per detonation and an annual treatment limit of 15,000 pounds. Following waste placement at the unit, detonation operations are conducted remotely from Building TA-36-8 (the control building). The TA-39-6 open detonation unit has a maximum waste treatment capacity of 1,000 pounds of explosive waste per detonation and an annual treatment limit of 15,000 pounds. Following waste placement at the TA-39-6 unit, detonation operations are conducted from Building TA-39-6 (the control building). Both units are used primarily for non-treatment-related experimental test detonations and are also occasionally used to treat hazardous explosive waste. Operations at each of the units require post-detonation visual surveys as soon as practical for materials not consumed by the detonation. This practice minimizes the potential for precipitation contacting untreated hazardous waste, if any. The Permittees have proposed treatment permit conditions for these units to update Permit Part 5. These proposed revisions are included within in newly proposed Permit Part 5, *Treatment by Open Detonation,* and within Supplement 1-1, *Permittees' Proposed Changes to Permit Parts 1-11,* of this Permit Renewal Application.

4.12.1 Containment Systems

In accordance with requirements from 40 CFR §264.601(b)(2), the effectiveness and reliability of containment, confinement, and collection systems and structures that prevent contaminant migration at the open detonation units are evaluated in Section 4.18, *Environmental Performance Standards.*

Engineering controls are in place at each open detonation unit to prevent runoff of waste constituents from the unit to other areas of the facility or to the environment. A site plan and an aerial photograph of the unit is included in the *LANL General Part A Application, Revision 10* (LANL 2020a). Drainage control features and storm water controls are included on figures in Supplement 4-2, *Open Detonation Unit Groundwater Monitoring and Surface Drainage Information.*

Existing storm water controls at the TA-36-8 open detonation unit include an earthen berm and swale that direct runon around and to the south of the unit. The lower reach of this swale is well vegetated, and a 12-inch culvert directs runoff under the access road, with the banks of the drainage adjacent to the outlet lined with riprap. The general unit area is surrounded with an earthen berm, and the outfall for the site is well vegetated and has a layer of wood chips that filter runoff from the site. The site is flat, so the vast majority of rainfall is absorbed into the soil. Native vegetation in the area surrounding the unit holds soil in place, increases infiltration, and slows and filters runoff.

Storm water controls at the TA-39-6 open detonation unit include a retaining wall to the north and west of the TA-39-6 firing pad. This wall diverts surface water runon north to a tributary of Ancho Canyon and prevents potentially contaminated runoff from entering the tributary to Ancho Canyon. The north slope of the retaining wall is covered with native vegetation to provide stabilization. Several rock check dams are located north of the firing point in a tributary to Ancho Canyon. Runoff from the TA-39-6 open detonation unit is directed into a rock-lined channel that leads to a culvert under the site access road. The discharge outlet of this culvert is protected with rock check dams. A drainage swale around the south edge of the dirt access road leading to the unit directs storm water away from the firing point and through the easternmost culvert present at the sire. Several rock check dams are located within the swale above this culvert. The discharge outlet of these culverts is protected with rock check dams. Thick native vegetation at the easternmost culvert's outlet serves as detention, filtration, and infiltration control, preventing sediment transport into the tributary to Ancho Canyon.

4.12.2 Operating Requirements

Open detonation operations are conducted in accordance with this section and as detailed in the most recent, approved versions of LANL facility plans and operating procedures. These procedures are described in the following sections to address the general and site-specific safety and health hazards associated with working with explosives.

Waste to be treated is collected from various areas at the Facility. Prior to treatment of any waste, the waste generator submits waste characterization documentation and a request for treatment. This information is reviewed for acceptance at the treatment unit by a trained professional familiar with the waste characterization requirements of the Waste Analysis Plan and the site-specific restrictions of the waste treatment unit at TA-36-8 or TA-39-6. Treatment event(s) is/are scheduled once waste characterization documentation has been approved by the firing site leader, waste acceptance personnel, high explosives official safety personnel, and responsible line management.

4.12.2.1Waste Treatment Process

Scheduling a waste treatment event involves arranging for transportation of waste from one or more locations to the make-up building (or preparation building) or to the TA-36-8 or TA-39-6 open detonation units. When loading waste, the cargo compartment of the transport vehicle is checked to ensure that it is clean and contains no loose items such as tools or pieces of metal. For transport, the wastes are placed in an enclosed compartment or secured with tie-downs. The load limit for transporting explosives is determined by the capacity of the transport vehicle. Wastes are transported by appropriately trained personnel in a designated vehicle to a make-up building or to the open detonation unit. The waste is unloaded from the vehicle and placed within the make-up building by qualified technicians/specialists. A visual examination is conducted after unloading to ensure that no explosive material remains in the transport vehicle.

For efficiency and with the intent to minimize handling of explosives, waste may be staged overnight after transport to the make-up room. The make-up buildings are located near the TA-36-8 and TA-39-6 open detonation units within an area where access is controlled.

Specific treatment operations and explosives ~~handling~~handling and assemblies are addressed in operating procedures described in this document and ~~take into account~~consider all the potential hazards present during treatment preparation. The wastes treated at the open detonation units are prepared in the make-up room, where assemblies necessary for detonation of the waste are located. The required amount of explosive is moved into the open detonation unit for a treatment event. Final setup for waste treatment occurs at the open detonation unit, and this setup includes configuration of explosives and detonator. This includes connecting electronic components and wiring at the open detonation unit to ensure remote initiation of the waste treatment detonation functions correctly.

The firing site leader at each open detonation unit configures a waste treatment shot that ensures complete detonation of the waste. Multiple compatible waste streams may be consolidated to create efficiencies in the waste treatment. Wastes requiring the use of more fuel may be paired with wastes that require less fuel, so the least amount of fuel possible is used to treat waste effectively and efficiently. Also considered in the process are other safety and health considerations, including but not limited to minimizing the handling and transport of explosives, noise mitigation, meteorological conditions, and fire danger. Risk to human health is the greatest consideration. Should operational or meteorological conditions change rapidly and unexpectedly, the waste may remain at the open detonation unit under administrative control until open detonation treatment can be conducted safely.

Operations at firing sites at LANL are carefully coordinated and Access Control is notified prior to and after conducting of treatment operations via phone or radio. Fire department personnel may be notified, and these personnel may be present or on standby at certain treatment events, as determined by high explosives safety personnel. Initiation for all waste treatment operations is performed remotely by qualified personnel from inside the control buildings. Upon completion of shot setup, area clearances are completed and the shot is fired. After the shot is fired, the firing site leader (or designee) conducts a visual inspection to ensure that the high explosives were expended and safe conditions exist. If the inspection confirms that the shot fired completely, an “All Clear” is signaled via phone or radio. All personnel must remain in the bunker until given permission to leave the control building by the personnel inspecting the site.

If there are indications that the shot did not fire properly, clearance personnel will be notified of the condition. All personnel within the control building will remain in the control building, with misfire or partial fire procedures going into effect. LANL minimizes the impact to the environment by conducting treatment operations in strictly controlled, remote areas within LANL boundaries. Waste treatment shots are carefully assembled to ensure thorough detonation and minimize fragment dispersion. Residues (metallic shards, wood, plastic, cables, or foam pieces) are managed in accordance with appropriate LANL waste management procedures.

4.12.2.2 Waste Accumulation

Explosives waste is not routinely accumulated at the firing site. When possible, explosives waste and explosives-contaminated waste are removed from compliant storage at the generating location just prior to being treated.

4.12.2.3 Treatment Operations

The TA-36-8 open detonation unit and the TA-39-6 open detonation unit are used for thermal treatment of explosive-contaminated hazardous waste that exhibits the characteristic of reactivity, in accordance with 40 CFR Part 265, Subpart P. The purpose of waste treatment at the units is to remove the characteristic of reactivity by open detonation. Treatment of the waste is accomplished by using a predetermined amount of explosive (fuel or donor charge) to initiate and increase the effectiveness of treatment. All treatment detonations are conducted above the ground surface, with a clearance area established based on the size of the treatment shot. Detonations are configured at each unit to minimize fragmentation dispersal. The detonation may create temperatures ranging from 4,500 to 9,000 degrees Fahrenheit (2,500 to 5,600 degrees Celsius) (NAVAMI 2005).

Generally, explosives-contaminated waste includes make-up room (located in the make-up building) wastes and, to a very limited degree, firing site debris. Make-up room waste consists of explosives-contaminated debris such as paper towels, gloves, swabs, and similar materials that contain no tangible pieces of explosives but are used in the preparation of detonations (i.e., shots) in the make-up building. Firing site debris that is potentially contaminated with explosives would only be generated in the rare instance that a waste treatment or experimental shot is incomplete. This debris waste stream consists of wood scraps, cardboard, burlap, Plexiglas®/Lexan®, plastic, glass, Styrofoam, electrical cables, and metallic foils used for pin switches or metals such as target plates. When generated, firing site debris is characterized using LANL waste management procedures and determined to not meet the criteria for a reactive waste. Therefore, firing site debris is almost always sent offsite for dispositioning.

Explosives waste includes identifiable excess explosives that are safe to handle. These materials include excess explosives assemblies and explosives, identifiable booster charge scrap, and any other process or cleanup wastes that have been determined to be potentially reactive.

Waste containers for explosives-contaminated waste and explosives waste generally consist of plastic bags, paper-lined cardboard boxes, or plywood boxes. Explosives-contaminated waste and explosives waste are packaged for intrusive transport typically in compliance with U. S. Department of Transportation requirements. Explosives-contaminated waste is placed within a container, sealed, and labeled appropriately. These waste containers are stored in a central accumulation area or a satellite accumulation area. Excess explosive waste may be stored in compliant explosives storage. Firing site debris that includes pieces of damaged explosives resulting from a misfire, sensitivity experiment, incomplete detonation, or exposure to severe testing is packaged separately from explosives waste. Exceptions to handling are done on special items, which are handled safely and appropriately.

4.12.2.3.1 Pretreatment Activities

Open detonation operations are conducted in accordance with this section and as detailed in the most recent, approved versions of LANL facility plans within the Permit and operating procedures (as described here), which are designed to help trained personnel assess and address the general and site-specific safety and health hazards associated with working with explosives.

Waste to be treated is collected from various areas at the Facility. Prior to treatment of any waste, the waste generator must submit waste characterization documentation and a request for treatment. This information is reviewed for acceptance at the treatment unit by a trained professional familiar with the waste characterization requirements of the Permit Attachment C, *Waste Analysis Plan* (the revised Waste Analysis Plan with the proposed changes to include open detonation is in this Permit Renewal Application's Supplement 1-3, *Permittees' Proposed Changes to Attachment C, Waste Analysis Plan*) and the site-specific restrictions of the waste treatment unit at TA-36-8 or TA-39-6. A treatment event(s) is/are scheduled once the waste characterization documentation has been approved by the firing site leader, waste acceptance personnel, high explosives official safety personnel, and responsible line management.

4.12.2.3.2 Waste Staging

For efficiency and with the intent of minimizing handling of explosives, waste may be staged overnight after transport to the make-up room in the make-up building. The make-up buildings are located near the TA-36-8 and TA-39-6 open detonation units, and within an area where access is controlled. Waste is not staged outside on the firing point.

4.12.2.3.3 Restrictions on Operations

Operating conditions for the open detonation units include not conducting detonation operations during adverse weather conditions and accepting only a maximum of up to 2,000 pounds of waste explosives per treatment at the TA-36-8 open detonation unit and 1,000 pounds of waste per treatment at the TA-39-6 open detonation unit. Annually, the Facility is limited to 15,000 pounds per year for both the open detonation units combined.

Transportation of or routine operations with explosives waste at the open detonation units may not occur during the following severe conditions:

- Lightning within a six mile radius
- ~~Bounding conditions as detailed in the LANL Fire Danger Matrix maintained by emergency operations personnel at the Facility~~
- Icy roads (for transport)
- During precipitation events
- Any time w~~W~~inds are greater than 20 miles per hour
- Winds greater than 10 miles per hour in drier weather conditions, such as in the spring and summer seasons when fire danger rating is deemed to be “Very High” or “Extreme”

Specific bounding conditions for treatment operations are detailed in the LANL Fire Danger Matrix (https://www.lanl.gov/resources/emergency/fire-danger-matrix.php) maintained by emergency operations personnel at the Facility. Wind data is standardized using the facility-wide LANL Weather Machine, meteorological tower 6 postings. The Weather Machine compiles temperature, wind, pressure, relative humidity, data collected by LANL meteorological towers and other pertinent National Weather Service forecast information. Routine open detonation operations occur only during daylight hours (i.e., one hour after sunrise or one hour before sunset).

4.13 Demonstration of Treatment Effectiveness

To address the applicable miscellaneous unit requirements specified in 40 CFR §270.23(d), a demonstration of treatment effectiveness must be included for the open detonation units. As indicated in the U.S. Army Environmental Hygiene Agency (AEHA) guidance document, "RCRA Part B Permit Writers Guidance Manual for Department of Defense Open Burning/Open Detonation Units" (AEHA 1987), a demonstration of treatment effectiveness can be based on laboratory or field data. For wastes treated by open detonation, information demonstrating that any residues or fragments remaining are not reactive after the detonation (i.e., as defined by RCRA) should be provided. At the open detonation units, the goal of waste treatment is to have no residue after each waste treatment event. The area is visually inspected for complete detonation directly after each treatment event. If any explosives waste remains after the initial treatment, it is treated again to ensure that any residues or fragments remaining are not reactive. Remaining residues that could be reactive would be considered an off-normal situation and would be documented as such. Any remaining explosive remnants would be treated in accordance with safety practices and approved LANL waste management procedures. Residues that are not reactive are managed as such, and must be in compliance with applicable state, federal, and local requirements.

4.14 Assessment of Alternatives

An assessment of alternatives to onsite open burning and open detonation treatment activities is included in Supplement 4-1, *Assessment of Alternatives for Open Detonation and Open Burning Activities for Open Detonation and Open Burning Activities* of Appendix 4, *Open Detonation and Open Burning Information,* of this Permit Renewal Application. The assessment discusses waste minimization efforts, operational practice changes, and process efficiencies that have occurred to decrease the amount and types of waste that require treatment through open detonation and open burning activities. Waste-minimization and process-efficiency efforts have decreased the volume of waste generated during routine operations. These efforts are continual at LANL and prove effective at reducing explosives waste for treatment by open detonation, resulting in no waste treatment detonations at either unit since 2014 at LANL. This reduction has been accomplished mainly by identifying other uses for excess and out-of-specification explosives. However, these activities do not eliminate all potential waste streams requiring thermal treatment (i.e., open detonation or open burning).

In addition, the assessment outlines alternative treatment technologies to open detonation and open burning and the restrictions for offsite transport of explosive hazardous waste. Overall, the assessment concludes that no single treatment technology exists that could treat all wastes currently treated by open burning and open detonation at LANL; therefore, multiple treatment technologies would have to be employed onsite to replace open detonation and open burning treatment activities. These technologies would also require RCRA permits prior to construction.

Additionally, the assessment in Supplement 4-1 outlines the safety considerations that are important for both onsite treatment activities and offsite shipment of explosives waste streams. It concludes that onsite open detonation and open burning treatment are the only options for treatment of certain waste streams. Open detonation or open burning is the safest and most reliable method for all explosives waste streams treated onsite and thus cannot be eliminated.

4.15 Noise Considerations

Noise resulting from open detonation treatment activities is minimized by conducting such treatment in a remote area within LANL boundaries and under optimal meteorological conditions. This section describes the potential impacts to human health and the environment resulting from noise and ground vibrations.

Impulse noise is a discrete noise event that typically lasts less than two seconds (often less than one second) and produces a rapid increase in the sound pressure level. Impulse noise measurements were collected at the intersection of Piera Loop and New Mexico State Road 4 in White Rock, New Mexico, located approximate 2.5 miles east of the TA-36-8 open detonation during the detonation of explosives. Measurements were taken on approximately 110 separate occasions between 2008 and early 2011. On seven of those occasions, impulse noise measurements were also taken at a location approximately 13 miles east of the open detonation unit, in El Rancho, New Mexico. The El Rancho location has a "direct line of sight" to LANL boundaries. The practice for evaluating noise concerns associated with all routine detonation activities is specifically described in Supplement 4-10, *Predicting and Controlling Noise from Detonation Activities*. Historic measurements collected that support the information in Supplement 4-10 are described below.

On December 21, 2010, the noise levels of a 35-pound detonation were recorded at the two locations. The measurement at Piedra Loop and State Road 4 intersection was 118 decibels (dB), and the measurement at El Rancho was 100 dB. There was a weather inversion during this event. Impulse noise measurements were also made at Piedra Loop and New Mexico State Road 4 intersection during a 400-pound detonation on August 20, 2009. The reading at this location was 106 dB.

On December 15, 2010, a noise measurement was made at the entrance to Bandelier National Monument during an open detonation at the TA-39-6 open detonation unit. The observed reading was 110 dB. Additional noise monitoring was conducted at the intersection of Monte Ray South and State Road 4 in White Rock, New Mexico, on seven additional occasions, with the highest reading being 106 dB on January 20, 2011, taken during a 100-pound open detonation.

Workers involved in actual open detonation operations are stationed in the control building at the unit during detonation and, based on the levels measured at the TA-36-8 unit, exposure is expected to be between approximately 126 and 132 dB. Exposure received at the TA-39-6 unit would be approximately 134 dB. Both of these potential exposures are below the occupational exposure limit of 140 dB set by the American Conference of Governmental Industrial Hygienists. As a precautionary measure, various types of hearing protection are made available to workers and visitors during open detonation operations.

4.16 Minimum Distance Requirements

Treatment of waste at the open detonation units is conducted using a noncontinuous (batch) thermal process, in which a discrete quantity of waste is treated through a complete thermal cycle, in accordance with requirements specified in 40 CFR §§265.370 and 265.373. Open detonation of wastes at the open detonation units will be conducted in a manner that does not threaten human health or the environment. Based on the unit's maximum 2,000-pound treatment capacity at the TA-36-8 open detonation unit, a minimum required distance of 1,730 ft. will be maintained between the point of detonation and the property of others. For the TA-39-6 open detonation unit's maximum 1,000-pound treatment capacity, a minimum required distance of 1,250 ft. will be maintained between the point of detonation and the property of others, as required by 40 CFR §265.382.

4.17 Ground Vibration Concerns

LANL measured ground vibration during a series of 400-pound open detonation events at the TA-36 open detonation in August 2009. The largest seismic ground motion at 0.6 miles (1 kilometer) from the TA-36-8 open detonation unit was approximately 10 times less than the U.S. Bureau of Mines Safe Level Standards for the 400-pound shots. At a distance of 1.2 miles, the acoustic signals were below U.S. Bureau of Mines Safe Level Standards for the 400-pound shots. In the nearest community of White Rock, New Mexico, located approximately 2.5 miles away from the TA-36-8 open detonation unit, all measurements were at least 15 dB below safe level standards. LANL has been taking detailed acoustic and seismic measurements for all shots at three locations since December 2010. Additionally, based on the fact that measurements are well below established safe level standards and due to the remote location of the open detonation units, potential impacts to human health and the environment resulting from ground vibration are assessed to be minimal.

4.18 Environmental Performance Standards

The TA-36-8 and TA-39-6 open detonation units are located in remote areas of LANL. The units are operated, maintained, and will be closed in a manner that will ensure protection of human health and the environment, in accordance with 40 CFR §264.601. General geologic and hydrologic characteristics of the LANL Facility and land-use patterns in the Los Alamos area are discussed in Section 2.1, *General Facility Description,* and Section 2.10, *Facility Location Information,* of this Permit Renewal Application.

The open detonation units have been designed to facilitate safe handling and treatment of wastes to prevent adverse human health and environmental impacts. Design information and waste management practices for the TA-36-8 open detonation unit and the TA-39-6 open detonation unit are detailed above.

4.18.1 Protection of Groundwater/Vadose Zone

As required by 40 CFR §264.601(a), the open detonation treatment units are operated in a manner that prevents releases that might have adverse effects to human health or the environment as a result of migration of waste constituents through the vadose zone to groundwater. The following sections provide information on the hydrogeology beneath the TA-36-8 open detonation unit and at the TA-39-6 open detonation unit, as well as describe monitoring and reporting conducted to assess the impact of open detonation operations on groundwater.

4.18.1.1 Hydrogeology

The TA-36-8 open detonation unit and the TA-39-6 open detonation unit are located in a mixed semiarid, temperate, and mountain climatic zone. From 1981 to 2010, the average annual precipitation in Los Alamos was 18.97 inches and the average annual snowfall was 57.5 inches (LANL, 2009a). Published precipitation data for TA-36 and TA-39-6 units do not exist; however, TA-49, located southwest of TA-36, has an annual precipitation of 22.27 inches per year (LANL, 1998). The evaporation rate of freestanding water exceeds the average annual precipitation. A discussion of the hydrology beneath each of the open detonation units is included in the sections below. Pertinent locations for monitoring are included within figures in Supplement 4-2, *Open Detonation Unit Groundwater Monitoring and Surface Drainage Information*, which lists the possible contaminants of concern and shows their monitoring frequency. Tables included within Supplement 4-2 are modified from the 2020 Interim Facility-Wide Groundwater Monitoring Plan and include the analyte suite and the frequency of analysis (C = continuous, Q = quarterly, S = semi-annual, and A = annual) conducted in 2019 for the constituents listed in the columns (LANL 2020b). Map 3 within the concurrent submittal of the LANL General Part A Permit Application, Revision 10.0 (LANL 2020a), shows the locations of all regional and alluvial wells used for data gathering at LANL, whereas the TA-36 and TA-39 topographic maps within the LANL General Part A Permit Application depict more detailed information about wells, surface water stations, springs, and groundwater movement at and around each of the open detonation units.

Supplement 4-2, *Open Detonation Unit Groundwater Monitoring and Surface Drainage Information,* of this Permit Renewal Application contains monitoring data for alluvial, perched-intermediate, and regional groundwater zones near the open detonation units.

4.18.1.1.1 Hydrogeology near and beneath the TA-36-8 Open Detonation Unit

A detailed description of the hydrogeologic characteristics immediately below the TA-36-8 open detonation unit is not currently documented in published or internal reports. However, a discussion of surface water, the vadose zone, and groundwater specific to Operable Unit 1130, which includes TA-36, and a conceptual hydrogeologic model of the area are presented in Sections 3.5 and 3.6 of the RFI Work Plan for Operable Unit 1130 (LANL, 1993a). Additional hydrologic information for the area north of the TA-36-8 open detonation unit is presented in the Pajarito Canyon Investigation Report, Revision 1 (LANL, 2009b).

The hydrologic conditions on the surface and within the dry-mesa setting such as that found at the TA-36-8 open detonation unit lead to slow unsaturated flow and transport (Birdsell et al., 2005). Dry mesas shed precipitation as surface runoff to the surrounding canyons, and most mesa-top infiltration occurs episodically following snowmelt. Much of the water that enters the soil zone is lost through evapotranspiration. Potential evapotranspiration was estimated to exceed precipitation at a climate station on the eastern portion of the plateau by a ratio of 6:1 (LANL, 2003b). As a result, annual net infiltration rates for dry mesas are less than ten 10 millimeters per year (mm/yr.) and are more often estimated to be on the order of 1 mm/yr. or less (Kwicklis et al., 2006). Because the dry mesas generally consist of nonwelded to moderately welded tuffs with low water content, flow is matrix dominated. Travel times for contaminants migrating through mesas to the regional aquifer are expected to be several hundred to thousands of years (Newman, 1996; Newman et al., 1997; Birdsell et al., 2000; Nylander et al., 2003).

The regional water table is approximately 1,000 ft. below the TA-36-8 open detonation unit. The only aquifer in the Los Alamos area capable of municipal and industrial water supply is the regional aquifer. The nearest supply well to the TA-36-8 open detonation unit, PM-2 is located 6,500 ft. to the northeast. PM-4 is 9,300 ft. north-northeast of the TA-36-8 open detonation unit. Upper levels of the regional aquifer on the Pajarito Plateau are predominantly under phreatic (unconfined) conditions (LANL, 2009b). The deep portion of the regional aquifer is predominantly under confined conditions, and it is the portion of the regional aquifer influenced by Pajarito Plateau municipal supply pumping. The intensive pumping causes very small water-level fluctuations in the upper (phreatic) portions of the aquifer. Seasonal water-table fluctuations of approximately 0.5 ft. are observed at monitoring well R-27 (Koch and Schmeer, 2010), located 2,400 ft. west of the TA-36-8 open detonation unit (Supplement 4-2, *Open Detonation Unit Groundwater Monitoring and Surface Drainage Information*). These low-magnitude responses in the phreatic zone from municipal well pumping are in contrast to the larger responses at monitoring wells completed in deeper parts of the aquifer, indicating that the hydraulic communication is poor between the phreatic zone and deeper parts of the aquifer. The small-scale fluctuations in the phreatic zone may be from drawdowns and/or strata compaction. The small water-level fluctuations do not seem to affect the magnitudes and directions of groundwater flow. Capture of contaminants by municipal supply wells, such as well PM-4, which is screened approximately 180 to 1,775 ft. below the regional water table (Koch and Schmeer, 2010), is unlikely because of this poor vertical hydraulic communication. As a result, contaminant migration follows the ambient water-table gradients rather than diverting towards the pumping water supply wells, based on hydraulic data. Based on water-table maps, the regional groundwater flow direction in the vicinity of the TA-36-8 open detonation unit is expected to range from east-northeast to east-southeast.

4.18.1.1.2 Hydrogeology near and beneath the TA-39-6 Open Detonation Unit

The TA-39-6 open detonation unit is located in a semiarid, temperate, mountain climate. From 1981 to 2010, the average annual precipitation in Los Alamos was 18.97 inches and the average annual snowfall was 57.5 inches (LANL, 2009a). Published precipitation data for TA-39 do not exist; however, TA-49, located west of TA-36, has an annual precipitation of 22.27 inches per year (LANL, 1998). The evaporation rate of freestanding water exceeds the average annual precipitation.

A detailed description of the hydrogeologic characteristics immediately below the TA-39-6 open detonation unit is not currently documented in published or internal reports. However, a discussion of surface water, the vadose zone, and groundwater specific to Operable Unit 1132, which includes TA-39, and a conceptual hydrogeologic model of the area is presented in Section 3.7 of the RFI Work Plan for Operable Unit 1132 (LANL, 1993b). Additional hydrologic information for the areas surrounding the TA-39-6 open detonation unit is presented in the Investigation Report for North Ancho Canyon Aggregate Area, Revision 1 (LANL, 2010a).

Ancho Canyon is classified as a dry canyon, as described by Birdsell et al. (2005). Generally, on the Pajarito Plateau, dry canyons have relatively small catchment areas (less than 13 square kilometers), experience infrequent surface flows, and have limited or no saturated alluvial systems. The hydrologic conditions yield little down canyon, near-surface contaminant migration and are characterized by very slow unsaturated water flow from the surface to the regional aquifer. Because surface-water flow is infrequent and shallow alluvial groundwater is not common, contaminants largely remain near their original sources, predominantly in soil and sediment. Net infiltration beneath dry canyons is low, with rates generally believed to be less than tens of mm/yr. and commonly on the order of 1 mm/yr. or less. Finally, transport times to the regional aquifer beneath dry canyons are expected to exceed hundreds of years.

The only aquifer in the Los Alamos area capable of municipal and industrial water supply is the regional aquifer. There are no municipal supply wells downgradient of the TA-39-6 open detonation unit. The regional water table is approximately 560 ft. below the TA-39-6 open detonation unit. Upper levels of the regional aquifer on the Pajarito Plateau are predominantly under phreatic (unconfined) conditions (LANL, 2009b). The deep portion of the regional aquifer is predominantly under confined conditions, and it is the portion of the regional aquifer influenced by Pajarito Plateau municipal supply pumping. The intensive pumping causes very small water-level fluctuations in the upper (phreatic) portions of the aquifer. Seasonal water-table fluctuations of less than 0.5 ft. have been observed at monitoring well R-31 (Koch and Schmeer, 2010), located 1,550 ft. southeast of the TA-39-6 open detonation unit. These low-magnitude responses in the phreatic zone from municipal well pumping are in sharp contrast to the much larger (10 to 20 ft.) responses at monitoring wells completed in deeper parts of the aquifer (e.g., well R-20 screen 3 in Pajarito Canyon near PM-2), indicating that the hydraulic communication is poor between the phreatic zone and deeper parts of the aquifer. The small-scale fluctuations in the phreatic zone may be from drawdowns and/or strata compaction. The small water-level fluctuations do not seem to affect the magnitudes and directions of groundwater flow. Capture of contaminants by municipal supply wells is unlikely because of this poor vertical hydraulic communication. Additionally, the small hydraulic response observed at well R-31 is attributable to pumping at the nearest municipal supply well

PM-2, which is located 14,775 ft. north of the TA-39-6 open detonation unit. As a result, contaminant migration follows the ambient water-table gradients rather than diverting towards the pumping water supply wells, based on hydraulic data. Based on water table maps, regional groundwater flow in the vicinity of the TA-39-6 open detonation unit is expected to be towards the southeast.

4.18.1.2 Groundwater Monitoring and Reporting

LANL has an established groundwater monitoring network to assess the quality of groundwater in the Los Alamos area. The monitoring network includes monitoring wells, water-supply wells, surface-water sampling stations, and springs located both inside and outside the LANL boundary. Three groundwater zones—alluvial, perched-intermediate, and regional groundwater—are monitored as part of the monitoring network. Sample locations, analytical suites, and sampling schedules for the monitoring network are identified in the most recent version of the IFGMP (LANL 2020b), a document updated annually with approval by NMED-HWB in accordance with the June 2016 Compliance Order on Consent (New Mexico 2016). These water-quality data are used for characterization purposes, to support corrective-measures work conducted at sites around the Facility, and to support general surveillance. Map 3 within the concurrent submittal of the LANL General Part A Permit Application, Revision 10.0 (LANL 2020a), shows the locations of all wells sampled as part of the IFGMP. The TA-36 topographic map within the LANL General Part A Permit Application shows the locations of IFGMP wells pertinent for monitoring groundwater downgradient of the TA-36-8 open detonation unit. The TA-39 topographic map within the LANL General Part A Permit Application shows the locations of the IFGMP wells pertinent for monitoring the TA-39-6 open detonation unit. These topographic maps also include wells upgradient of the TA-36-8 and the TA-39-6 open detonation units that provide baseline information about groundwater quality entering the site.

The locations of routinely monitored wells that are downgradient of the TA-36-8 and the TA-39-6 open detonation units are shown on figures within Supplement 4-2, *Open Detonation Unit Groundwater Monitoring and Surface Drainage Information*. The monitoring schedule for these wells are also included within Supplement 4-2. Details can be found in the most current version of the IFGMP. Surface and groundwater samples collected under the IFGMP are routinely analyzed for potential contaminants and other water-quality parameters. Figures and summary of the data from 2000 to present for the monitoring locations are provided in Supplement 4-2 of this Permit Renewal Application. The data indicate that no constituents related to the operations at these units have impacted groundwater at levels exceeding applicable standards. The sampling results are also published in periodic groundwater-monitoring reports submitted to the NMED-HWB and in the Facility's annual environmental reports. Tables and figures are located in Supplement 4-2, *Open Detonation Unit Groundwater Monitoring and Surface Drainage Information*.

4.18.2 Protection of Surface Water/Wetlands/Soil Surface

As required by 40 CFR §264.601(b), the open detonation units are located in a remote area and are operated in a manner that prevents any releases that might have adverse effects on human health or the environment as a result of migration of waste constituents in surface waters, wetlands, or on the soil surface. General operation of these units includes incorporating best management practices, such as the following: spill prevention and response; control of storm water runon and runoff; installation of erosion and sediment controls; personnel training; and good housekeeping practices.

4.18.2.1Surface Water

Storm water discharges from both of these units are regulated under the Clean Water Act by the National Pollutant Discharge Elimination System permit program. Prior to the issuance of the current LANL Storm Water Individual Permit in 2010, these open detonation units were regulated under the Multi-Sector General Permit (MSGP) for Storm Water Discharges Associated with Industrial Activity. The LANL Storm Water Individual Permit (NM0030759) issued by the EPA, Region 6, became effective on November 1, 2010. The current LANL Storm Water Individual Permit expired on March 31, 2014, but it has been administratively continued, pending issuance of a new permit. The EPA issued LANL a draft Storm Water Individual Permit on November 30, 2019. A final Permit is expected following a public comment period, which ends on July 31, 2020. Additional historic surface-water compliance information and Permit applicability is included in Section 2.3.2, “Protection of Surface Water/Wetlands,” of the Los Alamos National Laboratory Permit Modification Request for Open Detonation Units at Technical Areas 36 and 39 (TA-36-8 and TA-39-6), Revision 0 (LANL 2011).

The LANL Storm Water Individual Permit contains nonnumeric technology-based effluent limitations, coupled with a comprehensive, coordinated monitoring program and implementation of corrective actions where necessary, to minimize pollutants in LANL’s storm water discharges from SWMUs and AOCs. LANL must implement site-specific control measures (including best management practices) to address the nonnumeric technology-based effluent limits contained in the LANL Storm Water Individual Permit, followed by confirmation monitoring against New Mexico water-quality criteria-equivalent target action levels to determine the effectiveness of the site-specific measures. If target action levels are exceeded, corrective actions detailed in the LANL Storm Water Individual Permit are initiated and additional confirmation monitoring is conducted following completion of corrective actions. Monitoring of storm water under the LANL Storm Water Individual Permit has been ongoing since 2011.

4.18.2.1.1 Hydrologic Assessment and Surface Water Flow

Net annual precipitation for the Los Alamos area, including the open detonation units, is low. Surface waters within LANL are limited to ephemeral or intermittent flows in the canyon bottoms that result from rainfall or snowmelt. The locations of these surface waters, including intermittent streams, at each of the open detonation units are located on figures within Supplement 4-2, *Open Detonation Unit Groundwater Monitoring and Surface Drainage Information*.

The TA-36-8 open detonation unit is located near the headwaters of Fence Canyon, which connects geographically to Potrillo Canyon but does not discharge into it. Drainage from this unit flows east to Fence Canyon (receiving water). The stream flow in Fence Canyon and Potrillo Canyon is ephemeral and occurs only as the result of rainfall or snowmelt. Currently, LANL Storm Water Individual Permit monitoring is conducted below the point of discharge from the TA-36-8 open detonation unit, prior to entering Fence Canyon. Surface waters from the upstream portion of the Potrillo Canyon watershed do not contribute to flows that reach the Rio Grande through Water Canyon (LANL, 1993a). Canyon bottom surface waters from Potrillo Canyon downstream of the TA-36-8 open detonation unit eventually flow into Water Canyon. A gaging station (E267) in Portillo Canyon, located 3 miles upstream of the Rio Grande, recorded no flow for water year 2019.

The TA-39-6 open detonation unit is located in a tributary of the north branch of Ancho Canyon. All runoff from the TA-39-6 open detonation unit eventually flows to the main Ancho Canyon watercourse. Impervious surfaces comprise 99% of the 197-acre watershed that comprises the site monitoring area

(SMA). The stream flow in Ancho Canyon is ephemeral and occurs only as the result of rainfall or snowmelt. Canyon bottom surface waters from the north branch of Ancho Canyon eventually flow into the main channel of Ancho Canyon. A gaging station (E275) in Ancho Canyon, located approximately 2 miles upstream of the Rio Grande, recorded two days of flow for E275 in water year 2019, with a recorded maximum daily flow for water year of 8.9 cubic feet per second.

4.18.2.1.2 Monitoring and Reporting

The open detonation units were historically permitted under the National Pollutant Discharge Elimination System MSGP for Storm Water Discharges Associated with Industrial Activity. This permit coverage was replaced by the LANL Storm Water Individual Permit when it first became effective in 2010. Baseline storm water controls and other measures, including collection of storm water samples, have been implemented at both open detonation units, in accordance with applicable LANL Storm Water Individual Permit requirements.

LANL Storm Water Individual Permit controls incorporated into the TA-36-8 open detonation unit [identified as AOC 36-004(c)] include earthen and rock berms, swales, riprap, an infiltration basin, and rock check dams to control runon and runoff of storm water and erosion and movement of sediment from the site.

LANL Storm Water Individual Permit controls incorporated into the TA-39-6 open detonation unit [identified as SWMU 39-004-(c)] include berms, swales, and rock check dams, the combination of which control storm water runon and runoff, erosion, and movement of sediment from the site, as discussed in Section 4.12.1, *Containment Systems*.

For both units, these controls are designed to prevent pollutant migration that could affect surface water quality. Stormwater runoff monitoring at both open detonation units has been underway since the implementation of the LANL Storm Water Individual Permit in 2011.

Stormwater discharge from TA-36-8 open detonation unit is monitored from LANL Storm Water Individual Permit Site Monitoring Area F-SMA-2. Following the installation of baseline control measures, a baseline storm water sample was collected on August 15, 2011. Analytical results from this sample yielded the following target action level exceedances:

- Aluminum concentration of 866 micrograms per liter (µg/L) (maximum target action level is 750 µg/L)
- Copper concentration of 72.5 µg/L (maximum target action level is 4.3 µg/L)
- Gross-alpha activity of 140 picocuries per liter (pCi/L) (average target action level is 15 pCi/L).

Following the installation of enhanced control measures at F-SMA-2, corrective-action storm water samples were collected on July 15, 2014, and July 31, 2014. Analytical results from these corrective-action monitoring samples yielded the following target action level exceedances:

- Copper concentrations of 10.8 µg/L (maximum target action level is 4.3 µg/L)
- Gross-alpha activities of 112 pCi/L and 58.9 pCi/L (average target action level is 15 pCi/L).

Site history and shallow (i.e., less than 3 ft. below ground surface) soil-sampling data (where available) are used to determine whether the target action level exceedance constituent(s) may be related to historical industrial activities.

Copper was likely associated with industrial materials historically managed at this site. Copper was detected in 5 of 14 samples at maximum concentration 2.9 times the sediment's background value.

Alpha-emitting radionuclides are known to be associated with industrial materials historically managed at AOC 36-004(c)/TA-36-8. Consent Order samples were not analyzed for gross-alpha radioactivity but were analyzed using gamma spectroscopy, which can detect americium-241 and uranium-235, and for uranium isotopes, all of which are alpha-emitting radionuclides. Alpha-emitting radionuclides managed by the Permittees are exempt from regulation under the Clean Water Act and are excluded from the definition of adjusted gross-alpha radioactivity. Target action level exceedances were also evaluated against the appropriate storm water background value, that is, "Bandelier Tuff background" for undisturbed SMAs or "developed background" for urban settings. Background values are expressed as upper-tolerance limits using the approved EPA method to calculate background values. Upper-tolerance limits for undisturbed SMAs were derived from storm water runoff containing entrained sediments derived from Bandelier Tuff. Upper-tolerance limits developed for urban settings were derived from runoff from developed landscapes on the Pajarito Plateau, including buildings, parking lots, roads, and associated features. Monitoring location F-SMA-2 receives storm water runon from developed environments, including paved parking lots, roads, and buildings, as well as locations with sediment derived from Bandelier Tuff. Metals including copper are associated with building materials, parking lots, and automobiles. Gross alpha in Bandelier Tuff is associated with naturally occurring radioactive uranium- and thorium-bearing minerals.

- Copper—copper's upper-tolerance limit from developed landscape storm water runon is 32.3 µg/L; copper background storm water upper-tolerance limit from locations with sediment derived from Bandelier Tuff is 3.43 µg/L. The copper result from 2011 is greater than both values, whereas the 2014 results are between these two values.
- Gross alpha—the gross-alpha background upper-tolerance limit for locations with sediment derived from Bandelier Tuff is 1490 pCi/L, and the gross-alpha background storm water upper-tolerance limit for storm water runon from a developed landscape is 32.5 pCi/L. The 2011 and 2014 gross-alpha results are between these two values.

Stormwater discharge from TA-39-6 open detonation [identified by the LANL Storm Water Individual Permit as SWMU 39-004(c] is monitored from LANL Storm Water Individual Permit Site Monitoring Area A-SMA-3 along with another site [AOC 39-002(b)]. Following the installation of baseline control measures, a baseline storm water sample was collected on July 25, 2013. Silver is reported as a nondetectable result equal to or greater than the target action level. This value is reported at the practical quantitation level; however, the maximum target action level for this analyte is below the target action level. Analytical results from this sample yielded the following target action level exceedances:

- Aluminum concentration of 997 µg/L (maximum target action level is 750 µg/L)
- Copper concentration of 245 µg/L (maximum target action level is 4.3 µg/L)
- Mercury concentration of 9.04 µg/L (average target action level is 0.77 µg/L)
- Selenium concentration of 12.1 µg/L (average target action level is 5 µg/L)
- Gross-alpha activity of 136 pCi/L (average target action level is 15 pCi/L)
- Polychlorinated biphenyl concentration of 3060 ng/L (average target action level is 0.6 ng/L)

Following the installation of enhanced control measures at A-SMA-3, a corrective action storm water sample was collected on August 10, 2018. Analytical results from this corrective action monitoring sample yielded the following target action level exceedances:

- Copper concentration of 50.2 µg/L (maximum target action level is 4.3 µg/L)
- Gross-alpha activity of 90.8 pCi/L (average target action level is 15 pCi/L)
- PCB concentration of 3400 ng/L (average target action level is 0.6 ng/L)

Site history and shallow (i.e., less than 3 ft. below ground surface) soil-sampling data (where available) are used to determine whether the target action level exceedance constituent(s) may be related to historical industrial activities. Regarding SWMU 39-004(c)/TA-39-6:

- Aluminum is known to be associated with industrial materials historically managed at the site. Aluminum, however, was not detected above background value in 45 shallow (i.e., less than 3 ft. below ground surface) soil samples collected during the 2009 Consent Order investigation and 1995 RFI.
- Copper is known to be associated with industrial materials historically managed at the site. Copper was detected above background value in shallow Consent Order and RFI soil samples. Copper was detected above the soil background value in 15 of 45 shallow samples, with a maximum concentration 180 times the soil background value.
- Mercury is known to be associated with industrial materials historically managed at the site. Mercury was only detected above the soil background value in 2 of 45 shallow samples, with a maximum concentration 85 times the soil background value.
- Selenium is not known to be associated with industrial materials historically managed at the site. Selenium was not detected above background value in 45 shallow Consent Order and RFI soil samples.
- PCBs are known to have been associated with industrial materials historically managed at this site. Three PCB mixtures (Aroclor-1248, Aroclor-1254, and Aroclor-1260) were detected in shallow Consent Order samples. Aroclor-1248 was detected in 3 of 4 shallow samples, with a maximum concentration 30 times the residential soil screening level. Aroclor-1254 was detected in 1 of 4 shallow samples, with a maximum concentration 52% of the residential soil screening level. Aroclor-1260 was detected in 2 of 4 shallow samples, with a maximum concentration 3.1 times the residential soil screening level.
- Thorium and uranium are known to have been associated with industrial materials historically managed at this site. RFI and Consent Order samples were not analyzed for gross-alpha radioactivity but were analyzed for plutonium, thorium, and uranium isotopes, all of which are alpha-emitting, as well as total uranium, which has alpha-emitting isotopes. Alpha-emitting radionuclides managed by the Permittees are exempt from regulation under the Clean Water Act and are excluded from the definition of adjusted gross-alpha radioactivity.

Target action level exceedances were also evaluated against the appropriate storm water background value, that is, “Bandelier Tuff background” for undisturbed SMAs or “developed background” for urban settings. Background values are expressed as upper-tolerance limits using the approved EPA method for calculating background values. Upper-tolerance limits for undisturbed SMAs were derived from storm water runoff containing entrained sediments derived from Bandelier Tuff. Upper tolerance limits developed for urban settings were derived from runoff from developed landscapes on the Pajarito

Plateau, including buildings, parking lots, roads, and associated features. Most of the A-SMA-3 drainage area is located on Bandelier Tuff, and there is no runon from developed facilities (e.g., buildings, parking lots, and pavement). Therefore, the Bandelier Tuff background upper-tolerance limit was compared with aluminum, copper, PCBs, and gross-alpha storm water exceedances. Mercury and selenium do not have a sufficient number of detected results to determine the upper-tolerance limit background value.

- Aluminum—aluminum is a major component of Bandelier Tuff. Aluminum's upper-tolerance limit for storm water containing sediments derived from Bandelier Tuff is 2210 µg/L; the result from 2013 is less than this value.
- Copper—copper is associated with trace minerals in Bandelier Tuff. Copper's upper-tolerance limit for storm water containing sediments derived from Bandelier Tuff is 3.43 µg/L. The copper results from the storm water confirmation samples in 2013 and 2018 are above this value.
- PCBs—the PCB upper-tolerance limit for storm water containing sediments derived from Bandelier Tuff is 11.7 ng/L. The average target action level exceedances in the storm water confirmation samples in 2013 and 2018 are greater than the storm water baseline upper-tolerance limit.
- Gross alpha—gross-alpha activity is associated with naturally occurring radioactive uranium- and thorium-bearing minerals in Bandelier Tuff. The gross-alpha upper-tolerance limit for storm water containing sediments derived from Bandelier Tuff is 1490 pCi/L; the results from 2013 and 2018 confirmation samples are below this value.

Tables and figures are located in Supplement 4-2, *Open Detonation Unit Groundwater Monitoring and Surface Drainage Information*.

4.18.2.2Soil Surface Monitoring

The texture of the soils in Los Alamos County range from very fine clay and sandy loams to gravelly, sandy loams and stony, clay loams. Soil erosion by storm water or winds could potentially transport contaminants from the open detonation units to surrounding areas. Natural sediment storage features created by surface water runoff, such as stream bank and bar deposits or drainage channels, could contain heavy metals or explosives residues redistributed from the units.

Operational procedures for the open detonation units have been developed (described in previous sections) and are followed using careful assessment to limit the amount of contamination that may enter or remain in the soil. Preventative measures include implementing good housekeeping procedures, using a sufficient charge to ensure complete destruction, and performing effective treatment of the waste.

To meet the requirements of 40 CFR §264.601(b), the firing sites are operated in a manner that minimizes or prevents releases that might have adverse effects to human health or the environment as a result of migration of waste constituents on the soil surface. The following information assesses the potential for adverse effects to human health or the environment as a result of operations at the open detonation units and describes monitoring and reporting efforts that have been or will be undertaken to assess the impact of operations at the units. Surface soil samples were collected at both open detonation treatment units and analyzed for potential constituents to assess any impact from the units to the soil surface and mark any changes from previous monitoring activities.

The following paragraphs detail soil-monitoring efforts that have been performed at the open detonation units, in accordance with the requirements in 40 CFR §264.602. Description of modeling associated with the potential for soil deposition is included in Section 4.18.3, *Protection of Atmosphere,* and is included in Supplement 4-3, *Screening Level Air Modeling Analysis and Risk Evaluation for Open Detonation Operations* of Appendix 4, *Open Detonation and Open Burning Information,* of this Permit Renewal Application.

In 2010 and early 2011, soil samples were collected at the TA-36-8 open detonation unit and the TA-39-6 open detonation unit. A summary of the analytical results of these sample collection events is included in Attachment D of *Los Alamos National Laboratory Permit Modification Request for Open Detonation Units at Technical Areas 36 and 39 (TA-36-8 & TA-39-6), Revision 0* (LANL 2011). Samples were analyzed for high explosives, metals, dioxins/furans, semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), perchlorates, and radiological constituents (gross alpha, gross beta, and isotopic uranium). Both composite and grab samples were collected at each of the sites. Concentrations for the constituents of concern were measured within the soil in and around the units to determine the soil concentration baseline at the units after more than 50 years of use. Analytical results indicate that the average soil constituent concentration in and around the TA-36-8 open detonation unit and the TA-39-6 open detonation unit are less than the selected soil screening levels (in 2011) and operations at the units do not pose an unnecessary risk to human health. Potential contamination is believed to be primarily limited to the surface (i.e., the first few inches in depth) of the sites.

In 2018, the Permittees collected additional surface soil samples to assess any changes that might have occurred to the units. However, it should be noted that the last time the TA-36-8 unit was utilized for treatment operations was in February 2014 and the last waste-treatment operation at the TA-39-6 unit was September 2013. Supplement 4-5, *Soil Sampling Results Summary Report for the Open Detonation Unit at Technical Area (TA) 36-8,* and Supplement 4-6, *Soil Sampling Results Summary Report for the Open Detonation Unit at Technical Area (TA) 39-6,* of Appendix 4 of this Permit Renewal Application, both include the most current soil analytical summaries for the open detonation units. Soil sampling and laboratory analysis for constituents of concern, as detailed in the soil monitoring reports, were conducted at the open detonation units to determine if treatment activities affected the area. Soil samples were collected from the ground surface to 2 inches below the ground surface from locations in and around the open detonation areas based on predominant wind direction and drainage features. The laboratory analytical results were compared to established background values and to New Mexico residential soil screening levels. The soil-sampling and analysis results indicate most constituents for which the samples were analyzed were not detected in the soil samples. The soil constituent concentrations that were detected at both of the units are less than the selected soil screening levels, with a single exception. Organics detected at both units were all below available soil screening levels. Several inorganic constituents at both units were detected above established background values but below soil screening levels. All metals detected at TA-39-6 were less than residential soil screening levels. At TA-36-8, a single concentration of thallium was measured to be above residential soil screening levels. Details of the constituents detected are in Supplements 4-5 and 4-6.

Utilizing the 2018 soil-sampling analytical results, risk assessment analyses were conducted for each of the open detonation treatment units. These assessments conclude that there are no unacceptable risks associated with hazardous waste constituents measured within the soil that could pose increased risk to human and ecological receptors. These risk assessments are included as Supplement 4-7, *Open Detonation Unit at Technical Area 36 Human Health and Ecological Risk Screening Assessments*, and Supplement 4-8, *Open Detonation Unit at Technical Area 39 Human Health and Ecological Risk Screening Assessments,* of Appendix 4 of this Permit Renewal Application. Additionally, for completeness, a revision of the 2011 risk assessment (LANL 2011) is included as Supplement 4-9, *Revision of 2011 Open Detonation Risk Assessment.* This assessment includes an ecological risk assessment, as requested by the NMED in a March 2012 letter of disapproval for the 2011 open detonation permit modification request (NMED 2012).

This risk-screening assessments are utilized to determine whether hazardous contaminants from ongoing treatment operations over the lifetime history of the units pose an unacceptable risk to human health or the environment. Screening criteria for these assessments require that residential, industrial, and construction worker exposure scenarios be evaluated despite that the Permittees' OB and OD units are not located at residential locations. The NMED target levels for acceptable risk to identified receptors are a noncancer calculated Hazard Index (HI) of 1 and a cumulative cancer risk calculation of less than 1x10-5.

At TA-36-8 the residential scenario calculated risks were an HI of 0.3 and cancer risk of 3x10-6. For an industrial scenario calculated risks were an HI of 0.02 and cancer risk of 4x10-7. Based on a construction worker scenario, calculated risks were an HI of 0.09 and cancer risk of 6x10-8.

At TA-39-6 the residential scenario calculated risks were an HI of 0.2 and a cancer risk of 3x10-7. For an industrial scenario calculated risks were an HI of 0.01 and cancer risk of 6x10-8. Based on the construction worker scenario calculated risks are an HI of 0.1 and cancer risk of 8x10-9. These screening evaluations indicate that any hypothetical future resident or workers are not at risk due to exposure to soils at the OD Units.

Risk to potential ecological receptors are also evaluated as part of the risk screening process. The results of these assessments indicate OD Units do not present a significant ecological risk to any receptor evaluated, based on evaluations of soil contaminant concentrations at the units, and mitigating factors as to why a receptor would not be present in the areas.

Supplement 4-7, *Technical Area 36 - Open Burn/Open Detonation (OB/OD) Area - Technical Area 36-8 Open Detonation Unit Human Health and Ecological Risk Screening Assessments,* details the human health and ecological risk assessments conducted using the 2018 soil data collected from the TA-36-8 open detonation unit. The screening evaluation concluded that residents and workers at the site are not at risk as a result of exposure to soils at the hazardous waste management unit. Although the calculated risk for three ecological receptors was above the minimum no-effect ecological screening levels (American robin, plants and earthworms), there is likely no unacceptable risk to ecological receptors at the hazardous waste management units. Because of the nature of the operations at the unit, the entire unit footprint is kept cleared as disturbed, bare ground. Therefore, plants and earthworms are not expected to be present at the unit. Furthermore, surface water (as well as sediment) migration from the site is minimized and monitored, as described in 4.18.2.1, *Surface Water*. Lastly, robins are not expected to feed within the area of the unit that is kept bare, and regular monitoring of avian receptors within the area do not indicate that birds are adversely affected.

Supplement 4-8, *Technical Area 39 - Open Burn/Open Detonation (OB/OD) Area - Technical Area 39-6 Open Detonation Unit Human Health and Ecological Risk Screening Assessments*, details the human health and ecological risk assessments conducted using the 2018 soil data collected at the TA-39-6 open detonation unit. The screening evaluation concluded that residents and workers at the site are not at risk caused by exposure to soils at the hazardous waste management unit. Additionally, calculated risk for plants and earthworms at the site were above the minimum no-effect ecological screening levels. However, for the reasons described above (the area is kept bare and migration is controlled and monitored), plants and earthworms are not expected to be present at the unit.

4.18.3 Protection of Atmosphere

To meet the requirements of 40 CFR §264.601(c), the TA-36-8 and the TA-39-6 open detonation units are operated in a manner that prevents any releases that could have adverse effects to human health or the environment as a result of migration of waste constituents to the atmosphere. The following information addresses the potential for operations at the open detonation units to adversely affect human health or the environment, describes the air modeling, and provides monitoring efforts to assess the impact of operations at the units on air quality.

Air-dispersion modeling was used to predict maximum ground-level concentrations of contaminants that could be predicted to occur downwind from the treatment operations; this type of modeling is a standard technique accepted by the U.S. EPA and the NMED. Conservative model input parameters were used for the treated waste streams, including maximum treatment volumes, independently obtained emission products and constituents, and unattenuated air-dispersion routes to receptor locations. These potential receptor locations were used in the modeling to estimate contaminant concentrations close to the detonation sites and to nearby public receptors. Model results indicate that the maximum ground-level contaminant concentrations for each detonation site occur on LANL property adjacent to the sites and predicted concentrations at public receptors were far less.

Maximum contaminant concentrations derived from the model were applied to emission factors for each predicted contaminant, with the results compared to air-quality standards. This analysis was conducted using the highest maximum model result, which occurred at any public receptor outside the LANL boundary, as is the protocol under NMED modeling guidelines when demonstrating compliance with ambient air-quality standards for permit purposes.

Computed results were also used to show the predicted impacts for acute and annual air concentrations to be below additional recommended human health screening levels. This evaluation was conservatively obtained by using the maximum contaminant concentrations within the LANL property boundary. Additionally, predicted soil deposition over a 10-year period shows impacts from the treatment operations to soil contaminant concentrations from the treatment operations to be less than residential screening levels and the minimum identified ecological screening levels. Supplement 4-3, *Screening Level Air Modeling Analysis and Risk Evaluation for Open Detonation Operations,* of this Permit Renewal Application, includes the full air-modeling evaluation conducted for open detonation treatment operations at LANL.

In 2010 and 2011, the Permittees conducted air sampling at each of the open detonation units to determine if dioxins, furans, or metals could be detected in the air after an open detonation treatment event. These sampling efforts and the analytical results are detailed in Supplement 4-4, *Air Sampling at*

Open Detonation Units, of Appendix 4 of this Permit Renewal Application. There were no dioxins or furan compounds detected within any of the samples collected. Comparisons of metals detected within the samples were below acute inhalation-exposure screening levels.

The radiological sampling network at LANL, AIRNET measures environmental levels of airborne radionuclides, such as plutonium, americium, uranium, and tritium. Three AIRNET stations were installed in 1994 near LANL firing sites to evaluate any relationship between firing site activities and airborne concentrations of radioactive material. After ten years of sampling, AIRNET stations along the LANL perimeter measured no detectable levels of airborne radiological emissions that could be linked to firing site operations. Moreover, no correlation between firing site activities and the AIRNET stations could be made (Fuehne et. al., 2007). Therefore, the stations were shut down in 2003 and 2004, and there are no further plans for ambient air-quality monitoring at the open detonation units. There are approximately 60 air stations within and around the LANL boundary that continue to gather information on radionuclides by collecting water vapor and particulate matter.

5.0 OPEN BURNING TREATMENT

This section, in conjunction with the ~~application~~appendices and supplemental materials referenced herein, sets forth the operational, human health and environment and regulatory rationale to include a long-standing open burning waste management unit that was upgraded int 1998 under the umbrella of the LANL Hazardous Waste Facility Permit. Including the open burning waste management unit in the Permit will incrementally intensify scrutiny and regulation of the units by NMED-HWB.

Open burning at TA-16 has been conducted since the late 1940's. This small open burning unit at TA-16 have been subject to regulation under the RCRA as an interim status hazardous waste treatment unit since November 1980 (41+ years). These interim status waste management unit has been inspected annually by NMED-HWB and/or USEPA. None of these inspections has resulted in any allegation of noncompliance with any applicable RCRA regulations. Furthermore, environmental testing of soils, surface water, groundwater and air quality in the vicinity of the interim status unit and intensive risk analysis show no evidence that an unacceptable or actionable level of any hazardous constituent has come to exist after 70+ years of operation. Consequently, continued operation of the waste treatment unit under the Permit will be fully protective of human health and the environment.

To continue operating the open burning waste management unit in their proven historically safe and environmentally protective manner, LANL is seeking the approval of NMED to include the units under the intensified regulation umbrella of the LANL Hazardous Waste Facility Permit. Action by NMED to include the open burning waste management unit in the Permit will not increase the capacity of waste treatment relative to past practice. Such inclusion will, however, increase the level of scrutiny and regulation of the treatment unit to ensure continued operation in a manner protective of human health and the environment.

This section also addresses the ~~outlines treatment processes conducted at the open burning treatment unit and describes the operating steps and~~ requirements in place to ensure safe and effective waste treatment events of explosives waste and explosives-contaminated waste to meet the requirements in 40 CFR § 270.23 and 265, Subpart P. To permit the unit, summarized proposed changes to the 2010 Permit are included in this Permit Renewal Application in Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit*. The Permittees propose language for the operations requirements for the unit, as outlined in newly proposed Permit Part 6 included within Permit Renewal Application in Supplement 1-1, *Permittees' Proposed Changes to Permit Parts 1-11*. Additionally, the Permittees propose a soil monitoring program as the preferred approach to continue to meet the monitoring and analysis requirements of 40 CFR §264.602. All changes are included within Supplements 1-1 through 1-8, and occur within the following permit parts and attachments:

- Permit Part 1, *General Permit Conditions*
- Permit Part 6 *(Reserved)*
- Attachment A, *Technical Area Unit Descriptions*
- Attachment C, *Waste Analysis Plan*
- Attachment D, *Contingency Plan*
- Attachment E, *Inspection Plan*

- Attachment G, addition of Closure Plan, *Attachment G.28 Closure Plan Open Burning Treatment Unit Technical Area 16-388 Flash Pad*
- Attachment J, *Hazardous Waste Management Units*
- Attachment N, *Figures*

5.1 Open Burning Facility Background and Description

Since the 1950s, LANL has treated hazardous wastes by open burning operations at several units at an area known as the "TA-16 Burn Ground." As discussed below, open burning operations have changed dramatically over time. With the exception of the TA-16-388 Flash Pad, the subject of this Permit Renewal Application, all open burning treatment operations conducted at LANL have ceased and the remaining units have closed (or are undergoing closure). The TA-16-388 Flash Pad, in turn, is currently considered an interim status unit proposed by the DOE and Triad's predecessor (Los Alamos National Security, LLC) to be permitted through a Class 3 permit modification request submitted to NMED on September 30, 2013 (LANL 2013). This Permit Renewal Application incorporates by reference this Class 3 modification request. The Class 3 permit modification request, in Appendix B, discusses the (1) historical and regulatory history of the open burning treatment operations at the TA-16 Burn Ground, (2) required permits for open burning operations, and (3) the history of the open burning Permit Renewal Application (see reference LANL 2013).

5.1.1 Open Burning Permitting History

Since 1980, LANL has operated the TA 16-388 Flash Pad as an open burn treatment unit under the "interim status" requirements of the New Mexico Hazardous Waste Act and 40 CFR Part 265, Subpart P. Interim status is a designation given to facilities that were in existence prior to 1980 and contain requirements that apply until issuance of a final permit. The TA-16-388 Flash Pad is classified as a "thermal treatment hazardous waste management unit" because it is used for treating explosives hazardous wastes; the Flash Unit must meet requirements applicable to "miscellaneous units" under 40 CFR Part 264, Subpart X.

The permitting process for the TA-16-388 Flash Pad has taken several decades. In June 1995, DOE and the University of California (the predecessor to the current contractor, Triad) submitted a revised permit application for two open burning units, the TA-16-388 Flash Pad and the TA-16-399 Burn Tray. In July 2009, NMED-HWB issued a revised Draft Permit authorizing use of these units. On February 2, 2010, NMED issued a Notice of Intent to Deny (NOID) the application for the TA-16-388 Flash Pad and the TA-16-399 Burn Tray. The Fact Sheet accompanying the NOID identified the following deficiencies supporting denial: (1) the need to fully characterize the low to moderate risk associated with the ecological risk assessment conducted by the Permittees, (2) public opposition to open burning, and (3) the need to evaluate alternatives to open burning.

Following a public hearing, the Secretary of NMED issued a final decision to deny the open burn units on November 30, 2010. In December 2010, DOE and Los Alamos National Security, LLC (LANS), petitioned the Secretary of the NMED to reconsider the decision to deny the open burn units and allow the Permittees to resubmit an application that addressed the deficiencies identified in the application. On December 21, 2010, the Secretary granted the Permittees the request in an *Order Granting Applicants' Motion for Partial Reconsideration*. This Order required the Applicants to file a "full and complete permit application that adequately addresses all deficiencies previously identified in writing and at the hearing by the HWB at a date determined by the HWB."

Pursuant to the Secretary's Order, on September 30, 2013, DOE and Triad's predecessor (LANS) submitted a Class 3 permit modification request to permit the addition of the interim status unit TA-16-388 Flash Pad to the Permit. The Permittees decided to close TA-16-399 because it was no longer necessary from an operational standpoint. As required by the Secretary's Order, the Class 3 modification request specifically addressed all the deficiencies identified by the NMED. After the Class 3 permit modification was submitted, NMED-HWB issued an administrative completeness determination on April 24, 2014.
No further action was taken on this Class 3 permit modification request, and it was determined to pursue approval of this request in this Permit Renewal Application.

5.1.2 Open Burning Facility Description

At LANL there is one open burning treatment unit located at TA-16. The description provided below meets the application requirements for 40 CFR §§270.14(b)(1) and 270.23(a) and 265, Subpart P.

TA-16 is located in the southwestern portion of LANL (revised Figure 2 within Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures*). TA-16 is situated on a broad mesa bounded on the north by Cañon de Valle, on the south by State Road 4 and Bandelier National Monument, and on the west by West Jemez Road (State Road 501) and the Santa Fe National Forest. Elevation ranges from approximately 7,700 ft. at the west end of the Technical Area to approximately 6,800 ft. at the lower east end. Topography is varied, ranging from steep precipitous canyon walls to sloping mesa tops. The open burning unit at LANL is located at the "TA-16 Burn Ground" in the northeast corner of TA-16. It is located on a mesa that drains to the east and south and is bordered on the northern side by Cañon de Valle and on the southern side by Water Canyon. The location coordinates of the TA-16-388 Flash Pad in Universal Trans Mercator Zone 13, North American Datum 1983 (NAD83) coordinates are X-Coordinate- 379670.0 and Y-Coordinate- 3967821.0.

The open burning unit, known as the TA-16-388 Flash Pad (newly included Figure 15 within Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures*), consists of a 22-ft. by 22-ft. concrete pad set on a secondary containment area. The base of the pad is 12 inches thick. The entire concrete pad is on a 45-mil Hypalon liner, which is 6 inches below the bottom of the pad and curved up to ground level on all 4 sides, extending out 2 ft. from the pad perimeter. Inset 1 ft. from the edge of the concrete pad along the two sides and back is a 3-ft.-high, 8-inch-thick, integrally poured concrete wall. The pad is slanted down toward the back concrete wall. The TA-16-388 Flash Pad is also equipped with a retractable steel roof that covers the entire unit when not in use. A chain-link fence and brick retaining wall surround the TA-16-388 Flash Pad. Updated topographic map and aerial photography are included in the *LANL General Part A Application, Revision 10* (LANL 2020a).

Three 5-ft.-long forced-air propane burners with adjustable mounts are mounted on the concrete wall. These propane burners provide the heat source for treatment activities at the unit. A burner is mounted outside the wall on each side and on the back of the pad. One, two, or three burners can be used, depending on the amount and configuration of the material to be treated. Most treatment events utilize the two side burners. The total capacity of the propane supply system is approximately 7 million British thermal units per hour (BTU/hr.). Therefore, the output of each burner is dependent on how many are used for a burn. Usually, the burners are operated at approximately 2.5 million BTU/hr. This provides adequate heat to bring the material being flashed to a temperature sufficient to destroy explosives, as well as to maintain it at a level sufficient to avoid formation of incomplete combustion products for the duration of the treatment event. The burners and other components are maintained, modified, and/or replaced as needed to ensure proper operation and treatment effectiveness.

The TA-16-388 Flash Pad is used exclusively for open burning treatment of explosives waste streams that are generated at LANL—it is not used for any other activities. Following waste placement at the unit, open burning operations are controlled and monitored remotely from Building 16-389 (the control building). Operations at the unit require visual surveys and post-burn covering of the unit. This practice minimizes the potential for precipitation contacting untreated hazardous or residual waste, if any exists.

5.2 Waste Characterization and Acceptance

The explosives waste and explosives-contaminated waste treated by open burning typically consists of off-specification explosives wastes, excess explosives waste, and other explosives-contaminated solid wastes (e.g., rags, glass, and wood). These wastes exhibit the characteristic of reactivity, as defined in 40 CFR §261.23. The open burning treatment unit will only treat those wastes with the EPA Hazardous Waste Numbers listed in association with the open burning unit in the *LANL General Part A Permit Application, Revision 10.0* (LANL 2020a). Changes necessary to permit the treatment operations at the unit are proposed in the revised Permit Attachment C, *Waste Analysis Plan,* included within Supplement 1-3, *Permittees' Proposed Changes to Permit Attachment C, Waste Analysis Plan*.

The Permittees' proposed changes include waste characterization and analysis requirements for explosives and explosives-contaminated waste treated by open burning at LANL. The waste streams include homogeneous and heterogeneous wastes. Open burning operations are necessary for hazardous waste treatment to remove the characteristic of reactivity. Treatment by open burning renders hazardous waste nonreactive and any infrequent residue amenable to handling and dispositioning. Solid and liquid hazardous explosives waste may be treated (i.e., open burned) at the unit.

Waste characterization, acceptance, authorized wastes, and plans for waste analysis prior to treatment and after treatment (if needed) are outlined in Supplement 1-3, *Permittees' Proposed Changes to Attachment C, Waste Analysis Plan*, in accordance with the requirements at 40 CFR §§264.13(a-c), 265.375, 265.382, and 270.14(b)(2-3). The changes include information specific to waste analysis and acceptance at the open burning unit. The plan was developed to ensure that all hazardous waste streams treated at the hazardous waste management units are properly characterized and any hazardous constituents that the treated waste could contain or that are released through treatment are identified.

The types of hazardous listed waste treated at the open burning unit include the following: D001, D003, D030, F003, and F005. The waste categories treated at the open burning unit fall under several categories, such as explosives-contaminated combustible debris, explosives-contaminated solvents, explosives-contaminated noncombustible debris, excess explosives, and explosives from machining waste. Waste streams include combustibles contaminated with high explosives, sludge, sand, wipes, rags, tile, filters and filter socks, paper, spent carbon, scrap metal, and pipes. The average amount of waste treated at the unit from 2005 through 2019 was approximately 2,200 pounds of waste. The largest amount of waste treated in a year was approximately 4,000 pounds, and the least amount of waste was less than 1,000 pounds.

The process of generating, reviewing, and approving a waste stream profile includes a certification by the generator that the characterization is complete, a review by hazardous waste characterization subject matter experts, and a review by an environmental professional that the waste meets waste acceptance criteria and can be treated by open burning. The final check occurs when the waste is picked up from storage/accumulation and a visual inspection of the waste is conducted to ensure that the waste picked up is consistent with the waste described in the waste stream profile.

5.3 Security

The Permittees prevent the unknowing entry, and minimize the possibility for unauthorized entry, of persons or livestock onto the unit, in accordance with the requirements at 40 CFR §§264.14 and 270.14(b)(4). Security is of paramount importance to safe and successful operations at LANL.

Access to the isolated and security-controlled location of the open burning unit at TA-16 is maintained through both administrative controls and physical barriers. Access into the security area can be gained only through controlled entry stations by persons possessing an appropriate security clearance and site-specific training. Entry into the secured area is controlled via an entry station manned by LANL security personnel or by badge readers 24 hours per day. In addition, entry into the high explosives exclusion area is controlled through an industrial fence, with access granted through an access control station or a locked access gate. To gain access to the area, visitors must check in at the appropriate access control station to be added to the site-specific badge reader system. Unescorted access to the high explosives exclusion area is granted only to persons possessing appropriate security clearance and meeting site-specific training requirements. Proposed changes required to add the unit to the 2010 Permit include adding the unit description to Permit Attachment A, *Technical Area Unit Descriptions*, and also including a figure to Permit Attachment N, *Figures.* These proposed changes are included within this Permit Renewal Application within Supplement 1-2, *Permittees' Proposed Changes to Attachment A, Technical Area Unit Descriptions,* and Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures*.

5.4 Inspection Schedules and Procedures

Per the requirements for 40 CFR §§270.14(b)(5) and 264.602, inspections at the TA-16-388 Flash Pad are conducted and documented, as outlined in Permit Section 2.6, *General Inspection Requirements*, and Permit Attachment E, *Inspection Plan*. A revised inspection plan, including the requirements for the open burning hazardous waste management unit, can be found in Supplement 1-5, *Permittees' Proposed Changes to Permit Attachment E, Inspection Plan,* of this Permit Renewal Application. No changes to Permit Section 2.6 are associated with the addition of these hazardous waste management units.

5.5 Waivers for Preparedness and Prevention

The information requirements stipulated in 40 CFR §270.14(b)(6) require that a part B permit application include "a justification for any request to waive the preparedness and prevention requirements of Part 264, subpart C." No waivers of the preparedness and prevention requirements under Part 264, subpart C, are being sought by the Permittees.

5.6 Contingency Plan

The information requirements for 40 CFR §270.14(b)(7) stipulate inclusion of a Contingency Plan to meet the requirements of 40 CFR Part 264, Subpart D.

A copy of the revised Contingency Plan is included in this Permit Renewal Application in Supplement 1-4, *Permittees' Proposed Changes to Permit Attachment D, Contingency Plan,* as required by 40 CFR §270.14(b)(7), which has been drafted to meet the requirements in 40 CFR Part 264, Subpart D, *Contingency Plan and Emergency Procedures*. Information on emergency response resources and release prevention/mitigation are included in the 2010 Permit Attachment D, *Contingency Plan*. The proposed revised plan is included in this Permit Renewal Application Supplement 1-4, and incorporates the emergency equipment located at the TA-16-388 Flash Pad.

5.7 Hazards Prevention

The following sections present how operations at the TA-16-388 Flash Pad comply with the preparedness and prevention requirements of 40 CFR Part 264, Subpart C, and the application requirements for 40 CFR §§270.14(8)(i-vi), where they differ from those presented in Section 2.7, *Hazards Prevention,* of this Permit Renewal Application. Health and safety procedures are followed by site personnel during routine operations.

5.7.1 Waste Handling at the Open Burning Unit

All waste handling operations at the TA-16-388 Flash Pad are conducted, as discussed in Section 2.7.1, *Waste Handling and Preventing Hazards in Unloading/Loading*, of this Permit Renewal Application, meeting the requirements of 40 CFR §270.14(8)(i).

5.7.2 Control of Runon/Runoff

Prevention of runoff from the hazardous waste handling areas, per the requirements at 40 CFR §270.14(8)(ii), is described in Section 5.16.2, *Protection of Surface Water/Wetlands/Soil Surface,* of this Permit Renewal Application.

5.7.3 Preventing Water Supply Contamination

The water supply at LANL is as described in Section 2.7.3, *Preventing Water Supply Contamination,* of this Permit Renewal Application.

5.7.4 Mitigate the Effect of Equipment Failure and Power Outages

There are no special requirements at the TA-16-388 Flash Pad required to mitigate equipment failure and power outages, per the requirements of 40 CFR §270.14(b)(8)(iv). The description of required equipment and testing maintenance of that equipment follow the permit conditions referenced in Section 2.7.4, *Mitigate the Effect of Equipment Failure and Power Outages,* of this Permit Renewal Application, with the permit changes as described within the section.

5.7.5 Preventing Undue Exposure of Personnel

There are no special requirements at the TA-16-388 Flash Pad to prevent undue exposure of personnel, per the requirements in 40 CFR §270.14(b)(8)(v) and described in Section 2.7.5, *Preventing Undue Exposure of Personnel,* of this Permit Renewal Application.

5.7.6 Preventing Releases to the Atmosphere

The requirements of 40 CFR §270.14(b)(8)(vi) reflect the standards promulgated in 40 CFR §264.601, which is applicable to the open detonation waste management units. 40 CFR §264.601 requires that "A miscellaneous unit must be located, designed, constructed, operated, maintained, and closed in a manner that will ensure protection of human health and the environment. Permits for miscellaneous units are to contain such terms and provisions as necessary to protect human health and the environment, including, but not limited to, as appropriate, design and operating requirements, detection and monitoring requirements, and requirements for responses to releases of hazardous waste or hazardous constituents from the unit. Permit terms and provisions must include those requirements of subparts I through O and subparts AA through CC of this part, part 270, part 63 subpart EEE, and part 146 of this chapter that are appropriate for the miscellaneous unit being permitted. …" Protection of human health and environment will respect to the air and the atmosphere includes, but is not limited to:

> "(c) Prevention of any release that may have adverse effects on human health or the environment due to migration of waste constituents in the air, considering:
> (1) The volume and physical and chemical characteristics of the waste in the unit, including its potential for the emission and dispersal of gases, aerosols and particulates;
> (2) The effectiveness and reliability of systems and structures to reduce or prevent emissions of hazardous constituents to the air;
> (3) The operating characteristics of the unit;
> (4) The atmospheric, meteorologic, and topographic characteristics of the unit and the surrounding area;
> (5) The existing quality of the air, including other sources of contamination and their cumulative impact on the air;
> (6) The potential for health risks caused by human exposure to waste constituents; and
> (7) The potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents."

The open burning unit will comply with the provisions of 40 CFR §264, 40 CFR §264.601 and §270.14 by proper operation of the units in compliance with the terms of a RCRA permit issued by NMED. The Permittees' historic interim status compliance at the open burning treatment unit is unsurpassed and an indication of superior prospective compliance with any NMED issued RCRA permit conditions.

~~Releases to the atmosphere resulting from treatment activities at the open burning treatment unit cannot be prevented, as required by 40 CFR §270.14(b)(8)(vi). However, assuming conservative scenarios for treatment activities at the TA-16-388 Flash Pad, as~~ Data discussed in Section 5.16.3, *Protection of Atmosphere*, and included in Supplement 4-12, *Screening Level Air Modeling Analysis and Risk Evaluation for Open Burning Operations at Los Alamos National Laboratory*, the estimated resulting emissions will not exceed regulatory levels established to protect human health and the environment~~for~~

~~health-based protection~~. An extremely conservative scenario was utilized for modeled treatment activities at the unit that intentionally overestimates the quantity of waste treated as well as the types of waste that will be treated at the units. Explosives waste minimization efforts and process improvements have significantly reduced the toxicity, types, and quantity of the waste that must be treated by open burning. The demonstrated ability of the open burning process with propane fuel to destroy explosives and create few residuals display high removal efficiencies and ensure the prevention of any release that may have adverse affects on human health or the environment due to migration of waste constituents in the air. Therefore, these emissions will not adversely affect human health or the environment and thereby will meet and comply with the requirements of 40 CFR §264, 40 CFR §264.601(c) and 40 CFR §270.14(b)(8)(vi).

Specifically, a~~A~~ir-monitoring data collected in 2011 during treatment events at the open burning unit is included as Supplement 4-13, *Air Sampling at Open Burning Treatment Unit,* of this Permit Renewal Application. Each sample was collected downwind of the TA-16-388 Flash Pad at a distance of 25 ft. and 75 ft. Samples collected from five treatment events were analyzed for metals and dioxins/furans. The analysis results were then compared to acute air-inhalation exposure concentration screening levels, where screening levels could be identified. The data comparisons indicate the operations monitored did not exceed any appropriate state or federal levels specified for the analytes monitored. Finally, the entirety of Section 5.16 is incorporated into this Section 5.7.6 by reference.

5.8 Ignitable, Reactive, and Incompatible Waste Precautions

The application requirements for 40 CFR §270.14(b)(9) are included in Section 2.8, *Ignitable, Reactive, and Incompatible Waste Precautions,* of this Permit Renewal Application. There are no changes required within the 2010 Permit to Permit Section 2.8, *Ignitable, Reactive, and Incompatible Waste,* for the inclusion of the open burning unit. The treatment of wastes by open burning is an appropriate treatment method under RCRA. It is necessary to mitigate the ignitable and/or reactive hazards associated with explosives waste streams—it is the preferred waste management practice for health and safety concerns.

5.9 Traffic

In accordance with requirements for 40 CFR §270.14(b)(10), the primary traffic routes that might be used to transport hazardous waste to or from the TA-16-388 Flash Pad at TA-16 include Pajarito Road, State Road 502, Diamond Drive, State Road 501, Anchor Ranch Road, K-Site Road, State Road 4, and East Jemez Road (see Figures 1 and 2 in Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures*). Additional discussion of traffic at LANL is included in Section 2.9, *Traffic Pattern, Estimated Volume, and Control*.

5.10 Location and Facility-Wide Information

Facility location information to meet the requirements for 40 CFR §270.14(b)(11) is included within this Permit Renewal Application within Section 2.10, *Facility Location Information*. Additionally, the information requirements under 40 CFR §§270.14(b)(12, 14, 15, 16, 17, 18, 19, 20, 21, and 22) and 270.14(c & d) are covered for the LANL Facility within Sections 1 and 2 of this Permit Renewal

Application. There are no additional information requirements necessary to add to the open burning unit to the 2010 Permit.

5.11 Closure Plan

A Closure Plan for the open burning unit, as required by 40 CFR §270.14(b)(13), is included as a portion of Supplement 3-1, *Permittees' Proposed Changes to Attachments G.1 through G.30, Closure Plans,* of this Permit Renewal Application.

5.12 Design, Construction, Materials, and Operation

Open burning treatment is a recognized, well-characterized, and dependable method used to treat hazardous wastes that exhibit the explosive characteristic of reactivity (a subset of EPA hazardous waste number D003), which occurs by self-sustained combustion ignited by an external source. Reactive hazardous wastes are treated by open burning when it has been determined to be the safest method for treatment compared to other modes of treatment. It renders the treatment residuals safe to handle and dispose. After treatment, the characteristic of reactivity is removed, with remaining residues tested and generally disposed as nonhazardous wastes. The TA-16-388 Flash Pad is used to treat certain types of explosives hazardous waste streams by open burning. A description of the unit is included in Section 5.1, *Open Burning Facility Description*. The Permittees propose treatment permit conditions for these units to update Permit Part 5. These proposed revisions are included in Supplement 1-1, *Permittees' Proposed Changes to Permit Parts 1-11,* of this Permit Renewal Application.

5.12.1 Containment Systems

In accordance with requirements stipulated in 40 CFR §264.601(b)(2), the effectiveness and reliability of containment, confinement, and collection systems and structures that prevent contaminant migration at the open burning unit are evaluated in Section 5.16, *Environmental Performance Standards.*

The TA-16-388 Flash Pad open burning unit (newly included Figure 15 within Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures*) consists of a 22-f.t by 22-ft. concrete pad set on a secondary containment area. The base of the pad is 12 inches thick. The entire concrete pad is on a 45-mil Hypalon liner, which is 6 inches below the bottom of the pad and curved up to ground level on all 4 sides, extending out 2 ft. from the pad perimeter. Inset 1 ft. from the edge of the concrete pad along the two sides and back is a 3-ft.-high, 8-inch-thick, integrally poured concrete wall. The pad is slanted down toward the back concrete wall. The TA-16-388 Flash Pad is also equipped with a retractable steel roof that covers the entire unit when not in use.

5.12.2 Operating Requirements

The TA-16-388 Flash Pad is used for thermal treatment (via open burning) of hazardous waste that exhibits the characteristic of reactivity, in accordance with 40 CFR Part 265, Subpart P. Treatment of waste at the TA-16-388 Flash Pad is conducted using a noncontinuous (batch) thermal process, where a discrete quantity of waste is treated through a complete thermal cycle, in accordance with the requirements specified in 40 CFR §§265.370 and 265.373. Treatment is accomplished using propane burners to supply heat and fuel to dry the explosives, if necessary, and destroy the explosives contamination to make the waste residuals more amenable to disposal. All treatment operations are conducted on the pad either using a steel tray that may be lined with firebrick or on a steel platform.

Prior to waste treatment operations, the area is cleared of all personnel, except for authorized Burn Ground personnel. The gate in front of the TA-16-388 Flash Pad is closed to prevent entry until after the treatment is complete.

Open burning waste treatment operations occur only during the daylight hours (i.e., from one hour after sunrise to one hour before sunset) to ensure that the entire burn can be observed by a TA-16 Burn Ground Operator. Treatment events are monitored in accordance with 40 CFR §265.377, as applicable, to ensure that waste treatment is progressing as expected and that propane burners are operating correctly. Monitoring is performed through a closed-feed camera system or a periscope located at the TA-16-389 control building.

Based on the TA-16-388 Flash Pad's maximum 200-pound treatment capacity, a minimum required distance of 1,250 ft. will be maintained between the perimeter of the burn and the nearest non-LANL property, as required in 40 CFR §265.382. The closest property not owned by the Permittees is at a distance greater than one mile (5,280 feet) from the TA-16 Burn Ground. Additionally, the TA-16-388 Flash Pad is limited to an annual treatment capacity of 6,000 pounds per year.

5.12.3 Waste Treatment Process

Open burning operations are conducted in accordance with this section. The description below discusses how to assess and manage general and site-specific safety and health hazards associated with working with explosives. This section describes normal treatment operations at the TA-16-388 Flash Pad.

5.12.4 Waste Accumulation

Waste treated at the TA-16-388 Flash Pad is initially accumulated in less-than-90-day accumulation areas or satellite accumulation areas until the day of treatment. Explosives may also be collected directly from explosives storage locations at the Facility on the day of treatment. Safety concerns dictate that waste be burned promptly (within a couple of hours) after arriving at the TA-16 Burn Ground. Therefore, almost all wastes are treated on the same day that they are moved to the TA-16-388 Flash Pad.

5.12.5 Waste Transport

Waste to be treated is collected from various areas at the Facility. Prior to treatment of any waste, the waste generator must provide waste characterization documentation and a request for treatment. This information is reviewed for acceptance at the treatment unit by a trained professional familiar with waste characterization requirements of the Waste Analysis Plan and the site-specific restrictions of the waste treatment unit at the TA-16-388 Flash Pad. A treatment event(s) is/are scheduled once the waste characterization documentation has been approved by a TA-16 Burn Ground Operator, waste acceptance personnel, official explosives safety personnel, and responsible line management.

Scheduling of a waste treatment event involves arranging for the transportation of waste from one or more locations to the TA-16-388 Flash Pad. When loading waste, the cargo compartment of the transport vehicle is checked to ensure that it is clean and contains no loose items such as tools or sharp objects. For transport, the containers of waste are inspected for damage or leaking material and are then secured with tie-downs. The load limit for transporting explosives is determined by the capacity of the transport vehicle(s). Wastes are transported to the Burn Ground by appropriately trained and authorized personnel in vehicles designed to transport explosives. Qualified explosives handlers unload the waste from the vehicle and place it within the unloading area. A visual examination is conducted after unloading to ensure that containers are not damaged or leaking and that no explosive material remains in the transport vehicle.

Explosives-contaminated waste and explosives waste that must be transported on public roads between sites is packaged in compliance with requirements stipulated by the U.S. Department of Transportation. Onsite transportation requires that explosives waste be packaged in approved containers, sealed, and labeled appropriately. Waste containers (generally plastic bags, paper-lined cardboard boxes, plywood boxes, or plastic buckets) are then transported from the generator accumulation areas. Exceptions to packaging are made for special items to ensure the waste materials are handled and transported safely.

5.12.6 Waste Staging

Most waste streams treated at the TA-16-388 Flash Pad do not require staging prior to treatment. Waste streams that do not require staging include explosives machining waste, excess explosives, explosives-contaminated combustible debris, and explosives-contaminated solvent waste. The waste stream that may require staging prior to or during the burning treatment process is the explosives-contaminated noncombustible debris waste stream.

The explosives-contaminated noncombustible debris waste stream can consist of large pieces of equipment, debris from firing sites, material from decommissioning and demolition activities, and material from explosives processing areas that must be “flashed” prior to shipment offsite for recycle or disposal. Depending on the size and amount of waste to be flashed, it may take several days to stage the waste on the flash pad. The waste material to be treated may include relatively large metal pieces that involve extensive scheduling of collection and transport resources. They may require equipment such as forklifts or additional procedures for lifting of large pieces, as well as complicated stacking arrangements on removable steel supports.

Factors that influence waste staging are safety, the degree of difficulty in placing the waste on or removing it from the TA-16-388 Flash Pad, and the potential for influence from environmental factors (e.g., wind speed, fire conditions). Treatment operations can be delayed from a scheduled burn time caused by environmental factors, which are discussed below. If burning is delayed, a cover is placed over the waste.

5.12.7 Treatment Operations

The following sections describe open burning treatment operations on the day of treatment events.

5.12.7.1Pretreatment Activities

Propane burners are tested for functionality on the day of or the day before treatment operations, before the waste is transported to the TA-16-388 Flash Pad. Prior to waste treatment, the area at the TA-16 Burn Ground is visually inspected for unauthorized personnel and large animals. When staging of the waste is not required, the waste is placed in a steel tray or on a steel pallet. Multiple compatible waste streams may be consolidated to create efficiencies in waste treatment. Wastes requiring the use of more fuel may be paired with wastes that require less fuel, so that the least amount of fuel possible is used to effectively and efficiently treat the waste. Wastes that contain combustible materials are placed within a screen cage inside the tray to reduce the potential for residue to escape.

5.12.7.2 Open Burning Treatment Operations

After the waste is placed within the burn tray at the TA-16-388 Flash Pad, the roof over the concrete pad is retracted and all access barricades and gates are confirmed to be in place. All personnel present at the TA-16 Burn Ground are moved to the control building. Additional personnel are not allowed to be present at the TA-16 Burn Ground during treatment operations. Access Control is notified via phone or radio that the burn is about to commence and that the propane burners have been started. All treatment operations are initiated remotely by qualified personnel from inside the control building and observed on the monitor located in the control building.

During the entire waste treatment operation, either a television camera mounted above the front of the TA-16-388 Flash Pad or a periscope located at the TA-16-389 control building is used to monitor the operation from inside the control building at TA-16-389. The lockout key for the power that operates the unit is also located in the control building. The lockout key is controlled by the Lead TA-16 Burn Ground Operator at all times.

Most commonly, treatment events last approximately 30 minutes. However, treatment is always continued until the TA-16 Burn Ground Operator determines visually that the waste is fully treated. After the propane burners have been shut off, the power to the unit is switched off and the lockout key is locked away. Access control is then notified that the treatment event is complete. The barricades in front of the TA-16-388 Flash Pad are left in place for up to an eight-hour period after the treatment event is complete to allow the tray to cool. Security access gates in front of building 16-389 and at the entryway to the TA-16 Burn Ground are lifted after treatment operations are completed.

5.12.7.3 Post-Treatment Operations

The burn trays must be left uncovered while they cool after each treatment event. The metal cover is placed back over the TA-16 Flash Pad eight hours after a treatment event, or earlier if a TA-16 Burn Ground Operator determines that it is safe to do so. Any residue (i.e., ash) that is left from a treatment event is left within the tray for a minimum of 24 hours after treatment. After 24 hours, the ash is removed using a shovel, broom, dustpan, or other tools, as necessary. The residue is then placed in a plastic bucket and accumulated until the container is approximately half full. Residues are characterized as described within Permit Attachment C, *Waste Analysis Plan.* The proposed changes to the Permit Attachment C are presented in this Permit Renewal Application as Supplement 1-3, *Permittees' Proposed Changes to Attachment C, Waste Analysis Plan*, to account for the addition of the open burning unit.

5.12.7.4 Restrictions on Operations

As part of fire safety considerations, grasses and weeds located within a 200-ft. radius of the TA-16-388 Flash Pad are kept trimmed. This minimizes the potential for fire around the unit. Additionally, treatment operations are conducted within the bounding conditions detailed in the LANL Fire Danger Matrix (https://www.lanl.gov/resources/emergency/fire-danger-matrix.php), which is maintained by LANL emergency operations personnel. Wind data is standardized using the facility-wide LANL Weather Machine, meteorological tower 6 postings. The Weather Machine compiles temperature, wind, pressure, relative humidity, data collected by LANL meteorological towers and other pertinent National Weather Service forecast information.

Other environmental factors restrict treatment operations at the TA-16-388 Flash Pad. Transportation or treatment of explosives waste at the TA-16-388 Flash Pad may not occur under the following conditions:

- When lightning is detected within a 6-mile radius of the unit
- During all precipitation events
- When roads are icy (applies to transport only)
- When wind speeds are determined to be greater than 20 miles per hour at the TA-16-389 control building
- When winds are greater than 10 miles per hour in drier weather conditions, such as in the spring and summer seasons when fire danger rating is deemed to be "Very High" or "Extreme"

Risk to human health is the greatest consideration. Should any environmental factors change rapidly and unexpectedly, the waste may remain at the TA-16-388 Flash Pad, under administrative control, until treatment can be safely conducted. Applicable administrative controls include covering the waste if it is safe to do so and prohibiting nonessential personnel from entering the area.

5.13 Demonstration of Treatment Effectiveness

To address the applicable miscellaneous unit requirements specified in 40 CFR §270.23(d) and the thermal treatment unit requirements of 40 CFR Subpart 265, Subpart P, a demonstration of treatment effectiveness must be included for the TA-16-388 Flash Pad. As indicated in the AEHA guidance document, "RCRA Part B Permit Writers Guidance Manual for Department of Defense Open Burning/Open Detonation Units" (AEHA 1987), a demonstration of treatment effectiveness can be based on laboratory or field data. For wastes treated by open burning, information demonstrating that any residues remaining after burning are not reactive (i.e., as defined by RCRA) should be provided. At the TA-16-388 Flash Pad, this is accomplished by testing all residues for explosives. If explosives are present within the residue, it is treated again. Residues deemed not reactive are managed in accordance with LANL waste management procedures, characterized in accordance with Attachment C, *Waste Analysis Plan,* of the 2010 Permit (the proposed changes are presented in Supplement 1-3, *Permittees' Proposed Changes to Permit Attachment C, Waste Analysis Plan*), and managed in compliance with applicable state, federal, and local requirements.

Additionally, to provide an assessment of the temperatures of open burning treatment activities, measurements were collected from various types of burns at the TA-16-388 Flash Pad. Most open burning treatment events last approximately 30 minutes. The TA-16-388 Flash Pad internal operating procedures require that, for all burn events, the waste must continue to be treated until the operator determines visually that the waste is fully treated. The multidirectional propane burners ensure that high combustion turbulence is maintained throughout the treatment event.

Thermal studies, as described within Supplement 4-14, *Thermal Measurements at the TA-16-388 Flash Pad*, demonstrate that the propane burners on the TA-16-388 Flash Pad are capable of elevating the temperature within the burn cage well in excess of 2,000°F in most of the burn runs, to achieve complete combustion of complex and persistent toxins such as dioxins and furans and their building blocks. The thermal studies also demonstrate that open burning, as conducted on the TA-16-388 Flash Pad, meets all three major requirements of the American Chemistry Council's "3-T rule" for dioxin destruction: high combustion temperature to maximize waste destruction, adequate combustion time, and high combustion turbulence (American Chemistry Council 2003).

5.14 Inspection Schedules and Procedures

Per the requirements for 40 CFR §264.602, inspections at the open burning unit are conducted and documented, as outlined in Section 2.4, *Inspections.* Proposed changes to the plan are summarized in Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit,* and a revised version of the plan is attached as Supplement 1-5, *Permittees' Proposed Changes to Permit Attachment E, Inspection Plan,* of this Permit Renewal Application.

5.15 Special Requirements for Ignitable, Reactive, and Incompatible Wastes

Waste management procedures for ignitable, reactive, and incompatible wastes to be treated will be followed, pursuant to 40 CFR §264.17 and as described in Section 2.8, *Ignitable, Reactive, and Incompatible Wastes,* of this Permit Renewal Application.

5.16 Environmental Performance Standards

This section addresses the ability of the TA-16-388 Flash Pad operations to meet environmental performance standards that protect groundwater, surface water, soil, and air quality. EPA identified these media as having the greatest chance of becoming exposure pathways for migration of hazardous waste and hazardous waste constituents to potential human and environmental receptors. As required by 40 CFR §264.601, the Flash Pad is located, designed, constructed, operated, and maintained in a manner that facilitates safe handling and treatment of explosives wastes to prevent adverse impacts to human health and the environment.

5.16.1 Protection of Groundwater/Vadose Zone

As required by 40 CFR §264.601(a), the TA-16-388 Flash Pad is operated in a manner that prevents releases that might have adverse effects to human health or the environment caused by migration of waste constituents through the vadose zone to groundwater. Specific items to be considered include the following:

- The volume and physical and chemical characteristics of the waste in the unit, including its potential for migration through soil, liners, or other containing structures.
- The hydrologic and geologic characteristics of the unit and the surrounding area.
- The existing quality of groundwater, including other sources of contamination and their cumulative impact on the groundwater.
- The quantity and direction of groundwater flow.
- The proximity to and withdrawal rates of current and potential groundwater users.
- The patterns of land use in the region.
- The potential for deposition or migration of waste constituents into subsurface physical structures and into the root zone of food-chain crops and other vegetation.
- The potential for health risks caused by human exposure to waste constituents.

- The potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents.

The following sections provide information on the hydrogeology beneath the TA-16-388 Flash Pad and describe monitoring and reporting conducted in and around the area that can be used to assess the impact of open burning operations on groundwater. Tables and figures regarding groundwater flow and monitoring are located in Supplement 4-11, *Open Burning Unit Groundwater Monitoring and Surface Drainage Information,* of this Permit Renewal Application.

5.16.1.1 Hydrogeology in the Vicinity of the TA-16-388 Flash Pad

The TA-16-388 Flash Pad is located in the southwestern portion of LANL in a semiarid, temperate, mountain-climate setting. General geologic and hydrologic characteristics of LANL and land use patterns in the Los Alamos area are discussed in Appendix 1 of the Los Alamos National Laboratory General Part B Permit Application (LANL 2003b).

The TA-16 Burn Ground, where the TA-16-388 Flash Pad is located, is situated on a mesa top within TA-16. A hydrologic conceptual model for TA-16, including the area of the TA-16 Burn Ground, is presented in the TA-16 Well Network Evaluation and Recommendations (LANL 2012b). That document ranks different sources at TA-16 by their potential to impact groundwater. High- and moderate-ranking sources were characterized by significant hydrologic drivers, i.e., either large outfall volumes released to canyons or ponds located on mesa tops. Sources were also characterized in terms of the release of large inventories or high contaminant concentrations. Both of these conditions are necessary to consider an area to have a high or moderate impact to groundwater. The TA-16 Burn Ground area was ranked as a low-priority source for its potential to impact groundwater, because it lacks both a large contaminant inventory and a large volume of water to provide a hydrologic driving force for contaminant infiltration.

5.16.1.2 Existing Quality of Groundwater

From 1981 to 2010, the average annual precipitation in Los Alamos County was 18.97 inches and the average annual snowfall was 57.5 inches (LANL 2012a). The evaporation rate of freestanding water exceeds the average annual precipitation. Infiltration is limited and generally occurs in canyons or on mesas at sites that release large volumes of water (LANL 2011a; LANL 2012b). The topographic map for TA-16 within the concurrent submittal of the LANL General Part A Permit Application, Revision 10.0 (LANL 2020a), and the table within Supplement 4-11, *Open Burning Unit Groundwater Monitoring and Surface Drainage Information,* of this Permit Renewal Application, present the locations of all monitored springs and wells (regional, intermediate, and alluvial) that are pertinent to the TA-16 Burn Ground to evaluate potential impacts from the TA-16-388 Flash Pad. The table also contains monitoring data for groundwater contaminants in alluvial, perched-intermediate, and regional groundwater zones near the TA-16 Burn Ground that are equal to or exceed applicable regulatory screening levels.

Discharges from past explosives-manufacturing activities at TA-16 (high- and moderate-ranking sources, particularly at the nearby TA-16-260 outfall) are believed to be the dominant sources of the constituents found in deep groundwater (LANL 2011a; LANL 2012b). Contaminants are present in groundwater collected from springs and groundwater monitoring wells located at TA-16. It is believed that the spring contamination may be the result of ponded water on the mesas (e.g., historical and current ditches and ponds) and potentially the presence of fractures as infiltration pathways. The wells showing the highest contaminant concentrations are downgradient of higher priority TA-16 sources. However, those wells are located along infiltration pathways that are not downgradient of the TA-16-388 Flash Pad.

5.16.1.3 Quantity and Direction of Groundwater Flow

The only aquifer in the Los Alamos area capable of municipal and industrial water supply is the regional aquifer. The regional water table is approximately 1,200 ft. below the TA-16 Burn Ground. This aquifer occurs primarily within the poorly to semi-consolidated basin-fill sediments of the Santa Fe Group. The total thickness of the Santa Fe Group beneath the Pajarito Plateau is poorly defined. The deepest well on the plateau (PM-5), with a depth of 3,110 ft., does not fully penetrate the base of the basin-fill sediments. Estimates of the total thickness of these sediments range from 6,650 ft. in the central basin to as much as 9,000 to 10,000 ft. in the central and western parts of the basin (Broxton and Vaniman, 2005). Given the average long term water level declines on the order of 1.2–1.3 ft./yr., the aquifer should meet projected water demands for hundreds of years.

Water supply well PM-5, the nearest water-supply well to the TA-16-388 Flash Pad, is located approximately 16,000 ft. (3 miles) to the northeast. Water-supply well PM-4 is located approximately 19,000 ft. (3.6 miles) east of the TA-16-388 Flash Pad, and PM-2 is located approximately 21,000 ft. (4 miles) southeast of the unit. Upper levels of the regional aquifer on the Pajarito Plateau are predominantly under phreatic (unconfined) conditions (LANL 2011a).

5.16.1.4 Current and Potential Groundwater Users

The deep portion of the regional aquifer is predominantly under confined conditions, and it is the portion of the regional aquifer influenced by Pajarito Plateau municipal supply pumping (note: neither the alluvial or perched groundwater systems are influenced by municipal water supply pumping). At TA-16, water-supply pumping does not cause any obvious water-level responses in either shallow or deep aquifer screens for those regional aquifer wells near the TA-16-388 Flash Pad (LANL 2011a). As a result, potential contaminant migration follows the ambient water-table gradients rather than diverting towards the water supply wells. Based on hydraulic data, capture of potential contaminants near the water table by municipal supply wells is unlikely. Based on water table maps, the regional groundwater flow direction in the vicinity of the TA-16 Burn Ground is expected to range from east-northeast to east-southeast. Because the TA-16-388 Flash Pad has a low likelihood of impacting groundwater beneath TA-16, impact at the water-supply wells is even less likely. Supplement 4-11, *Open Burning Unit Groundwater Monitoring and Surface Drainage Information,* of this Permit Renewal Application, includes figures that show the locations of groundwater monitoring wells and springs that are pertinent for evaluating potential impacts of the TA-16-388 Flash Pad and data tables with groundwater monitoring information.

5.16.1.5 Groundwater Monitoring and Reporting

LANL has established a groundwater monitoring network to assess the quality of groundwater in the Los Alamos area. The monitoring network includes monitoring wells, water-supply wells, surface-water sampling stations, and springs located both inside and outside the LANL boundary. Three groundwater zones (alluvial, perched-intermediate, and regional groundwater) are monitored as part of the monitoring network. Sample locations, analytical suites, and sampling schedules for the monitoring network are identified in the IFGMP (LANL 2020b). The IFGMP is updated annually with approval by NMED-HWB, in accordance with the June 2016 Compliance Order on Consent, referred to as the

Consent Order (New Mexico 2016). The groundwater monitoring points provide information regarding potential impacts to groundwater from contaminant sources upgradient of the TA-16-388 Flash Pad.

A summary of the data from 2000 to the present for locations both upgradient and downgradient of the TA-16 Burn Ground is provided in Supplement 4-11. The table shows the frequency of detections above the listed regulatory standards for constituents potentially related to operations at the TA-16-388 Flash Pad. A key confounding factor regarding the groundwater monitoring data is that constituents of concern are common across TA-16 and are predominantly attributable to sources other than those at TA-16-388 Flash Pad, many of which have substantially higher amounts of contamination associated with releases to the environment. Therefore, Supplement 4-11 includes data from groundwater monitoring locations that are upgradient of the TA-16 Burn Ground to provide local baseline groundwater conditions for comparison to groundwater data collected to monitor the TA-16-388 Flash Pad. The sampling results are also published in periodic groundwater monitoring reports submitted to the NMED-HWB and in the Facility's annual environmental reports.

5.16.2 Protection of Surface Water/Wetlands/Soil Surface

As required by 40 CFR §264.601(b), the TA-16-388 Flash Pad is operated in a manner that prevents any releases that might have adverse effects on human health or the environment caused by migration of hazardous waste constituents in surface waters or wetlands. There are no permanent surface-water bodies within the confines of the Flash Pad and the unit operations will not utilize water. However, as discussed within this section, surface-water runoff from the Flash Pad has the potential to flow and impact Fishladder Canyon, which in turn is a tributary to Cañon de Valle. As used in this section, "surface waters" includes storm water runoff and snowmelt runoff that can create sheet flow across the site. In addition, there is a wetland located approximately 1,500 ft. away from the TA-16-388 Flash Pad.

The following factors were considered in the surface-water analysis discussed below:

- The volume and physical and chemical characteristics of the waste in the unit.
- The effectiveness and reliability of containing, confining, and collecting systems and structures in preventing migration.
- The hydrologic characteristics of the unit and the surrounding area, including the topography of the land around the unit.
- The patterns of precipitation in the region.
- The quantity, quality, and direction of groundwater flow.
- The proximity of the unit to surface waters.
- The current and potential uses of nearby surface waters and any water quality standards established for those surface waters.
- The existing quality of surface waters and surface soils, including other sources of contamination and their cumulative impact on surface waters and surface soils.
- The patterns of land use in the region.
- The potential for health risks caused by human exposure to waste constituents.
- The potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents.

5.16.2.1 Hydrologic Assessment and Surface Water Flow

Located in the southwestern portion of LANL, TA-16 occupies portions of the Water Canyon, Cañon de Valle, and S-Site Canyon watersheds. The TA-16-388 Flash Pad is located on the mesa top in TA-16's northeastern corner, which lies within the Cañon de Valle watershed. This watershed extends east-southeast across LANL from TA-16 to its confluence with Water Canyon at the boundary between TA-15 and TA-37. Surface water in TA-16 consists of storm water runoff, snowmelt runoff, and perennial spring flow that drains in small drainages or by sheet flow into Cañon de Valle. Surface water in Cañon de Valle to the north of the TA-16 Burn Ground is perennial from Burning Ground Spring to a stream gage (E256) below MDA P, which is an SWMU on the northern portion of the mesa top for which corrective actions are complete. From the southern portion of the TA-16 Burn Ground, where the TA-16-388 Flash Pad is located, intermittent surface water occurs from natural and anthropogenic sources from gage station (E257) to the Cañon de Valle confluence with Water Canyon.

Surface-water runoff from the TA-16-388 Flash Pad flows southwest to a small tributary to Fishladder Canyon, which in turn is a tributary to Cañon de Valle. Fishladder Canyon is located between the main channel of Cañon de Valle and S-Site Canyon, with a drainage length of approximately 3.5 kilometers (2.2 miles) and a drainage area of approximately 1.2 square kilometers (0.4 square miles). Surface water in the vicinity of the TA-16 Burn Grounds consists of storm water and snowmelt runoff that may flow by small drainages or sheet flow into Fishladder Canyon. Fishladder Seep is located in a hanging valley approximately 800 ft. southeast of the Burning Ground. Alluvial groundwater occasionally discharges at Fishladder Seep, although the prevalence of surface flow in Fishladder Seep has decreased significantly in recent years. Supplement 4-11, *Open Burning Unit Groundwater Monitoring and Surface Drainage Information,* of this Permit Renewal Application, contains a figure of drainage (Figure 4.11-1) near the open burning unit.

The US Army Corps of Engineers has identified and delineated a small wetland in this area (ACOE 2005). Wetland 16-1 is approximately 70 ft. long and 20 ft. wide, with an area of 0.03 acres. The wetland is more than 1500 ft. away from the TA-16-388 Flash Pad and is unlikely to be impacted by activities at the open burning unit.

Surface water within the Cañon de Valle watershed has been detrimentally impacted by two severe forest fires (LANL 2011a). In May 2000, the Cerro Grande fire burned the headwaters of Cañon de Valle and Water Canyon west of LANL, and also burned a large part of the Water Canyon watershed within LANL, including areas in TA-08, TA-09, TA-11, TA-14, TA-15, TA-16, TA-28, and TA-37. Various naturally occurring inorganic chemicals (e.g., barium, cobalt, and manganese) and anthropogenic fallout radionuclides (e.g., cesium-137, plutonium-239 and -240, and strontium-90) were concentrated in Cerro Grande ash at levels exceeding that of background sediment before the fire, and the transport of ash has resulted in elevated levels of these analytes in post-fire sediment deposits in some canyons.

In June 2011, the Las Conchas fire burned the headwaters of Cañon de Valle and Water Canyon west of LANL. The upper Cañon de Valle watershed was burned more severely than the upper Water Canyon watershed: 60% of the Cañon de Valle watershed within the burn perimeter was classified as high or moderate severity. Floods in July and August 2011 transported ash from the burn area onto LANL; it is expected that various inorganic chemicals and fallout radionuclides will be elevated in these media similar to the baseline samples collected from post-Cerro Grande fire runoff.

5.16.2.2 Surface Water Monitoring and Reporting

Protection of surface water is established by implementation of a Clean Water Act National Pollutant Discharge Elimination System storm water individual permit associated with industrial activities from certain SWMUs and AOCs (referred to as the “LANL Storm Water Individual Permit”) (NPDES Permit No. NM0030759). The LANL Storm Water Individual Permit was initially effective on November 1, 2010. The LANL Storm Water Individual Permit expired on March 31, 2014, and has been administratively continued pending issuance of a new permit. A draft permit was issued by the EPA on November 30, 2019. A final permit is expected following a public comment period, which ended on July 31, 2020. The 2005 Consent Order (New Mexico 2005) designated the TA-16-388 Flash Pad as SMWU [16-010(c)], regulated under the LANL Storm Water Individual Permit. However, under the 2016 Consent Order (New Mexico 2016), the unit is identified as a permitted unit and is regulated by the 2010 Permit. A request to remove the TA-16-388 Flash Pad from the LANL Storm Water Individual Permit is currently pending with the EPA. Until the unit is removed from the LANL Storm Water Individual Permit, it will be monitored in compliance with that permit.

The LANL Storm Water Individual Permit contains non-numeric technology-based effluent limitations, coupled with a comprehensive, coordinated monitoring program and corrective action where necessary, to minimize pollutants in storm water discharges from sites. LANL is also required to implement site-specific control measures (including best management practices) to address the non-numeric technology-based effluent limits contained in the LANL Storm Water Individual Permit, followed by confirmation monitoring against New Mexico water-quality-criteria-equivalent target action levels to determine the effectiveness of the site-specific measures. If target action levels are exceeded, corrective actions detailed in the LANL Storm Water Individual Permit are initiated and additional confirmation monitoring is conducted, following completion of corrective actions. The LANL Storm Water Individual Permit designates SWMU 16-010(c) as a Moderate Priority Site with a corrective action deadline of October 31, 2015.

Installation of baseline control measures at CDV-SMA-2.5 (Cañon de Valle-Site Monitoring Area-2.5) were completed on December 15, 2010, and certified on January 12, 2011 (LANL 2011b). The active control measures are listed in the 2020 Individual Permit Annual Report (LANL 2020c) and the 2019 update to the Individual Permit Site Discharge Pollution Prevention Plan (LANL 2020d). The control measures include established vegetation, an earthen berm, straw wattles, riprap-lined channels/swales, and rock check dams that function as runon, runoff, erosion, and/or sediment controls.

The pollutants of concern to be monitored for each SMA are specified in Appendix B of the LANL Storm Water Individual Permit. At a minimum, all SMAs must be initially monitored for metals, gross-alpha radiation, Ra-226 + Ra-228, and cyanide (weak acid dissociable). The storm water monitoring requirement for CDV-SMA-2.5 also includes high explosives and SVOCs. Baseline confirmation monitoring at CDV-SMA-2.5 started in May 2011 at station SS090420, which is collocated with the E257 station (shown on Figure 4.11-1 within Supplement 4-11, *Open Burning Unit Groundwater Monitoring and Surface Drainage Information*). Baseline confirmation samples were collected on September 1, 2011, and October 12, 2012. No target action level exceedances were observed. However, the SVOC results were rejected as an outcome of data validation and are not usable for confirmation sampling assessment. A second sample was collected on July 26, 2013, and analyzed for SVOCs. No target action level exceedances were observed, thereby completing baseline confirmation monitoring.

Because this SWMU is an active hazardous waste management treatment unit, it is no longer subject to the Consent Order. A request to remove this site from the LANL Storm Water Individual Permit is currently pending with the EPA. Until this site is removed from the LANL Storm Water Individual Permit, it will be monitored in compliance with that permit. Supplement 4-11, *Open Burning Unit Groundwater Monitoring and Surface Drainage Information,* of this Permit Renewal Application, contains a figure of drainage near the open burning unit.

5.16.2.3Soil Surface Monitoring

The following paragraphs detail soil monitoring efforts at the TA-16-388 Flash Pad, in accordance with the requirements in 40 CFR §264.602(b). Description of modeling associated with the potential for soil deposition as a result of modeled air impacts at the TA-16-388 Flash Pad is included in Supplement 4-12, *Screening Level Air Modeling Analysis and Risk Evaluation for Open Burning Operations at Los Alamos National Laboratory,* of this Permit Renewal Application. This modeling is discussed in the next section.

In 2009, 2012, and 2013, soil sampling occurred using grab sampling to collect soil samples to measure soil constituent levels at the TA-16-388 Flash Pad. A summary of the soil laboratory analytical results for the 2012 and 2013 sample collection events and a comparison of those results to the 2009 data are included in Attachment F of *Class 3 Permit Modification Request for Addition of an Open Burning Unit at Technical Area (TA) 16 to the Los Alamos National Laboratory (LANL) Hazardous Waste Facility Permit, EPA ID No. NM0890010515* (LANL 2013).

The most recent soil-sampling event occurred on September 2018, to continue to monitor and assess soil constituents at the TA-16-388 Flash Pad site. Sample locations were selected based on areas where deposition from air to soil is likely to occur and at locations of storm water runoff. Soil samples were collected from the ground surface to 2 inches below the ground surface and analyzed for constituents of concern. The laboratory soil analytical results were compared to established background values and New Mexico residential soil screening limits. The soil analytical results demonstrate that the majority of constituents analyzed for were nondetect. Soil sample concentrations were measured above their background values for eight inorganic constituents, but the concentrations did not exceed the soil screening levels. Supplement 4-15, *2018 Soil Sampling Results Summary Report for the Open Burning Unit at Technical Area (TA) 16-388 Flash Pad,* of Appendix 4 of this Permit Renewal Application, includes the most current soil analytical summary for the open burning unit and provides more detailed information regarding the soil sampling and analytical results.

5.16.2.4Assessment of Potential Health Risks

Using the 2018 soil-sampling analytical results, risk assessment analyses were conducted to assess the potential for risk to human and ecological receptors from the open burning treatment unit. The assessments are included as Supplement 4-16, *Technical Area 16 - Open Burn/Open Detonation (OB/OD) Area - Technical Area 16-388 Flash Pad Human Health and Ecological Risk Screening Assessments,* of this Permit Renewal Application. The human health risk assessment concluded that there are no unacceptable risks associated with the constituents measured within the soil. The ecological risk assessment concluded that there is a minimal risk to ecological receptors. The detected concentrations of barium above background levels presents a potential risk to plants. However, no effects on plants were noted during a site visit. The calculation of risk presented by the detected concentrations of dioxins/furans in the soils demonstrates that the low-effect ecological screening level for mammals and the no-effect ecological screening level for birds was exceeded at one sample location. Small mammal studies at TA-16 have found no uptake of dioxins/furans by small mammals.

5.16.3 Protection of Atmosphere

To meet the requirements of 40 CFR §264.601(c), the TA-16-388 Flash Pad is located in a remote area within LANL boundaries and is operated in a manner that prevents any releases of waste constituents to the atmosphere that may have adverse effects to human health or the environment.

Air modeling using the Open Burn and Open Detonation Model was conducted for the open burning unit. The air-dispersion model is used to estimate the ground-level concentrations that might occur downwind after an open burning event. The data inputs for the model use the most conservative values to provide the most protective modeling. For example, the data input regarding the maximum amount of explosive waste treated at the unit overestimates the quantity of waste to be 6,000 pounds per year compared to the actual amount of waste treated which is approximately 2,200 pounds per year on average. Additionally, the number of treatments conducted and the amount of time it takes to complete treatment operations were also overestimated. The waste stream emissions factors used for the analysis were also based on constituents that are more hazardous than what would ever be treated at the unit and estimate a higher air impact than what would be released from the unit under normal operations. After running the model through several iterations, the results demonstrate that all maximum ground-level concentrations occur close to the TA-16 Burn Ground. No ambient air-quality standards are projected to exceed the modeling results, since the model results are conservative. The calculated air-concentration results were compared to the air-quality standards and the appropriate human health screening levels, where available, and the predicted impacts are all below the appropriate screening levels. Predicted soil deposition (over a 10-year period) demonstrates that impacts to soil concentrations are also less than the human health and ecological screening levels. The air-analysis report which includes more detailed discussion of model inputs, emission factors, and results is included in Supplement 4-12, *Screening Level Air Modeling Analysis and Risk Evaluation for Open Burning Operations at Los Alamos National Laboratory,* of this Permit Renewal Application.

Atmospheric monitoring efforts that have been performed at the TA-16-388 Flash Pad, in accordance with the requirements of 40 CFR §264.602 and are included in Supplement 4-13, *Air Sampling at Open Burning Treatment Unit,* of this Permit Renewal Application. Each sample was collected downwind of the open burning treatment unit at a distance of 25 ft. and 75 ft. Samples collected from five treatment events were analyzed for metals and dioxins/furans. The analysis results were then compared to acute air-inhalation exposure concentration screening levels, where screening levels could be identified. The data comparisons indicate the operations monitored did not exceed any appropriate state or federal levels specified for the analytes monitored.

6.0 PERMIT CHANGES

This Permit Renewal Application contains a number of proposed Permit changes sought by the Permittees. These changes include proposed modifications to the text in both the Permit Parts and in Permit Attachments. All proposed Permit changes are specifically identified and summarized in Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit*, which outlines changes proposed in Supplements 1-1 through 1-8; and Appendix 3, *Summary Table of Proposed Changes to Hazardous Waste Management Unit Closure Plans*, which outlines proposed changes in Supplement 3-1, *Permittees' Proposed Changes to Attachments G.1 through G.30, Closure Plans*. There are five categories of proposed permit changes summarized below.

1) Changes referred to within Section 2 of this Permit Renewal Application include changes to text and figures within the 2010 Permit Parts 1-11 and Permit Attachments A, C, D, E, and F. Section 2 of this Permit Renewal Application addresses several minor and nonsubstantive changes as needed to update terminology and/or organizational changes, facilitate implementation, clarify information where needed, update or add practices that are in place by the Permittees, and remove redundant information. These changes occur in the following:

   - Permit Section 2.8.1, *Ignitable and Reactive Waste Precautions*
   - Permit Section 2.10.2, *Testing and Maintenance of Equipment*
   - Attachment C, *Waste Analysis Plan*
   - Attachment D, *Contingency Plan*
   - Attachment E, *Inspection Plan*
   - Attachment F, *Personnel Training Plan*

2) Changes referred to within Section 3 of this Permit Renewal Application include removal of text regarding secondary containment that is not applicable, inclusion of practices that are already in place by the Permittees, corrections of typographical errors, and updates to referenced sections. These changes occur in the following:

   - Permit Section 3.5, *Management of Containers*
   - Permit Section 3.10.2, *Secondary Containment*
   - Permit Section 3.12.1, *General Operating Conditions*
   - 3.14.2(1), *Retention Basin*
   - 3.14.3, *Subsurface Vapor Monitoring*

3) Changes based on the Class 3 permit modification request pursuant to the 2017 Settlement Agreement in *U.S. v. Curry*, DC NM Case No. 10-0125. The changes associated with the request are described within Section 6.2 of this Permit Renewal Application. These proposed changes occur in the following:

   - Proposed new Permit Section 1.4.2, *Integration with Consent Order*
   - Permit Section 1.8, *Definitions*
   - Permit Section 1.9.1, *Duty to Comply*
   - Deleted Permit Section 4.6, *TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF)*
   - Permit Section 9.1, *Introduction*
   - Permit Section 9.1.1, *Regulated Units*
   - Permit Section 9.3, *Closure Requirements for Regulated Units*

- Deletion of applicable text within Attachment G, *Closure Plans*, applicable tables within Attachments G.1 through G.30: deletion of text "low-level radioactive solid waste" under column "Waste Type"

4) Changes required for the proposed addition of three treatment units. The application requirements for the addition of two open detonation units and one open burning unit are included in Sections 4 and 5 of this Permit Renewal Application. Specific Permit Parts and Permit Attachment changes necessary to include these units within the Permit are outlined in Sections 4.0 and 5.0. The other proposed changes occur in the following:

- Permit Section 1.2, *Permittees and Permitted Activity*, Table 1.2.1
- Permit Section 1.4.1, *Effect of this Permit on Interim Status Units*
- Permit Section 1.5, *Effects of Inaccuracies in Permit Application*
- Proposed new Permit Part 5, *Treatment by Open Detonation*
- Proposed new Permit Part 6, *Treatment by Open Burning*
- Attachment A, *Technical Area Unit Descriptions*
- Attachment C, *Waste Analysis Plan*
- Attachment D, *Contingency Plan*
- Attachment E, *Inspection Plan*
- Attachment G, addition of applicable closure plans
- Attachment J, *Hazardous Waste Management Units*
- Attachment N, *Figures*

5) Other proposed changes to the 2010 Permit text and figures that are not addressed in the four circumstances listed above are described in Section 6.2 of this Permit Renewal Application. These changes are minor in nature and have been proposed in most cases for clarity, consistency, or to remove redundant information within the 2010 Permit. These proposed changes are included in the following:

- Permit Table of Contents
- Permit Section 1.5, *Effects of Inaccuracies in Permit Application*
- Permit Section 1.8, *Definitions*
- Permit Section 1.9.8, *Inspection and Entry*
- Permit Section 1.9.14, *Other Noncompliance*
- Permit Section 1.10, *Information Repository*
- Permit Section 1.13, *Public Notification Via Electronic Mail (E-Mail)*
- Permit Section 1.16, Transfer of Land Ownership
- Permit Section 1.17.2, *Demolition Activities Update*
- Permit Section 2.4.7, *Waste Characterization Review*
- Permit Section 2.9, *Waste Minimization Program*
- Permit Section 2.12.2, *Facility Operating Record*
- Permit Section 3.5, *Management of Containers*
- Permit Section 3.12.1, *General Operating Conditions*
- Permit Section 3.14.2, *Retention Basin*
- Permit Section 3.14.3, *Subsurface Vapor Monitoring*
- Permit Section 11.1, *Corrective Action Requirements Under the Consent Order*
- Permit Section 11.2, *Corrective Action Requirements Under the Permit*
- Permit Section 11.3.1.1, *Notification of Detections*

- Permit Section 11.3.2, *Groundwater Monitoring Reporting*
- Permit Section 11.4.1.1, *Groundwater Cleanup Level for Perchlorate*
- Permit Section 11.10.2.7.i, *Groundwater Levels*
- Attachment A, *Technical Area Unit Descriptions*
- Attachment B, *Part A Application*
- Attachment C, *Waste Analysis Plan*
- Attachment D, *Contingency Plan*
- Attachment E, *Inspection Plan*
- Attachment F, *Personnel Training Plan*
- Attachment J, *Hazardous Waste Management Units*
- Attachment N, *Figures*

6.1 U.S. v. Curry

On July 20, 2017, the DOE and LANS (predecessor to Triad and N3B) submitted a Class 3 permit modification request to propose changes to the 2010 Permit that were agreed to under the terms of a Settlement Agreement dated April 17, 2017, resolving the Permittees' appeal of the 2010 Permit in *U.S. v. Curry*, DC NM Case No. 10-0125. This permit modification request is incorporated by reference into this renewal application and can be found at https://permalink.lanl.gov/object/tr?what=info:lanl-repo/eprr/ESHID-602518. As required by 40 CFR §270.42(c), the Permittees issued a public notice for a 60-day public comment period and conducted an informational public meeting on August 30, 2017. Permittees are requesting that the NMED approve these permit changes as part of this Permit Renewal Application. The Class 3 permit modification request, along with the administrative record (e.g., public notice, public comments, and public meeting) are incorporated by reference into this Permit Renewal Application, as referenced (LANL 2017).

Following is a summary of the proposed changes in the *U.S. v. Curry* Class 3 PMR sought for approval in this renewal application:

- Permit Section 1.4, *Effective of Permit*: revisions to provide information for the integration of corrective action in the 2016 Consent Order for regulated units at TA-54 MDAs G, H, and L.
- Permit Section 1.4.2.2, *Public Participation*: addition of language to this section related to public participation.
- Permit Section 1.8, *Definitions*: addition of definitions for the 2016 Consent Order and regulated units.
- Permit Section 1.9.1, *Duty to Comply*: addition of language related to delegation and assignment of the Permittees' responsibilities under the Permit.
- Permit Section 4.6, *TA-50 RLWTF:* deletion of permit text related to the regulation of RLWTF.
- Permit Section 9.1, *Introduction*: addition of language related to three categories of permitted units at the Facility.
- Permit Section 9.1.1, *Regulated Units*: addition of language related to the closure requirements for regulated units within MDAs G, H, and L.
- Permit Section 9.4, *Closure Requirements for Indoor and Outdoor Units*: addition of language related to closure requirements for indoor and outdoor permitted units.
- Attachment G, *Closure Plans*, Tables G.1 through G.30: deletion of text "low-level radioactive solid waste" under column "Waste Type."

- Attachment J, *Hazardous Waste Management Units*: deletion of text under Table J-1, *Active Portions of the Facility*, related to TA-54 MDA G, H, and L.

6.2 Other Permit Changes

This section includes a summary of the proposed changes to the 2010 Permit that are not otherwise discussed in the rest of the Permit Renewal Application. The Permittees' proposed changes are detailed within Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit*, and the appropriate supplements.

Most of the proposed changes within Supplement 1-1, *Permittees' Proposed Changes to Permit Parts 1-11*, fall under "other proposed permit changes" and include the following: minor changes to update the table of contents, removal of redundant information, updates to terminology, updates to current practices in place at the Facility, clarification of definitions and provisions for requirements such as the requirement to provide the NMED with copies of records during inspections, and the correction of typographical errors. Additional proposed changes to reporting requirement dates and waste minimization requirements are described herein and summarized in the table included as Appendix 1.

The Permittees propose to change the due dates for the annual reports required by Permit Section 1.9.14, *Other Noncompliance,* and Permit Section 2.9, *Waste Minimization Program*. The Permittees request that report due dates be moved to December 15 of each year due to several factors. The first is because data calls for information cannot be finalized until September 30 of each year due to the nature of the reports—that provides only 61 days for data gathering, drafting, finalizing, security review, and submittal. Additionally, there are now two contractors coordinating a single reporting deliverable, which typically requires more time for all parties to review the submittal. Lastly, the Thanksgiving holiday at the very end of the drafting and finalization window (e.g., the last weekend in November) results in complications for timely submittal to the NMED and subsequent placement in the Information Repository.

Proposed changes to Permit Section 1.10, *Information Repository*, include revision of the public notice requirements for the annual training to include the words "at least" before the 30-day requirement. The addition of the words "at least" provides flexibility for publishing the newspaper advertisements, because it is not possible for the five newspapers that are required to publish the advertisements to occur exactly 30 days before the scheduled training.

The Permittees propose a revision to the e-mail notification requirement included in Permit Section 1.13 *Public Notification Via Electronic Mail (E-Mail)*. The revision proposes a change to the deadline for completion of these e-mail notifications be increased to 15 days. This deadline better coincides with the deadline to place documents within the LANL Information Repository, as required by the 2010 Permit (10 days). Therefore, the e-notification deadline would fall after the deadline for placement in the Information Repository, rather than before, as it does now. The additional time will enable the Permittees to better coordinate placement of documents into the Information Repository, especially for submittals around holiday closures.

The Permittees propose a change to the frequency of reporting demolition activities at LANL. The proposed revisions reduce the reporting to twice yearly (biannually) to include a fiscal year notice (due September 30 every year) and an update to the annual notice (to be due March 30 every year).

Additional language is proposed to require a supplemental notice in the event that a demolition project is identified outside of the proposed reporting. Changes within this section are proposed based on reporting experience over the last several years that have identified few changes during current quarterly reporting. Occasional changes to the schedule that affect regular reporting would be more effectively managed through a supplemental notice.

Within Permit Section 2.4.7, *Waste Characterization Review,* Item (4) states that when re-characterization of a hazardous waste stream is needed because the Permittees are notified by a receiving offsite facility that characterization of a hazardous waste they obtained from the offsite facility does not match a pre-approved waste analysis certification or accompanying waste manifest or shipping paper, the Permittees must notify the NMED in writing within three days of their receipt of the notice of the discrepancy from a receiving facility. The Permittees propose this notification requirement be revised to be 15 days, as stipulated by the manifest discrepancy requirements at 40 CFR §264.72 to allow adequate time for the Permittees and the offsite facility to resolve the characterization issue, if necessary, and to draft a response and perform proper accuracy and security review for the notification. The regulation specifically states that manifest discrepancies be resolved within 15 days after the offsite facility receives the waste before requiring that a report be made to the regulatory agency. Per the regulation, differences in discrepancy type that can be resolved include the potential for inspection or analysis of the waste [40 CFR §264.72(b)]. Resolution of the discrepancy may entail repeated or additional waste analysis before determining that there is a characterization basis for the discrepancy or a final resolution. In addition, the 40 CFR §264.13(a)(3) waste analysis requirements include the need for repeat analysis of a waste stream following the offsite receiving facility's notification, but there is no minimum timeframe given at that regulatory citation. The current three-day notification provision prevents the Permittees from being allowed to resolve the discrepancy before notifying the NMED. Documentation of the actions resulting from such a notice will also be available, as required by the Facility Operating Record. Additionally, this Permit Section is particularly difficult to comply with at LANL because of the size and number of waste-generating organizations at the Facility. Often, notifications of characterization discrepancies of a waste stream are received from the offsite receiving facility via informal means (e-mail) to individuals, rather than facility liaison groups that can facilitate the notification to NMED.

The change proposed within Section 2.12.2, *Facility Operating Record:* correct a typographical error to a regulation citation.

Editorial updates are proposed to the text within Permit Section 3.14.3, *Subsurface Vapor Monitoring*, to aid in the clarification associated with the intent of the soil vapor monitoring conducted under the provisions of the Permit.

Several permit revisions are proposed to align the 2010 Permit with the 2016 Consent Order (New Mexico 2016). These proposed revisions occur in the following sections of the 2010 Permit:

- Permit Section 1.16, *Transfer of Land Ownership*
- Permit Section 3.14.3, *Subsurface Vapor Monitoring*
- Permit Section 11.1, *Corrective Action Requirements Under the Consent Order*
- Permit Section 11.2, *Corrective Action Requirements Under the Permit*
- Permit Section 11.3.1.1, *Notification of Detections*

- Permit Section 11.3.2, *Groundwater Monitoring Reporting*
- Permit Section 11.4.1.1, *Groundwater Cleanup Level for Perchlorate*

An update to Permit Section 11.10.2.7.i, *Groundwater Levels*, is proposed to change the length of the groundwater sampling period. This change was made related to the first Triennial Review (2018) findings; in accordance with the January 2016 Settlement Agreement and Stipulated Final Order, which found an inconsistency between the Permit which required a 14-day sampling period, whereas the IFGMP required a 21-day period. Groundwater corrective actions are being conducted in accordance with 2016 Consent Order Section XII, Groundwater Monitoring. Consistent with this, all monitoring wells within a watershed or area-specific monitoring group are sampled with 21 days of the start of the groundwater sampling event. This 21-day timeframe is necessary because of the number of monitoring locations in many of the monitoring groups.

Proposed revisions throughout Permit Attachment A, *Technical Area Unit Descriptions,* are included within Supplement 1-2, *Permittees' Proposed Changes to Attachment A, Technical Area Unit Descriptions*. The Permittees propose to update the section numbering and references to accommodate the proposed addition of open burning and open detonation sections. The Permittees propose correction of typographical errors within Permit Attachment A, including correction of the title of the attachment. Proposed changes also include formatting headings and section numbering consistency. Other proposed revisions to the attachment include removal of redundant information that may be inconsistent or that may not be complete when compared to the other instances within the 2010 Permit, where text regarding equipment, specific requirements, or information resides. Proposed updates to the description of security and access at Technical Area 50, Building 69, to remove information that is no longer relevant to the units that remain within the area. The information regarding TA-50 is based on outdated information originally included within a permit application that proposed permitting more units at Technical Area 50, which were subsequently closed. Additionally, the unit descriptions for units located at Technical Area 55 have been updated. Grammatical and formatting edits proposed within Supplement 1-2, *Permittees' Proposed Changes to Attachment A, Technical Area Unit Descriptions* are all reflected in the redline document, but may not be specifically highlighted in Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit*, because formatting changes are difficult to highlight in table format. Additionally, grammatical and consistency changes may provide unnecessary clutter in the summary table.

Proposed changes to Permit Attachment B, *Part A Application*, have not been highlighted in this Permit Renewal Application because they are included in the concurrent submittal of the LANL General Part A Permit Application, Revision 10.0 (LANL 2020a). No substantive changes have been proposed to the form. Updates to the form include signatory name changes and environmental permit listing updates.

As described in Sections 2.2, 4.2, and 5.2 of this Permit Renewal Application proposed changes to Permit Attachment C, *Waste Analysis Plan*, are summarized in Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit,* and included in Supplement 1-3, *Permittees' Proposed Changes to Attachment C, Waste Analysis Plan*. Major updates to the plan include the addition of hazardous waste management units proposed for permitting. All other changes to the attachment are to improve consistency within the plan, remove outdated or redundant information, update terminology, remove acronyms and abbreviations, and organize tables in a consistent manner. Grammatical and formatting edits proposed within Supplement 1-3, *Permittees' Proposed Changes to Attachment C, Waste Analysis Plan* are all reflected in the redline document, but may not be specifically highlighted in Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit*, because formatting changes are difficult to highlight in table format. Additionally, grammatical and consistency changes may provide unnecessary clutter in the summary table.

Changes to Permit Attachment D, *Contingency Plan*, are described in Sections 2.6, 4.6, and 5.6 of this Permit Renewal Application and are included as Supplement 1-4, *Permittees' Proposed Changes to Permit Attachment D, Contingency Plan.* Changes are associated with hazardous waste management units that are proposed to be added to the 2010 Permit, general rearrangement of the plan, updating terminology associated with emergency preparedness activities, updating to modern emergency communication technology, and organizational changes to facilitate implementation, provide clarity, and remove redundant information. Grammatical and formatting edits proposed within Supplement 1-4, *Permittees' Proposed Changes to Permit Attachment D, Contingency Plan*, are all reflected in the redline document, but may not be specifically highlighted in Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit*, because formatting changes are difficult to highlight in table format. Additionally, grammatical and consistency changes may provide unnecessary clutter in the summary table.

Sections 2.4, 4.4, and 5.4 of this Permit Renewal Application discuss the changes summarized in Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit,* and included as Supplement 1-5, *Permittees' Proposed Changes to Permit Attachment E, Inspection Plan*. Proposed changes include adding open burning and open detonation unit inspection requirements, as well as making updates to the arrangement of the inspection plan and the inspection forms.

Changes to Permit Attachment F, *Personnel Training*, are included as Supplement 1-6, *Permittees' Proposed Changes to Attachment F, Personnel Training Plan*. The Permittees propose updates to the plan to improve the quality of the document, correct inconsistencies, and update language to reflect multiple contractors and consolidate repetition within the plan.

Proposed changes within Attachment J, *Hazardous Waste Management Units,* are summarized in Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit,* and are detailed in Supplement 1-7, *Permittees' Proposed Changes to Attachment J, Hazardous Waste Management Units*. These changes propose to remove reference to interim status units, remove descriptions of units that are no longer valid, make changes as described in Section 6.1 above, and correct a typographical error.

The Permittees propose changes to Attachment N, *Figures,* including the consolidation of duplicative figures, updating outdated figures, and moving a figure to Permit Attachment D, *Contingency Plan,* where it is more appropriately placed. Proposed changes are summarized in the Attachment N portion of Appendix 1, *Summary Table of Proposed Changes to the 2010 Los Alamos National Laboratory Hazardous Waste Facility Permit,* and are included in Supplement 1-8, *Permittees' Proposed Changes to Attachment N, Figures*. Necessary proposed text changes to the 2010 Permit are included in Supplement 1-1, *Permittees' Proposed Changes to Permit Parts 1-11*; Supplement 1-2, *Permittees' Proposed Changes* *to Attachment A, Technical Area Unit Descriptions*; and Supplement 1-4, *Permittees' Proposed Changes to Permit Attachment D, Contingency Plan.* Text changes are necessary within the following sections:

- Permit Section 2.5, *Security*
- Permit Section 2.8, *Special Requirements for Ignitable, Reactive, or Incompatible Waste*
- Permit Section 3.14.1, *General Operating Conditions*
- Permit Section 3.14.3, *Subsurface Vapor Monitoring*
- Permit Attachment Section A.1.1, *TA-3 Building 29*
- Permit Attachment Section A.1.1.1, *TA-3-29 Room 9010*
- Permit Attachment Section A.1.1.3, *TA-3-29 Portion of Room 9030*
- Permit Attachment Section A.5, *TA-50*
- Permit Attachment Section A.5.1, *TA-50-69 Indoor Permitted Unit*
- Permit Attachment Section A.5.2, *TA-50-69 Outdoor Permitted Unit*
- Permit Attachment Section A.5.3, *Security and Access*
- Permit Attachment Section A.6, *TA-54*
- Permit Attachment Section A.6.1, *Area L*
- Permit Attachment Section A.6.1.1, *Storage Dome 215*
- Permit Attachment Section A.6.1.2, *Storage Sheds 68, 69, and 70*
- Permit Attachment Section A.6.1.3, *Storage Shed 31*
- Permit Attachment Section A.6.1.4, *TA-54-32*
- Permit Attachment Section A.6.1.5, *TA-54-35*
- Permit Attachment Section A.6.1.6, *TA-54-36*
- Permit Attachment Section A.6.1.7, *TA-54-58*
- Permit Attachment Section A.6.1.8, *TA-54-39 and Containment Pad*
- Permit Attachment Section A.6.2, *Area G*
- Permit Attachment Section A.6.2.1, *Pad 9*
- Permit Attachment Section A.6.2.2, *Pad 1*
- Permit Attachment Section A.6.2.3, *Pad 3*
- Permit Attachment Section A.6.3, *TA-54 West*
- Permit Attachment Section A.6.3.1, *TA-54 West Building (RANT, Radioactive Assay Nondestructive Testing)*
- Permit Attachment Section A.6.3.2, *TA-54 West Outdoor Pad*
- Permit Attachment Section A.6.4, *Security and Access Control*
- Permit Attachment Section A.7, *TA-55*
- Permit Attachment Section A.7.8, *Outdoor Storage Pad*
- Permit Attachment Section A.7.9, *TA-55-0355 Pad*
- Permit Attachment Section A.7.12, *Security and Access Control*
- Permit Attachment Section A.8, *TA-63*
- Permit Attachment Section A.8.1, *Concrete Pad*
- Permit Attachment Section A.8.10, *Subsurface Vapor Monitoring*
- Permit Attachment Section D.1.6.2, *Emergency Facilities at Los Alamos National Laboratory*

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8.0 CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

JEANNETTE HYATT (Affiliate) Digitally signed by JEANNETTE HYATT (Affiliate) Date: 2022.05.18 22:29:00 -06'00'

05/18/2022

Jeannette T. Hyatt
Senior Director
Environment and Waste Programs
Triad National Security, LLC
Operator

Date Signed

Kimberly Lebak Digitally signed by Kimberly Lebak Date: 2022.05.24 19:08:00 -06'00'

05/24/2022

Kimberly D. Lebak
President
Newport News Nuclear BWXT-Los Alamos, LLC
Operator

Date Signed

Theodore A. Wyka Digitally signed by Theodore A. Wyka Date: 2022.05.20 07:14:32 -06'00'

05/20/2022

Theodore A. Wyka
Manager, Los Alamos Field Office
National Nuclear Security Administration
U.S. Department of Energy
Owner/Operator

Date Signed

Michael A. Mikolanis Digitally signed by Michael A. Mikolanis Date: 2022.05.24 18:12:05 -06'00'

05/24/2022

Michael Mikolanis
Manager, Los Alamos Field Office
Environmental Management
U.S. Department of Energy
Owner/Operator

Date Signed

Attachment 4

Revised Supplement 1-1,
Permittees’ Proposed Changes to Permit Parts 1–11

TABLE OF CONTENTS

Table 1.2.1. List of Hazardous Waste Management Units and Co-Operators

Location	Type of Permitted Unit	Owner/Co-operator
TA-3	Storage and Treatment	DOE/Triad
TA-14	Interim Status Open Burning/Open Detonation	DOE/Triad
TA-16	~~Interim Status~~ Open Burning	DOE/Triad
TA-36	~~Interim Status~~ Open ~~Denotation~~Detonation	DOE/Triad
TA-39	~~Interim Status~~ Open ~~Denotation~~Detonation	DOE/Triad
TA-50	Storage and Treatment	DOE/Triad
TA-55	Storage and Treatment	DOE/Triad
TA-63	Storage and Treatment	DOE/Triad
TA-54-38 West	Storage and Treatment	DOE/Triad
TA-54 Areas G, H and L	Storage, Treatment and Disposal (Including Units Undergoing Closure)	DOE/N3B

1.3 CITATIONS

Whenever this Permit incorporates by reference a provision of the 20.4.1 NMAC or Title 40 CFR, the Permit shall be deemed to incorporate the citation by reference, including all subordinate provisions of the cited provision, and make binding the full text of the cited provision.

Hazardous waste management regulations are cited throughout this Permit. The federal Hazardous Waste Management Regulations, 40 CFR Parts 260 through 273, are generally cited rather than the New Mexico Hazardous Waste Management Regulations, 20.4.1 NMAC. The federal regulations are cited because only the federal regulations set forth the detailed regulatory requirements; the State regulations incorporate by reference, with certain exceptions, the federal regulations in their entirety. Citing only the federal regulations also serves to avoid encumbering each citation with references to two sets of regulations. However, it is the State regulations that are legally applicable and enforceable. Therefore, for the purpose of this Permit, and enforcement of its terms and conditions, all references to provisions of federal regulations that have been incorporated into the State regulations shall be deemed to include the State incorporation of those provisions.

1.4 EFFECT OF PERMIT

As to those activities specifically authorized or otherwise specifically addressed under this Permit, compliance with this Permit during its term shall constitute compliance, for purposes of enforcement, with Subtitle C of RCRA and the HWA, and the implementing regulations at 40 CFR Parts 264, 266, and 268 except for those requirements that become effective by statute after the Permit has been issued (*see* 40 CFR § 270.4).

Compliance with this Permit shall not constitute a defense to any order issued or any action brought under: §§ 74-4-10, 74-4-10.1, or 74-4-13 of the HWA; §§ 3008(a), 3008(h), 3013, 7002(a)(1)(B), or 7003 of RCRA; §§ 104, 106(a), or 107, of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §§ 9601 to 9675; or any other federal, state or local law providing for protection of public health or the environment.

This Permit does not convey any property rights of any sort or any exclusive privilege, nor authorize any injury to persons or property, any invasion of other private rights, or any infringement of state or local laws or regulations. Compliance with this Permit does not relieve Permittees from the responsibility of complying with all applicable state or federal laws and regulations (*see* 40 CFR §§ 270.4, 270.30(g) and 270.32(b)(1)).

1.4.1 Effect of this Permit on Interim Status Units

~~For~~The Permittees have submitted a revised closure plan for the interim status units listed in Table J-1 that the Permittees ~~do not choose to operate, the Permittees shall submit to the Department within 180 days of the effective date of this Permit either a notice of intent~~have determined to close ~~in accordance with a current closure plan, or a revised closure plan.~~. These documents ~~shall~~ indicate that the closure of these interim status units shall be initiated in accordance with 40 CFR § 265.113(a) no later than 270 days after the approval of the ~~effective date of this Permit~~individual plan.

1.4.2 ~~For the interim status units listed in Table J-1 that the Permittees propose to permit, the Permittees shall submit to the Department 180 days of the effective date of this Permit a permit modification request in accordance with 40 CFR § 270.42 that includes all applicable information required at 40 CFR §§ 270.10, 270.11, 270.14, and 270.23 for each unit.~~Integration with Consent Order

1.4.2.1 MDAs G, H, and L

The Consent Order requires the Permittees to conduct corrective action for releases of hazardous waste, hazardous waste constituents, and contaminants as defined in Section III of the Consent Order, at all solid waste management units (SWMUs) and Areas of Concern (AOCs) to fulfill, among other requirements, the requirements of 40 CFR § 264.101. TA-54 Material Disposal Areas (MDAs) G, H, and L, in their entirety, are undergoing corrective action under the Consent Order. The Department has determined that all corrective action for releases of hazardous waste and hazardous constituents from the “regulated units” at MDAs G, H, and L will be conducted solely under the Consent Order and not under this or any future Permit, with the exception of long-term monitoring and maintenance which will be conducted under a future modified permit. MDAs G, H, and L include land disposal units that meet the definition of regulated units as defined in 40 CFR § 264.90(a)(2). These regulated units are situated among SWMUs or AOCs. Investigations performed under the Consent Order have found that releases have occurred at MDAs G, H, and L and that both SWMUs and regulated units have likely contributed to these releases. These regulated units meet the conditions in 40 CFR §§ 264.90(f) and 264.110(c) for the use of alternative requirements under the Consent Order in place of the closure, groundwater monitoring, and post-closure requirements in 40 CFR Part 264, Subparts F and G.

The Permittees shall propose remedies in the Corrective Measures Evaluation Report under the Consent Order that achieve compliance with the closure performance standards at 40 CFR § 264.111. Fulfilling the requirements of the approved Corrective Measures Implementation Plan under the Consent Order shall also satisfy the requirements of 40 CFR Part 264, Subpart G.

1.4.2.2 Public Participation

Pursuant to Consent Order section XVII.B, statements of basis and remedies selected by the Department under Consent Order Section XVII associated with MDAs G, H, and L will follow the public participation requirements applicable to remedy selection under sections 20.4.1.900 NMAC incorporating 40 C.F.R § 270.41, 20.4.1.901 NMAC, 20.4.1.902 NMAC, and 20.1.4 NMAC. This will include a public comment period that extends for at least 60 days, and an opportunity for a public hearing on the remedy.

1.5 EFFECT OF INACCURACIES IN PERMIT APPLICATION

This Permit is based on information submitted in the Permittees' Application. The Application has numerous iterations; however, this Permit is based on:

(1) the Part A Application dated ~~August 2018~~June 2020;

(2) the General Part B Permit Application dated August 2003;

(3) the TA-3-29 CMR Part B Application dated September 1999;

(4) the TA-50 Part B Permit Application dated August 2002;

(5) the TA-54 Part B Permit Application dated June 2003;

(6) the TA-55 Part B Permit Application dated September 2003; ~~and~~

(7) the TA-63 Permit Modification Request dated August 2011~~.~~;

(8) the Permit Modification Request for Open Detonation Units at TAs 36 and 39 (TA-36-8 & TA-39-6) dated July 2011;

(9) the Permit Modification Request for an Open Burning Unit at TA-16 dated September 2013;

(10) Request for Class 3 Permit Modification, Settlement Agreement Case No. 10-01251, Los Alamos National Laboratory Hazardous Waste Facility Permit, EPA I.D. #NM0890010515 (NA/LA, EM/LA) dated July 2017; and

(11) the Los Alamos National Laboratory Part B Permit Application for Renewal of the LANL Hazardous Waste Facility Permit dated June 2020.

Any inaccuracies found in the Application may be grounds for the termination, revocation and re-issuance, or modification of the Permit in accordance with 40 CFR §§ 270.41 through 270.43, which are incorporated herein by reference, and for enforcement action.

The Permittees shall inform the Department of any deviation from, or changes in, the information contained in the Application that would affect the Permittees' ability to comply with this Permit. Upon knowledge of such deviations, the Permittees shall, within 30 days, provide this information in writing to the Department in accordance with Permit Sections 1.9.14 and 1.9.15 and 40 CFR §§ 270.30(l)(11) and 270.43(a)(2), which are incorporated herein by reference.

1.6 PERMIT ACTIONS

1.6.1 Duration of Permit

This Permit shall be effective for a fixed term of ten years from its effective date. The effective date of this Permit shall be 30 days after notice of the Department's decision has been served on the Permittees or such later time as the Department may specify (*see* 40 CFR § 270.50(a)).

1.6.2 Permit Modification

This Permit may be modified for both routine and significant changes as specified in 40 CFR §§ 270.41 through 270.43, and any modification shall conform to the requirements specified in these regulations. The filing of a permit modification request by the Permittees, or the notification by the Permittees of planned changes or anticipated noncompliance, does not stay the applicability or enforceability of any permit condition (*see* 40 CFR § 270.30(f)).

1.8 DEFINITIONS

Terms used in this Permit shall have the same meanings as those in the HWA, RCRA, and their implementing regulations unless this Permit specifically provides otherwise. Where a term is not defined in the HWA, RCRA, implementing regulations, or this Permit, the meaning of the term shall be determined by a standard dictionary reference, EPA guidelines or publications, or the generally accepted scientific or industrial meaning of the term.

Acceptable Knowledge is defined at Permit Attachment C (*Waste Analysis Plan*), Section C.3.1.1.

Active Portion means that portion of a facility where treatment, storage, or disposal operations are being or have been conducted after the effective date of 40 CFR Part 261 and which is not a closed portion as defined in 40 CFR § 260.10.

Aquifer means a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs.

Area of Concern (AOC) means any area that may have had a release of hazardous waste or hazardous constituents, which is not from a solid waste management unit.

Consent Order means the ~~March 1, 2005~~June 2016 Compliance Order on Consent (as modified) issued to the ~~Permittees~~DOE pursuant to the HWA and the New Mexico Solid Waste Act requiring the ~~Permittees~~DOE to conduct Facility-wide investigations and cleanups of contaminants released to the environment.

Day means a calendar day unless otherwise specified. Business day means Monday through Friday, other than a federal or State legal holiday.

Department means the New Mexico Environment Department and any successor and predecessor agencies.

Discharge means the accidental or intentional spilling, leaking, pumping, pouring, emitting, emptying, or dumping of hazardous waste into or on any land or water.

Disposal means the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including groundwaters.

Disposal Unit means any unit at the Facility at which hazardous waste is intentionally placed into or on any land or water and at which waste will remain after closure. The term disposal unit does not include corrective action management units into which remediation wastes are placed.

mixing hazardous waste constituents in the same area. A container alone does not constitute a unit; the unit includes containers and the land or pad upon which they are placed. At the Facility, hazardous waste management units include both permitted units and interim status units.

Interim Status Unit means any hazardous waste management unit that was in operation before the effective date of the statutory or regulatory amendments that caused the unit to become subject to permitting requirements, that meets the requirements for interim status under § 3005(e) of RCRA, 42 U.S.C. § 6925(e), for which interim status has not been terminated pursuant to section 3005(e)(2) of RCRA, 42 U.S.C. § 6925(e)(2), and that has not been issued a permit by EPA or the Department.

Land Disposal means placement of waste in or on the land, except in a corrective action management unit or staging pile, and includes without limitation, placement in a landfill such as a pit or a trench, surface impoundment, waste pile, or land treatment facility, or placement in a concrete vault or a shaft intended for disposal purposes.

Macroencapsulation is an EPA-approved immobilization technology that includes the application of surface coating materials such as polymeric organics (e.g., resins and plastics) or use of a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media. The encapsulating material must completely encapsulate debris and be resistant to degradation by the debris and its contaminants and materials into which it may come into contact after placement (leachate, other waste, microbes).

Off-Site Waste means any hazardous waste transported to the Facility from off-site but does not include intra-Facility waste.

Partial Closure means the closure of a portion of a permitted hazardous waste management unit, in accordance with the applicable closure requirements of 40 CFR Part 264 at a facility that contains other active hazardous waste management units.

Permit means this document including all attachments hereto and all modifications to the Permit.

Permitted Unit means a hazardous waste management unit: 1) that is not an interim status unit; and 2) that is authorized by this Permit and listed in Attachment J (*Hazardous Waste Management Units*), Table J-1 (*Active Portion of the Facility*), or Table J-2 (*Permitted Units Undergoing Post-Closure Care*).

Regulated Unit means a surface impoundment, waste pile, land treatment unit, or landfill that accepted hazardous waste after July 26, 1982 (*see* 40 CFR 264.90(a)(2)).

Release means any accidental or intentional spilling, leaking, pouring, emitting, emptying, discharging, injecting, pumping, escaping, leaching, or dumping of any hazardous waste or hazardous constituents inside a permitted unit or from a permitted unit to the environment, including the abandonment or discarding of barrels, containers, and other closed receptacles containing hazardous waste or hazardous constituents.

Representative Sample means a sample of a universe or whole (*e.g.*, waste pile, lagoon, groundwater) which can be expected to exhibit the average properties of the universe or whole.

Secretary means the Secretary of the New Mexico Environment Department or his or her designee.

Solid Waste Management Unit (SWMU) means any discernable unit at which solid waste has been placed at any time and from which the Department determines there may be a risk of a release of hazardous waste or hazardous waste constituents, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at the Facility at which solid wastes have been routinely and systematically released; they do not include one-time spills (*see* 61 Fed. Reg. 19431, 19442-43 (May 1, 1996)).

Storage means the holding of hazardous waste for a temporary period, at the end of which the waste is treated, disposed of, or stored elsewhere.

Transuranic (TRU) Waste means waste of more than 100 nanocuries of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years, except for: 1) high-level radioactive waste; 2) waste that the DOE Secretary has determined, with the concurrence of the EPA Administrator, does not need the degree of isolation required by the disposal regulations; or 3) waste that the Nuclear Regulatory Commission (NRC) has approved for disposal on a case-by-case basis in accordance with 10 CFR Part 61 (*see* Pub. L. 102-579, § 2(18) (1992)).

Waste Stream means each waste material generated from a single process or from an activity that is similar in the materials from which it was generated, similar in its physical form and hazardous constituents, and distinguishable from other wastes by EPA Hazardous Waste Numbers ~~and~~or Land Disposal Restriction (LDR) status.

1.9 DUTIES AND REQUIREMENTS

1.9.1 Duty to Comply

The Permittees shall comply with all applicable conditions in this Permit except to the extent and for the duration such noncompliance is authorized in a temporary emergency permit pursuant to 40 CFR § 270.61. Any Permit noncompliance, except under the terms of an emergency permit, constitutes a violation of the HWA and RCRA and is grounds for enforcement or other Department action and may subject the Permittees to an administrative or civil enforcement action, including civil penalties and injunctive relief, as provided in Permit Section 1.9.2, or permit modification, suspension, termination, or revocation, or denial of a permit application or modification request under § 74-4-4.2 of the HWA and 40 CFR §§ 270.41 and 270.43.

~~No delegation or assignment of the Permittees' responsibilities under this permit can be made to any person or entity, including a separately organized agency, without the expressed permission of the Department; this prohibition does not preclude the Permittees' use of contractors for remediation.~~

~~The Permittees shall not allow any person or entity which currently exists or may be created, including a separately organized agency, to interfere with the performance of their obligations or responsibilities under this Permit.~~

1.9.2 Enforcement

Any violation of a condition in this Permit may subject the Permittees or their officers, employees, successors, and assigns to:

1) a compliance order under § 74-4-10 of the HWA or § 3008(a) of RCRA (42 U.S.C. § 6928(a));
2) an injunction under § 74-4-10 of the HWA or § 3008(a) of RCRA (42 U.S.C. § 6928(a)), or § 7002(a) of RCRA (42 U.S.C. § 6972(a));
3) civil penalties under § 74-4-10 of the HWA or §§ 3008(a) and (g) of RCRA (42 U.S.C. §§ 6928(a) and (g)), or § 7002(a) of RCRA (42 U.S.C. § 6972(a));
4) criminal penalties under § 74-4-11 of the HWA or §§ 3008(d), (e), and (f) of RCRA (42 U.S.C. §§ 6928(d), (e), and (f)); or
5) some combination of the foregoing.

The list of authorities in this paragraph is not exhaustive and the Department reserves the right to take any action authorized by law to enforce the requirements of this Permit.

1.9.3 Transfer of Permit

The Permittees shall not transfer this Permit to any person except after prior written approval of the Department. The Department will require modification or revocation and re-issuance of the Permit, as specified in 40 CFR §§ 270.40(b) and 270.41(b)(2), to identify the new Permittees and incorporate other applicable requirements under the HWA, RCRA, and their implementing regulations. The prospective new Permittee shall file a disclosure statement with the Department, if applicable and as specified at § 74-4-4.7 of the HWA, prior to modification or revocation and re-issuance of the Permit.

Before transferring ownership or operation of the Facility (or portions thereof), the Permittees shall notify the new owner and operator in writing of all applicable requirements of this Permit and 40 CFR §§ 264.12(c) and 270.30(l)(3), which are incorporated herein by reference.

1.9.8 Inspection and Entry

The Permittees shall allow authorized representatives of the Department, upon the presentation of credentials and at reasonable times, and under the conditions of this Permit, to:

(1) enter upon the Permittees' premises where the permitted unit or activity is located or conducted or where records must be kept;

(2) have access to and photograph any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required;

(3) inspect any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required;

(4) have access to, and copy, at reasonable times, any records that must be kept; and

(5) sample or monitor, for the purposes of ensuring Permit compliance or as otherwise authorized by the HWA or RCRA, any substances or parameters at any location.

(*see* 40 CFR § 270.30(i))

In the event that ~~entry, access, or the ability to photograph or sample is~~the Permittees are not able to immediately ~~available~~provide inspection and entry as identified above in Permit Section 1.9.8(1) through (5) due to security or safety restrictions, the Permittees shall provide needed inspection and entry,~~ photographs, or samples~~ as soon as reasonably possible.

1.9.9 Sampling and Records

1.9.9.1 Representative Sampling

All samples and measurements taken by the Permittees under any condition in this Permit shall be representative of the medium, waste, or other material being sampled. To obtain a representative waste sample, the Permittees shall use an appropriate method from 40 CFR Part 261, Appendix I or an equivalent method approved by the Department. Laboratory methods must be those specified in the most current edition of *Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846),* or an equivalent method, as specified in Attachment C (*Waste Analysis Plan*) and Permit Section 2.4.

1.9.10 Reporting Planned Changes

The Permittees shall give advance written notice to the Department as soon as possible, of any planned physical alterations or additions to any permitted unit at the Facility (*see* 40 CFR § 270.30(l)(1)).

1.9.14 Other Noncompliance

The Permittees shall report all instances of noncompliance not reported under Permit Section 1.9.11. This report shall be submitted to the Department annually by December ~~1~~15 for the year ending the previous September 30. These reports shall contain the information listed in Permit Section 1.9.12.2 and 40 CFR § 270.30(1)(10), which is incorporated herein by reference. The Permittees shall notify the Department in writing if there were no instances of noncompliance during the reporting period. This notice shall be submitted to the Department by December ~~1~~15 for the year ending the previous September 30.

1.9.15 Omissions or Misstatements in Applications or Other Reports

Whenever the Permittees become aware that they have failed to submit any relevant facts in a permit application, or have submitted incorrect information in a permit application or a report to the Department, the Permittees shall promptly report such facts or information in compliance with 40 CFR § 270.30(1)(11), which is incorporated herein by reference.

1.9.16 Signatory requirement

Solely for their respective permitted units, the Permittees shall sign and certify all applications, reports, or information submitted to the Department and required by this Permit in compliance with 40 CFR §§ 270.11 and 270.30(k), which are incorporated herein by reference.

1.9.17 Submissions to the New Mexico Environment Department

The Permittees shall submit all written reports, notifications, or other submissions required by this Permit to be submitted to the Department by certified mail or hand-delivery to:

Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

The Permittees shall ensure that any notice, deliverable, or other requirement that under the terms of this Permit would be due on a Saturday, Sunday, or a state or federal holiday shall be due the first business day following the Saturday, Sunday, or state or federal holiday.

1.9.18 Approval of Submittals

All documents that the Permittees prepare under the terms of this Permit and submit to the Department that are subject to the requirements of 20.4.2 NMAC shall be subject to the procedures set forth therein. Documents requiring Department approval that are not subject to the requirements of 20.4.2 NMAC may be reviewed and approved, approved with modifications or directions, disapproved, denied, or rejected by the Department.

Upon the Department's written approval, all submittals and associated schedules shall become enforceable as part of this Permit in accordance with the terms of the Department's written approval, and such documents, as approved, shall control over any contrary or conflicting requirements of this Permit. This provision does not affect any public process that is otherwise required by this Permit, the HWA, or its implementing regulations.

1.9.19 Extensions of Time

The Permittees may seek an extension of time in which to perform a requirement of this Permit, for good cause, by sending a written request for extension of time and proposed revised schedule to the Department. The request shall state the length of the requested extension and describe the basis for the request. The Department will respond in writing to any request for extension following receipt of the request. If the Department denies the request for extension, it will state the reasons for the denial.

The Permittees shall give notice by e-mail to persons on the e-mail notification list of all Department approved extensions of time in accordance with Permit Section 1.13.

1.9.20 Confidential Information

The Permittees may claim that any information required by this Permit or otherwise submitted to the Department is confidential pursuant to the provisions of §§ 74-4-4.3(D) and (F) of the HWA and 40 CFR §§ 260.2 and 270.12.

1.9.21 New or Modified Permitted Units

The Permittees may not treat or store hazardous waste at a new permitted unit or in a modified portion of an existing permitted unit except as provided in 40 CFR § 270.42 until the Permittees have complied with the requirements of 40 CFR §§ 270.30(l)(2)(i) and (ii).

1.10 INFORMATION REPOSITORY

The Permittees shall establish both an electronic Information Repository (IR) accessible through the internet on the Permittees' environmental web site and a physical IR containing paper documents. (S*ee* 40 CFR § 124.33(d))

The Permittees shall ensure that the electronic and physical IRs contain, unless specified otherwise, the following documents:

(1) The Permittees' Part A and Part B Permit Applications associated with the permit renewal;

(2) A link to this Permit as it appears on the Department's website (electronic IR only);

(3) Permit modification requests associated with this Permit submitted pursuant to 40 CFR § 270.42 and any associated Department responses;

(4) The Waste Minimization Report submitted pursuant to Permit Section 2.9;

(5) The Biennial Report submitted pursuant to Permit Section 2.12.5;

(6) Corrective action documents submitted pursuant to Permit Part 11;

(7) Notices of deficiency or disapproval (NODs), NOD responses, final approval letters, and Department directions associated with the documents identified in Paragraphs 1, 3 and 6, above; and

(8) Notices of violation (NOV), administrative compliance orders, responses required by the Department, and Department directions associated with this Permit.

(*See* 40 CFR § 124.33(c))

Within 180 days of the effective date of this Permit, the Permittees shall establish the electronic IR, and inform the Department of the location, nature, and normal business hours of the physical IR. (*See* 40 CFR §§124.33 and 270.30(m))

The Permittees shall add new documents to the IR within ten days after the documents are submitted to, or received from, the Department. (*See* 40 CFR § 124.33(f))

The Permittees shall inform the public of the existence of each IR by the following methods:

(9) written notice to all individuals on the facility mailing list 30 days after the IR becomes operational;

(10) public notice in area newspapers, including the *Santa Fe New Mexican*, the *Journal North- Albuquerque Journal*, the *Rio Grande Sun*, the *Taos News*, and the *Los Alamos Daily Post* when the IR becomes operational;

(11) continuous notice on the Permittees' environmental home page of the existence of the IRs; and

(12) in the public notice for any of the Permittees' requested permit modifications.

(*See* 40 CFR § 124.33(e))

The Permittees shall ensure that the electronic IR includes an electronic index of the documents contained in the IR that identifies each document by title, publication date, author, and any identification number, such as a Los Alamos Unrestricted Release

(LAUR) number. The Permittees shall ensure that all documents maintained in the electronic IR are searchable by title, date, author, identification number, and individual words and phrases, and that all such documents are printable.

The Permittees shall conduct annual training to inform inexperienced computer users of how they can access and utilize the electronic IR. The Permittees shall inform the public of this training at least 30 days prior to the training by methods specified in Permit Section 1.10(9) through (11). The Permittees shall document the training content and all efforts to inform the public in the Facility Operating Record.

1.10.1 PUBLIC ENVIRONMENTAL DATABASE

The Permittees shall provide data from environmental media (*i.e.*, soil, sediment, surface water, groundwater, air and biota) collected under this Permit and incorporated into LANL databases to the public database through updates on a no less than monthly basis.

1.11 GENERAL DOCUMENTS AND INFORMATION TO BE MAINTAINED AT THE FACILITY

The Permittees shall maintain at the Facility the following documents and all amendments, revisions, and modifications to these documents:

(1) this Permit, including all attachments;

(2) a topographic map as required by 40 CFR § 270.13(l) and this Permit;

(3) the Waste Analysis Plan as required by 40 CFR § 264.13(b) and this Permit;

(4) the Inspection Plan (*see* 40 CFR § 264.15(b)); and

(5) a copy of emergency response agreements including all Memorandums of Agreement, Memorandums of Understanding, and Mutual Aid Agreements.

The above-mentioned list is not intended to be exhaustive.

The Permittees shall maintain the documents referenced in this Permit Section in a paper or an electronic format acceptable to the Department.

1.12 COMMUNITY RELATIONS PLAN

The Permittees shall establish and implement a Community Relations Plan (CRP) to describe how the Permittees will keep communities and interested members of the public informed of Permit-related activities, including waste management, closure, post-closure, and corrective action (*see* 40 CFR § 270.32(b)(2)). The CRP shall explain how communities and interested members of the public can participate in Permit-related activities.

1.13 PUBLIC NOTIFICATION VIA ELECTRONIC MAIL (E-MAIL)

The Permittees shall notify individuals by e-mail of submittals as specified in this Permit. The Permittees shall maintain a list of individuals who have requested e-mail notification and send such notices to persons on that list. The notice shall be sent within ~~seven~~fifteen days of the submittal date and shall include a direct link to the specific document to which it relates.

The Permittees shall provide a link on the internet on the Permittees' environmental home page (http://www.lanl.gov/environment) whereby members of the public may submit a request to be placed on the e-mail notification list. In the event that the environmental home page stops operation, the Permittees shall use their best efforts to fully restore the page and its operation as soon as possible.

1.14 DISPUTE RESOLUTION

In the event the Permittees disagree, in whole or in part, with a condition or disapproval of any submittal, the Permittees may seek dispute resolution.

1.14.1 Notice to the Department

To invoke dispute resolution, the Permittees shall notify the Department in writing within 30 days of receipt of the Department's approval with conditions or disapproval of a submittal. Such notice shall set forth the specific matters in dispute, the position the Permittees assert should be adopted, the basis for the Permittees' position, and any matters considered necessary for the Department's determination.

The Permittees shall give notice by e-mail to persons on the e-mail notification list of invocation of dispute resolution in accordance with Permit Section 1.13.

1.14.2 Agreement or Disagreement between Parties

The Department and the Permittees shall have 30 days from the Department's receipt of notification provided under Permit Section 1.14.1 to meet or confer to resolve any disagreement. In the event an agreement is reached, the Permittees shall comply with the terms of such agreement or, if appropriate, submit a revised submittal and implement the submittal in accordance with the agreement, including the schedule specified in the agreement.

1.14.3 Final Decision of the Department

If an agreement is not reached within the 30 day period, the Department will notify the Permittees in writing of its decision on the dispute, and the Permittees shall comply with the terms and conditions of the decision. Such a decision shall be the final decision of the Department Secretary resolving the dispute and shall be incorporated as an enforceable part of this Permit. The Permittees shall comply with the terms of such decision including any schedule specified in the decision.

1.14.4 Actions Not Affected by Dispute

With the exception of those conditions under dispute, the Permittees shall proceed to take any action required by those portions of the submission and of this Permit that the Department determines not to be affected by the dispute.

1.14.5 Available Remedies Reserved

If an agreement is not reached within the 30 day period, the Permittees may seek any available legal remedy, including judicial review of the matter. Whether a disputed decision is final for purposes of judicial review shall be determined according to established principles of administrative law.

1.15 COMPLIANCE SCHEDULE

The Permittees shall submit documents to the Department for its approval, or perform other actions required by this Permit, in accordance with the schedule provided in Attachment I (*Compliance Schedule*) (*see* 40 CFR § 270.33(a)). If the action is not itself the submittal of a written document, the Permittees shall submit to the Department a written notification of their compliance with the schedule no later than 14 days following the scheduled date.

The Permittees shall give notice by e-mail to persons on the e-mail notification list in accordance with Permit Section 1.13 of any such submittal or notification under this Permit Section (1.15) and Attachment I as established on the effective date of this Permit.

Schedules required to be submitted by the conditions of this Permit are, upon approval of the Department, incorporated into this Compliance Schedule by reference and become an enforceable condition of this Permit. Such schedules are not subject to e-mail notification requirements under Permit Section 1.13.

1.16 TRANSFER OF LAND OWNERSHIP

The provisions of this Permit Section shall apply to any transfer in fee of Facility property subject to the requirements of this Permit to another entity. ~~This Section does not apply to Facility property subject to requirements of Section III.Y of the Consent Order.~~

DOE shall not transfer any land without submitting a notice to the Department. DOE shall submit the notice at least 120 days prior to the proposed effective date of transfer. At a minimum, the notice shall include an update of the Facility boundaries, as indicated in Figures 1, 2, and 3 in Attachment N (*Figures*), at an appropriate scale to fully illustrate the boundaries of the transferred property and the modified Facility boundary.

The list shall be accompanied by an attachment that shall describe the processes or conditions that may result in the presence of hazardous material in each building or fixed structure.

1.17.2 Demolition Activities Update

On or before ~~the last day of each quarter (December 31,~~ March 30~~, June 30, and September 30),~~ every year, the Permittees shall update the list to include any additional buildings and fixed structures that may contain hazardous material scheduled for demolition, or shall notify the Department in writing that no such additional demolitions have been scheduled. In the event a demolition project is identified after the previous notice due date, but will occur prior to the next notice due date, Permittees shall submit a supplemental notice conforming to Section 1.17.1 not less than 30 days prior to demolition.

1.17.3 Actions

Based on the list, the Department may identify in writing those buildings or fixed structures for which it requires notice.

If a demolition completion report is prepared for any building or fixed structure identified by the Department, the Permittees shall provide to the Department a copy of the report within 30 days after such final report is written.

auditable form in the Facility Operating Record. The Permittees shall assign a traceable identifier to this documentation to facilitate both access to this information and its verification by the Permittees and the Department.

2.4.4 Waste Received from Off-Site

If a hazardous waste stream is received at the Facility from an off-site facility identified at Permit Section 2.2.1, the Permittees shall obtain from the facility a detailed characterization of a representative sample of the waste. If acceptable knowledge is used for the waste characterization, the Permittees shall require the facility to provide all acceptable knowledge documentation used to characterize the waste stream (*see* 40 CFR § 270.32(b)(2)). In addition, the Permittees shall ensure that all applicable waste characterization requirements specified in Permit Section 2.4 have been met and documented.

The Permittees shall ensure that the waste matches the identity of the waste designated on the accompanying manifest or shipping paper. If discrepancies between the waste received from an off-site treatment facility and the information on the manifest are found, the Permittees shall comply with the requirements of 40 CFR § 264.72, which is incorporated herein by reference, to resolve the discrepancies.

2.4.5 Treatment-Derived Waste

The Permittees shall characterize treatment-derived wastes generated both on-site and off-site by determining whether the treatment residues meet the applicable treatment standard in accordance with 40 CFR § 268.7(b), which is incorporated herein by reference, unless the Permittees have documented that the purpose of the treatment process is not to attain the applicable treatment standard. The Permittees shall ensure adherence to notification and recordkeeping requirements specified at 40 CFR § 268.7(b)(3)(ii). If the waste remains a hazardous waste, the Permittees shall further characterize it in compliance with the applicable requirements of Permit Section 2.4.1.

2.4.6 Reserved

2.4.7 Waste Characterization Review

The Permittees shall ensure that the initial characterization of any hazardous waste stream managed under this Permit is reviewed or repeated to verify that the characterization is accurate and up to date (*see* 40 CFR § 264.13(b)(4)). The Permittees shall document this review in the Facility Operating Record.

The Permittees shall perform the following:

(1) Annually reevaluate all hazardous waste streams generated to verify the accuracy of initial and subsequent characterization results. The annual reevaluation shall

be required no later than one year from the date of initial characterization of the hazardous waste stream or one year from the last annual revaluation;

(2) Recharacterize hazardous wastes whenever there is a change in the waste-generating processes which includes a change in the status of the waste for purposes of Land Disposal Restrictions or when analytical results indicate a change in the waste stream;

(3) Annually verify the waste characterization of one percent of hazardous waste streams characterized solely by acceptable knowledge (*see* 40 CFR §§ 264.13(b)(4) and 270.32(b)(2)). Such waste characterization verification shall be performed by quantitative chemical analyses appropriate for the waste as specified in Attachment C (*Waste Analysis Plan*). The one percent of wastes whose characterization is to be verified shall be determined in relation to the total number of unique waste streams characterized solely by acceptable knowledge and managed at TA-54 in the previous calendar year. The waste streams whose characterization is to be verified shall be chosen without further bias and the selection procedure shall be documented in the Facility Operating Record. Wastes not required to undergo this annual verification and not to be counted toward the total number of wastes managed in the previous year include mixed transuranic wastes, hazardous debris, and hazardous wastes that are hazardous only because they are listed at 40 CFR Part 261, Subpart D; and

(4) Recharacterize a hazardous waste stream whenever the Permittees are notified by a receiving off-site facility that the characterization of a hazardous waste they obtained from the Permittees' Facility does not match a pre-approved waste analysis certification or accompanying waste manifest or shipping paper. The Permittees shall notify the Department in writing within ~~three~~fifteen days of their receipt of the notice of the discrepancy from a receiving facility.

2.4.8 Waste Characterization for Compliance with RCRA Air Emission Requirements

The Permittees shall characterize hazardous wastes managed in containers and tanks to determine the average volatile organic compound (VOC) concentration relative to 500 parts per million by weight (ppmw) at the point of waste origination in compliance with 40 CFR Part 264, Subpart CC. The Permittees shall determine the average VOC concentration either by utilizing acceptable knowledge or by using the procedures specified in 40 CFR § 264.1083(a), which is incorporated herein by reference. The Permittees shall review and update this determination at least once every 12 months following the date of the initial determination in compliance with 40 CFR § 264.1082(c)(1), which is incorporated herein by reference.

incorporated herein by reference, as well as the training requirements in Attachment F (*Personnel Training Plan*).

2.8 SPECIAL REQUIREMENTS FOR IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTE

The Permittees shall manage ignitable, reactive, and incompatible hazardous wastes in containers and tanks in compliance with the requirements of 40 CFR §§ 264.17, 264.176, 264.177, 264.198, and 264.199, which are incorporated herein by reference, and Permit Parts 3 and 4. The Permittees shall ensure that containers holding ignitable or reactive wastes are located at least 15 meters from the facility boundary defined as the technical area (TA) specific ~~boundary~~boundaries identified in ~~Figures 11, 22, 24, and 38~~Figure 2 in Permit Attachment N (*Figures*). At TA-63, the Permittees shall ensure that containers holding ignitable or reactive waste are located at least 15 meters from the TWF fence line, as shown in Figure ~~55~~13 in Permit ~~attachment~~Attachment N (*Figures*) (*see* 40 CFR §§ 264.176 and 270.32(b)(2)).

The Permittees shall take precautions during the treatment or storage of ignitable or reactive waste, the mixing of incompatible waste, or the mixing of incompatible wastes and other materials to prevent reactions that could lead to or cause the following:

(1) generation of extreme heat, pressure, fire, explosions, or violent reactions;

(2) production of uncontrolled toxic mist, fumes, dusts, or gases in sufficient quantities to threaten human health or the environment;

(3) production of uncontrolled inflammable fumes or gases in sufficient quantities to pose a risk of fire or explosions;

(4) damage to the structural integrity of the container, tank, permitted unit, or other structure associated with the permitted unit; and

(5) a threat to human health or the environment.

(*see* 40 CFR § 264.17(b))

2.8.1 Ignitable and Reactive Waste Precautions

The Permittees shall prevent accidental ignition or reaction of ignitable or reactive wastes by taking the following precautions:

(1) ensure there are no sources of open flames in, on, or around the container or tank;

(2) segregate and separate ignitable or reactive wastes and protect them from sources of ignition or reaction such as cutting and welding, frictional heat, sparks (*e.g.*, static, electrical, mechanical), spontaneous ignition, and radiant heat;

(3) maintain adequate clearance around fire hydrants at permitted units;

(4) use only non-sparking tools or non-sparking processes when managing hazardous waste containers that contain ignitable or reactive wastes;

(5) ensure appropriate lightning protection is provided for all storage and treatment units;

(6) perform ongoing inspection, testing, and maintenance of fire protection equipment to determine appropriate test criteria and preventative maintenance activities;

(7) confine smoking and open flames to designated areas that are a minimum of 50 feet from areas where ignitable or reactive wastes are handled;

(8) stack containers of ignitable and reactive wastes no more than 2 drums high to comply with the National Fire Protection Association's (NFPA) *Flammable and Combustible Liquids Code*; ~~and~~

(9) ensure that each permitted unit's fire suppression system is compatible with the hazardous waste being stored or treated at the permitted unit~~.~~ or that any waste containers stored within a unit that may hold waste incompatible with a fire suppression system discharge are stored in a manner that will prevent contact with fire suppression system discharges; and

(10) ensure "No Smoking" signs are conspicuously placed prior to entry at a permitted unit.

The Permittees shall assume that all drums with volume capacities between 55 and 110 gallons that hold mixed transuranic wastes and that are not vented, and standard waste boxes that hold mixed transuranic waste and are not vented, contain hydrogen gas and the associated wastes are subject to the conditions of this Permit Section (2.8.1).

2.8.2 Incompatible Waste Precautions

The Permittees shall ensure that a storage container holding a hazardous waste that is incompatible with any waste or other materials stored nearby in other containers must be separated from the other materials (or waste) or is protected from them by means of a dike, berm, wall, or other device not to include the container, in order to, in the event of leakage from containers under conditions normally incident to storage, prevent the commingling of the incompatible wastes or materials (*see* 40 CFR § 264.177(c)).

The Permittees shall ensure that incompatible wastes or materials are not stored within or on the same secondary containment structure.

The Permittees shall ensure that incompatible wastes or materials are not stored so that a release or spill of these wastes might commingle in a fire suppression water holding area or tank.

The Permittees shall ensure that all waste and materials are segregated and stored in accordance with the Department of Transportation's (DOT) compatibility groupings or classes contained in 49 CFR § 177.848 (*see* 40 CFR § 270.32(b)(2)).

The Permittees shall not store cyanides and cyanide mixtures or solutions with acids if a mixture of the materials could generate hydrogen cyanide. The Permittees shall not store Class 8 (corrosive) liquids above or adjacent to Class 4 (flammable) or Class 5 (oxidizing) wastes except when it is known that the mixture of the wastes could not cause a fire or a dangerous evolution of heat or gas.

The Permittees shall ensure that hazardous wastes are not placed in an unwashed container (*see* 40 CFR § 264.177(b)) or tank (*see* 40 CFR § 264.199(b)) that previously held an incompatible waste or material.

2.9 WASTE MINIMIZATION PROGRAM

The Permittees shall implement and maintain a waste minimization program to reduce the volume and toxicity of hazardous wastes generated at the Facility (*see* 40 CFR § 264.73(b)(9)). The waste minimization program shall include proposed, practicable methods of treatment and storage currently available to the Permittees to minimize the present and future threat to human health and the environment. The Waste Minimization Program shall include the following items:

(1) written policies or statements that outline goals, objectives, and methods for source reduction and recycling of hazardous waste at the Facility;

(2) employee training or incentive programs designed to identify and implement source reduction and recycling opportunities for all hazardous wastes;

(3) source reduction or recycling measures implemented in the last five years or planned for the next federal fiscal year;

(4) estimated dollar amounts of capital expenditures and operating costs devoted to source reduction and recycling of hazardous waste;

(5) factors which have prevented implementation of source reduction or recycling;

(6) summary of additional waste minimization efforts that could be implemented at the Facility that analyzes the potential for reducing the quantity and toxicity of each waste stream through production process changes, production reformulations, recycling, and all other appropriate means including an

assessment of the technical feasibility, cost, and potential waste reduction for each option;

(7) flow charts and/or tables summarizing all hazardous waste streams produced by the Facility by quantity, type, building or area, and program; and

(8) demonstration of the need to use those processes which produce a particular hazardous waste due to a lack of alternative processes, available technology, or available alternative processes that would produce less volume or less toxic waste.

The Permittees shall submit to the Department a report regarding progress made in the waste minimization program in the previous year. The report shall address items (1)-(8) above, shall show changes from the previous report, and shall be submitted annually by December ~~1~~15 for the year ending the previous September 30.

2.10 PREPAREDNESS AND PREVENTION

The Permittees shall maintain and operate each permitted unit in a manner that minimizes the possibility of fire, explosion or any unplanned sudden or non-sudden release of hazardous waste or hazardous constituent to the air, soil, or surface water that could threaten human health or the environment (*see* 40 CFR § 264.31). In addition to the general preparedness and prevention requirements identified here, the Permittees shall comply with the TA-specific preparedness and prevention requirements and shall maintain the equipment identified in Attachment A (*Technical Area Unit Descriptions*) and Attachment D (*Contingency Plan)*.

2.10.1 Required Equipment

At a minimum, the Permittees shall maintain at the Facility and at each permitted unit the internal communication and alarm system devices, fire control equipment, spill control equipment, and decontamination equipment listed in the tables in Attachment A (*Technical Area Unit Descriptions*) and Attachment D (*Contingency Plan*) (*see* 40 CFR § 264.32(b)(2)). The Permittees shall ensure that any changes to the emergency equipment lists adhere to the permit modification requirements at 40 CFR §§ 270.41 through 270.43.

The Permittees shall maintain spill kits at each permitted container storage and tank unit as specified in Attachment D (*Contingency Plan*). These spill kits shall be capable of mitigating small containable spills of acidic, caustic, inflammable, and otherwise hazardous waste present at the unit. For larger spills, the Permittees shall have plugging and diking equipment, siphon pumps, and loaders readily available at the Facility.

The Permittees shall ensure that there is adequate water pressure and volume available to each permitted unit to provide for fire suppression (*see* 40 CFR § 264.32(d)).

The Permittees shall operate and maintain the area-wide environmental monitoring network as specified in Section D.7.3 of Attachment D (*Contingency Plan*).

At permitted units where equipment is necessary to mitigate the effects of a power outage, the Permittees shall maintain batteries, generators, or some other form of backup power supply capable of operating equipment including evacuation alarms, emergency communication equipment, automatic fire suppression systems, and emergency lights. (*See* 40 CFR §§ 270.14(b)(8)(iv) and 270.32(b)(2))

The Permittees shall ensure that it is possible to provide fuel to backup generators under adverse conditions.

2.10.2 Testing and Maintenance of Equipment

The Permittees shall test the equipment listed in Section E.1.1 of Attachment E (*Inspection Plan*) in accordance with the schedule identified in Attachment E to ensure its functionality in the event of an emergency. The Permittees shall maintain the equipment specified in Permit Section 2.10.1 to ensure its proper operation in the event of an emergency (*see* 40 CFR § 264.33). This equipment shall undergo inspection in accordance with Attachment E (*Inspection Plan*). The Permittees shall document such inspections in the Facility Operating Record in accordance with this Permit Part.

If testing or inspections identify any missing or nonfunctioning communication equipment, alarm system, fire protection component, spill control, or decontamination equipment, the Permittees shall ensure it is promptly repaired or ~~provide substitute equipment. The~~mitigated, or provide substitute equipment or provide other functionally equivalent measures and/or equipment (e.g., placement of fire watch and use of fire extinguishers, or limiting operations in the immediate area). If applicable, the Permittees shall ensure that employees and contractors working in the area are notified of the presence of substitute equipment and, if necessary, provide them with training in its use (*see* 40 CFR § 270.32(b)(2)). The Permittees shall document in the Facility Operating Record instances of such notifications and trainings. The Permittees shall ensure that malfunctioning equipment is clearly marked as out of use and that the location of the substitute or functionally equivalent equipment ~~is~~and/or measures are clearly posted on or adjacent to the faulty equipment or that such equipment/measures are communicated to any personnel working within the area (*see* 40 CFR §§ 264.31 and 270.32(b)(2)).

2.10.3 Access to Communications or Alarm System

Whenever an employee is present at a permitted unit and the unit contains hazardous waste, the Permittees shall ensure that all personnel at the unit have immediate access to an internal alarm or emergency communication device either directly or through visual or voice contact with another employee (*see* 40 CFR § 264.34(a)). The Permittees shall ensure that communication devices are easily accessible without personnel having to enter another building (*see* 40 CFR § 270.32(b)(2)).

The Permittees shall ensure that any employee working alone at a permitted unit is capable of summoning external emergency assistance and shall have immediate access to

2.12.2 Facility Operating Record

The Permittees shall maintain a written Facility Operating Record for the operations of each permitted unit at the Facility until the Department has approved either the closure certification statement or, if the unit enters post-closure care, the post-closure certification statement with respect to such unit as specified in Permit Sections 9.5 and 10.2.3 respectively (*see* 20.4.1.500 and 501 NMAC). For documents that address the entire Facility (*e.g.*, certifications of a Facility program to reduce the volume and toxicity of hazardous waste), the Permittees shall maintain these documents throughout the active life of the Facility including the post-closure care period.

Unless specifically prohibited by this Permit, an electronic record in a format acceptable to the Department and capable of producing a paper copy shall be deemed to be a written record (*see* 40 CFR § 270.32(b)(2)). Any substantive alterations made to the electronic record shall be documented, dated, and made part of the Facility Operating Record.

The Permittees shall incorporate, as soon as it becomes available, into the Facility Operating Record the following information:

(1) a description of the hazardous waste received and the methods and dates of treatment and storage at each permitted unit in accordance with Appendix I of 40 CFR Part 264, which is incorporated herein by reference;

(2) the location of each type of hazardous waste within each permitted unit and the total quantity of all wastes and waste types at each unit (the location shall be identified as one of the permitted units listed in Attachment J (*Hazardous Waste Management Units*) and any associated structure (*e.g.*, room, dome));

(3) records and results of waste analyses and waste determinations that are performed pursuant to Permit Section 2.4, Attachment C (*Waste Analysis Plan*), and 40 CFR §§ 264.1083, 268.7, and 268.9, which are incorporated herein by reference;

(4) incident reports and details of all incidents that required the implementation of Attachment D (*Contingency Plan*), any instance of fire, explosion, spill, or release from, or at, a permitted unit regardless of whether the incident required implementation of the Contingency Plan or Permit Part 11 (*see* 40 CFR § 270.32(b)(2));

(5) records and results of inspections as required in Permit Section 2.6 and Attachment E (*Inspection Plan*);

(6) monitoring, testing, analytical data, and response actions when required by 40 CFR §§ 264.191, 264.193, 264.195, 264.602, 264.1063(d) through 264.1063(i), 264.1064, and 264.1082 through 264.1090, which are incorporated herein by reference;

(7) notices to off-site generators as specified in 40 CFR § 264.12(b), which is incorporated herein by reference;

(8) (reserved);

(9) an annual certification stating a Facility program is in place to reduce the volume and toxicity of hazardous waste generated;

(10) for treated wastes, the information contained in the notice and certification required under 40 CFR § 268.7(b), which is incorporated herein by reference;

(11) if applicable, for hazardous wastes left in the ground after closure (*i.e.*, disposal units), the information required of a treatment facility under 40 CFR § 268.7(~~b~~c), which is incorporated herein by reference;

(12) for stored wastes, the notice (or information contained in the notice for wastes generated on-site) and certification required at 40 CFR § 268.7, which is incorporated herein by reference;

(13) all monitoring reports and records required by this Permit, including but not limited to:

a. records of all monitoring data used to complete Permit Application(s);

b. all data gathered or generated during the closure or post-closure process; and

c. all laboratory reports, drilling logs, bench-scale or pilot scale data;

(14) documentation demonstrating distribution of the Contingency Plan in accordance with Permit Section 2.11.3;

(15) documentation demonstrating the installation and maintenance of secondary containment system coatings or sealants as required at Permit Section 3.7.1(4) and 4.4(4);

(16) personnel training records including both introductory and continuing training programs used to prepare employees to safely operate and maintain a permitted unit in compliance with 40 CFR § 264.16(d), which is incorporated herein by reference, and this Permit;

(17) documentation of notifications and trainings associated with alternate emergency equipment as required at Permit Section 2.10.2; and

(18) documentation of all instances where an indoor fire suppression system has been activated resulting in fire suppressants contacting a waste storage pad.

3.3 ACCEPTABLE STORAGE CONTAINERS

The Permittees shall only use containers that comply with 40 CFR Part 264 Subpart I *(Use and Management of Containers*) for storage of hazardous waste at permitted units. Prior to shipment of hazardous waste, containers must comply with Department of Transportation (DOT) shipping container regulations (*see* 49 CFR § 173 - *Shippers - General Requirements for Shipment and Packaging*, and 49 CFR § 178 - *Specifications for Packaging*).

Solid, oversize items (*e.g.*, glovebox, glovebox parts, vacuum pumps, tanks, duct work, piping, HEPA filters) contaminated with hazardous wastes that cannot be containerized in the waste containers referenced in the previous paragraph shall be subject to this Permit Part. These items shall be wrapped in plastic with a minimum of two layers of plastic to prevent dispersion of contaminating material.

3.4 COMPATIBILITY OF WASTE WITH CONTAINERS

The Permittees shall use containers made of, or lined with, materials that are compatible with and will not react with the hazardous waste to be stored, so that the ability of the container to contain the waste is not impaired (*see* 40 CFR § 264.172).

3.5 MANAGEMENT OF CONTAINERS

(1) The Permittees shall ensure that all containers are kept closed during storage except when waste is added to or removed from the container or when a container's contents need to be repackaged (*see* 40 CFR § 264.173(a)). The Permittees shall not open, handle, or store a container holding hazardous waste in a manner that may rupture the container or cause the container to leak (*see* 40 CFR § 264.173(b)).

(2) The Permittees shall establish and maintain lines of demarcation which identify the boundaries of all permitted CSUs. The line may be identified by paint, tape, signs, or other permanent, visible marking on the floor or base material (*see* 40 CFR § 270.32(b)(2)). Permanent fences marking the unit boundary, or rooms or buildings whose walls constitute the boundary of the permitted units, satisfy this requirement.

(3) The Permittees shall ensure that drums stored in movable buildings (*e.g.*, modular buildings, transportainers) with non-grated floors are stored on wheeled drum dollies, steel pallets, or are otherwise elevated.

(4) The Permittees shall ensure that when waste containers are moved during storage, the location of each hazardous waste and the quantity at each location is documented in accordance with Permit Section 2.12 (*see* 40 CFR § 264.73(b)(2)).

3.10 TA-3 CONTAINER STORAGE REQUIREMENTS

The Permittees (DOE and Triad) co-operate hazardous waste management units at TA-3 and have a duty to meet the additional permit requirements in this Section.

3.10.1 General Operating Conditions

The Permittees shall ensure that storage of hazardous or mixed waste in containers at TA-3-29 occurs only in the CSU in Rooms 9010, and portions of Rooms 9020, and 9030 identified in Attachment A (*Technical Area Unit Descriptions*) and Attachment J (*Hazardous Waste Management Units*), Table J-1 (*Active Portion of the Facility*).

~~3.10.2 Secondary Containment~~

~~The Permittees shall paint the floors in Rooms 9010, 9020, and 9030 within the TA-3-29 permitted unit with an epoxy sealant. The sealant must be maintained in accordance with Permit Section 3.7.1 of this Part and the manufacturer's specifications.~~

3.11 TA-50 CONTAINER STORAGE REQUIREMENTS

The Permittees (DOE and Triad) co-operate hazardous waste management units at TA-50 and have a duty to meet the additional permit requirements in this Section.

3.11.1 General Operating Conditions

(1) The Permittees shall ensure that storage of hazardous or mixed waste in containers at TA-50 occurs only in two areas: 1) an indoor storage area located in Building 69 (TA-50-69), Rooms 102 and 103; and 2) an outdoor storage area (TA-50-69, Outdoor) located south/southeast of Building 69, comprised of an asphalt pad and modular transportainer units, as identified in Attachment A (*Technical Area Unit Descriptions)* and Attachment J (*Hazardous Waste Management Units*).

(2) The Permittees shall ensure that ignitable wastes will not be stored inside the glovebox located within the indoor permitted unit.

(3) The Permittees shall at all times maintain a fire access lane between the TA-50-69 Outdoor and Indoor permitted units (*see* 40 CFR § 270.32(b)(2)).

3.11.2 Preventing Hazards in Loading/Unloading

The Permittees shall not load or unload waste at TA-50 during severe weather conditions.

3.11.3 Preventing Run-on

The Permittees shall prevent surface water run-on from contacting stored waste containers at the TA-50 permitted units.

The Permittees shall annually inspect and when necessary maintain the drainage swales located south of the permitted unit between the permitted unit and Material Disposal Area (MDA) C, and located on the west side of the permitted unit between Pecos Drive and the TA-50 fence line, to ensure that potential run-on is directed away from the permitted units (*see* 40 CFR § 264.175(c)(1)).

3.12 TA-54 CONTAINER STORAGE REQUIREMENTS

3.12.1 General Operating Conditions

The Permittees shall ensure that storage of hazardous waste in containers at TA-54 occurs only in the permitted unit at Area L, the nine permitted units at Area G, the two permitted units at TA-54 West, and as identified in Attachment A (*Technical Area Unit Descriptions)* and Attachment J (*Hazardous Waste Management Units*). Permittees Triad and N3B co-operate different permitted units at TA-54. Triad co-operates two permitted units at TA-54 West and N3B co-operates ten permitted units at Areas G and L. The Permittees have a duty to meet the additional Permit requirements of this Section solely for their respective permitted units, as specified below.

Area G (N3B, co-operator)

(1) The Permittees shall remove all fluids above the HDPE liner at Area G, Dome 224 within 24 hours of discovery (*see* 40 CFR§ 270.32(b)(2)). The Permittees shall include a record of the evacuation in the Facility's Operating Record including a complete chemical analysis of the fluid.

(2) The Permittees shall ensure that at Area G, all containers storing hazardous waste with free liquids are stored on secondary containment pallets, except inside the following structures: Domes 230, and Sheds 144, 145, 146, 177, 1027, 1028, ~~1029~~1030, and 1041.

Area L (N3B, co-operator)

(1) The 10,000 gallon holding tank at Area L, Dome 215 shall be inspected monthly and any detected fluids shall be characterized and removed within 3 days. The Permittees shall include a record of all holding tank inspections and evacuations in the Facility's Operating Record, including a complete chemical analysis of the tank contents (*see* 40 CFR § 270.32(b)(2)).

(2) The Permittees shall ensure that at Area L, all containers storing hazardous waste with free liquids are stored on secondary containment pallets, except when inside the following structures: Sheds 31, 68, 69, 70; concrete pad with canopy TA-54-32; concrete pads TA-54-35, TA-54-36, TA-54-58; and building TA-54-39 (Room 101 and South Containment Pad).

in accordance with Permit Section 3.7.1 of this Permit Part and the manufacturer's specifications.

3.12.3.7 Dome 224

The Permittees shall not rely on the engineered high-density polyethylene (HDPE) liner in Dome 224 as a method of secondary containment and shall instead store all hazardous waste container holding free liquids on secondary containment pallets.

3.13 TA-55 CONTAINER STORAGE REQUIREMENTS

The Permittees (DOE and Triad) co-operate hazardous waste management units at TA-55 and have a duty to meet the additional permit requirements in this Section.

3.13.1 General Operating Conditions

The Permittees shall ensure that storage of hazardous or mixed waste in containers at TA-55 occurs only in the permitted units B13, B45, B40, B05, G12, K13, the vault located at TA-55-4, TA-55-0355 Pad and the outdoor container storage pad located northwest of TA-55-4, and as identified in Attachment A (*Technical Area Unit Descriptions*) and Attachment J (*Hazardous Waste Management Units*).

3.14 TA-63 CONTAINER STORAGE REQUIREMENTS

The Permittees (DOE and Triad) co-operate hazardous waste management units at TA-63 and have a duty to meet the additional permit requirements in this Section.

3.14.1 General Operating Conditions

The Permittees shall ensure that storage and characterization of hazardous waste in containers at the Transuranic Waste Facility (TWF) occurs only on the permitted unit pad at TA-63, and as identified in Attachment A (*Technical Area Unit Descriptions)* and Attachment J (*Hazardous Waste Management Units*). This includes five storage buildings, the storage and characterization building, the characterization trailers, and the outside areas of the concrete pad within the unit boundary subject to the provisions of Permit Section 3.5.1, *Storage Configuration and Minimum Aisle Space*.

(1) The Permittees shall store all hazardous waste containers known or suspected of holding free liquids on secondary containment pallets. If containers with free liquid are stored in the characterization trailers without secondary containment pallets for longer than 24 hours, the Permittees shall follow the reporting conditions of Permit Section 1.9.14, Other Noncompliance.

(2) The Permittees shall not store containers with ignitable or reactive waste (E.P.A. Hazardous Waste Numbers D001 or D003) within 15 meters of the permitted unit's security barrier system shown in Figure ~~55~~13 (*see* 40 CFR §264.176 and

3.14.2 Retention Basin

The Permittees shall inspect the retention basin as required by Permit Section 2.6, *General Inspection Requirements*, and in accordance with Permit Attachment E, *Inspection Plan*, for evidence of contamination and deterioration during each inspection. The Permittees shall record inspection results and any remediation in the Operating Record. Any decontamination of the retention basin will be subject to the provisions of Permit Attachment D, *Contingency Plan*.

(1) The Permittees shall control run-on and run-off as specified in Permit Attachment A, Section A.~~6.9~~8.8., *Control of Run-on/Run-off*. Run-off collected in the retention basin shall be evaluated before discharge. If the run-off is known to be or potentially contaminated with hazardous waste constituents from a spill, leak, or other release, it shall be sampled.

If sampling and analysis are required due to known or suspected contamination, the Permittees shall collect a water sample within 24 hours of discovery of the known or suspected contamination. The analytical testing shall include all appropriate methods based on the composition of waste stored at the unit. If the run-off present in the retention basin is determined to be hazardous waste, the Permittees shall implement Attachment D, Contingency Plan, and manage the waste spill as required by Permit Section D.4. The Permittees shall use the analytical results, together with information from the Operating Record, to characterize the water in accordance with Permit Attachment C, *Waste Analysis Plan*. The Permittees shall record the type and quantity of waste water present in the retention basin, the date of the incident, and the date of removal of the waste water in the Operating Record.

If the Permittees determine that the storm water is not hazardous waste, but that it is contaminated with hazardous waste constituents, the Permittees shall ensure the storm water meets the applicable clean-up requirements in Permit Section 11.4.3, *Surface Water Clean-up Levels*, prior to discharge.

If the Permittees determine that the storm water is not contaminated with hazardous waste constituents, the Permittees shall manage the storm water in accordance with *The Multi-Sector General Permit For Stormwater Discharges Associated with Industrial Activity* (MSGP) for the facility.

(2) Within 24 hours of a fire event, the Permittees shall collect a sample of fire suppression water collected in the retention basin and analyze it for any hazardous waste constituents managed at the facility. If the fire suppression water present in the retention basin is determined to be hazardous waste, the Permittees shall manage the waste water as required by Attachment D, *Contingency Plan*. The Permittees shall use the analytical results, together with information from the Operating Record, to characterize the water in accordance with Permit

3.14.3 Subsurface Vapor Monitoring

The Permittees shall monitor subsurface vapors to evaluate for releases at the TWF from Material Disposal Area (MDA) C. If soil vapors are determined to present a potential risk to site workers, then the Permittees shall initiate corrective action as necessary to protect human health.

The subsurface vapor monitoring network is described in Permit Attachment A, Section A~~-6-10~~.8.9, and Figure ~~56~~32 in Attachment N (Figures). Vapor monitoring well construction must be completed and at least one vapor sample collected from each well sampling port prior to the start of operations at the TWF. Vapor samples must then be collected quarterly during the first year of operation. After the first year of sampling, the Permittees may propose an alternate sampling frequency for subsequent years, in a permit modification request, based on the evaluation of data from the pre-operational and quarterly samples, as well as relevant vapor monitoring data collected from nearby vapor-monitoring locations. All vapor samples shall be analyzed for volatile organic compounds (VOCs), and samples shall be collected in appropriate sample canisters and submitted for analysis of VOCs using EPA Method TO-15. The Permittees must submit a vapor monitoring work plan to the Department for approval no less than 90 days after the effective date of this Permit. The Permittees are required to submit a letter report no later than 60 days following each sample collection event detailing the sampling procedure, analytical results, and any deviations from the Department approved work plan.

The Department utilized the methodology described below to determine appropriate soil gas screening levels (SGSLs) for all vapor-phase hazardous constituents detected in the subsurface~~ at MDA C~~. Required detection and action levels for analytical data are consistent with the lowest SGSLs.

The SGSL levels for constituents detected at MDA C are provided as action levels in Tables 3.14.3.1, 3.14.3.2 and 3.14.3.3 at the end of this Section (3.14.3). The SGSL values were calculated using a generalized equation derived from Equation 19 in the EPA's "User's Guide to Evaluating Subsurface Vapor Intrusion Into Buildings" (February 22, 2004, United States Environmental Protection Agency, Washington, DC), and the methodology outlined in "Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance)" (October 2011, Department of Toxic Substances Control, California Environmental Protection Agency). The equation is as follows:

$$SGSL = IARL/\propto$$

Where:

SGSL = Soil gas screening level
IARL = Risk-based screening level for industrial workers indoor air
α = Attenuation factor (ratio of indoor air concentration to soil gas concentration)

The industrial air screening level from the May 2013 EPA Regional Screening Level (RSL) Tables, adjusted to a 1e-05 cancer risk, was applied for the indoor air concentration (IARL) (http://www.epa.gov/region9/superfund/prg/rsl-table.html). The attenuation coefficients were derived via utilization of EPA advanced soil gas Johnson and Ettinger model for sampling depths of 5, 25, and 60 feet below ground surface. http://www.epa.gov/oswer/riskassessment/airmodel/johnson_ettinger.htm). If the IARLs change for any constituent in Tables 3.13.3.1, 3.14.3.2 and 3.14.3.3, the Permittees shall calculate a revised SGSL using the attenuation factors identified in the Table. The revised SGSLs will be included in the letter report required by this Section.

If sample results, reported in accordance with Permit Section 11.10.3, indicate that volatile organic constituents are present at concentrations above soil gas screening levels at any port in any of the vapor detection network wells, the Permittees must:

(1) Notify NMED in writing within 24 hours of detection;

(2) Resample the wells as soon as is practicable within ten business days to confirm results. Confirmatory samples must be processed on a rush basis at the analytical laboratory;

(3) If the confirmatory analytical sample results verify the accuracy of the initial sample results, the Permittees must notify NMED in writing within 24 hours of confirmation in order to discuss whether subsurface mitigation measures are required to protect human health.

The Respondents shall notify the Department in writing within fifteen days after review of the analytical data if the data indicate any of the following:

(1) Detection of a contaminant in a vapor monitoring well if that contaminant has not previously been detected in the well.

(2) Detection of a contaminant in a vapor monitoring well at a concentration that exceeds one-half the soil gas screening level, if that contaminant has not previously exceeded one-half such screening level in the well.

(3) Detection of a contaminant in a vapor monitoring well at a concentration that exceeds one-half the soil gas screening level and that has increased for the third consecutive sampling of that well.

The written notification shall be submitted to the Department in a letter report that includes, at a minimum, in table format, the date or dates of the sampling event, the well designation, the location of the well, a list of the analytical data that triggered the reporting requirement, any known issues with sample quality, and the specific category for which the data is reported under this Section (3.14.3). The Permittees may submit a proposal for further sampling or investigation or, alternately, the Department may require further investigation. Any ~~further~~ sampling ~~or~~, investigation ~~would be performed in accordance with the~~ , or corrective action ~~required~~involving MDA C would be conducted solely under ~~2005~~the 2016 Order on Consent or Permit Part 11.

release to the environment, the Permittees shall submit a written report to the Department containing the information at 40 CFR § 264.196(d)(3), which is incorporated herein by reference.

(9) The Permittees shall give notice by e-mail to persons on the e-mail notification list of the written report under 40 CFR § 264.196(d)(3) in accordance with Permit Section 1.13.

4.5 IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTES

The Permittees shall ensure that the mixed waste storage tank and stabilization units do not manage ignitable or reactive waste.

The Permittees shall ensure that incompatible wastes, or wastes and other materials that are incompatible, are not placed in the same tank system or stabilization unit (*see* 40 CFR § 264.199).

~~4.6 TA-50 RADIOACTIVE LIQUID WASTE TREATMENT FACILITY~~

~~The Permittees shall discharge all treated wastewater from the TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF) through the outfall permitted under Section 402 of the federal Clean Water Act, or as otherwise authorized by the terms of an applicable Clean Water Act permit that regulates the treatment and use of wastewater. If the Permittees intentionally discharge through a location other than the permitted outfall or as otherwise authorized, they will fail to comply with this requirement, and as a consequence the wastewater treatment unit exemption under 40 CFR § 264.1(g)(6) will no longer apply to the RLWTF. The Permittees shall not accept listed hazardous wastes as specified at 40 CFR Part 261 Subpart D at the RLWTF.~~

~~PART 5: (RESERVED)~~

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PART 5: TREATMENT BY OPEN DETONATION

5.1 MANAGEMENT OF OPEN DETONATION UNITS

The Permittees shall utilize only the two permitted open detonation units for the treatment of hazardous waste. The Permittees shall treat by open detonation to remove the characteristic of reactivity (D003). In addition to exhibiting explosive reactivity, hazardous wastes may also exhibit other hazardous waste characteristics or be listed in 40 CFR part 261, Subpart D. All treatment open detonations are conducted above ground surface and by means of an explosion in which a chemical transformation passes through the material faster than the speed of sound.

The Permittees shall conduct open detonation operations in accordance with this Permit Part, Attachment A (*Technical Area Unit Descriptions*), 40 CFR 265, Subpart P, 40 CFR 264, Subpart X, 40 CFR§§ 268.7(b) and 40 CFR Part 270, which are incorporated by reference. The Permittees shall ensure that open detonation waste treatment occurs only at the following two permitted units:

1) TA-36-8 (open detonation unit); and

2) TA-39-6 (open detonation unit)

(See Figures 2, 6 and 7 in Permit Attachment N (*Figures*)).

5.1.1 Maximum Quantity of Waste to be Treated

The Permittees shall not treat more than 2000 lbs of wastes per treatment event at the TA-36-8 open detonation unit or 1000 lbs of waste per treatment event at the TA-39-6 open detonation unit. The Permittees shall not treat more than 15,000 lbs per calendar year, cumulatively at the two permitted units or 150,000 lbs for the ten year term of the Permit.

5.2 WASTE STREAMS TO BE TREATED AT THE OPEN DETONATION UNITS

The Permittees shall limit open detonation treatment activities to the explosives waste streams for open detonation identified in Attachment C (*Waste Analysis Plan*). The Permittees shall treat only those wastes identified by EPA Hazardous Waste Numbers (waste codes) listed in Attachment B (*Part A Application*) associated with TA-36 and TA-39 and identified as utilizing waste process code X01.

The Permittees shall not treat by open detonation any of the following wastes or materials (see 40 CFR § 270.32(b)(2)):

(1) wastes that do not meet the definition of waste explosives per 40 CFR § 265.382, *Open burning; waste explosives;*

(2) the hazardous component of mixed wastes;
(3) biologic or chemical warfare weaponry;
(4) small arms ammunition up to 50 calibers;
(5) materials containing beryllium;
(6) materials containing perchlorate-based propellants or explosives; or
(7) polychlorinated biphenyls (PCBs).

5.3 DESIGN CONSTRUCTION, OPERATION, AND MAINTENANCE

5.3.1 General Requirements

The Permittees shall design, construct, operate, and maintain the open detonation units in accordance with the requirements of this Permit to minimize the possibility of accidental fire, explosion, or any sudden or non-sudden release of hazardous waste or hazardous waste constituents into air, soil, sediment, surface water or groundwater which could threaten human health or the environment, as required by 40 CFR §§ 264.31 and 264.601.

The Permittees shall ensure that warning signs are posted at each of the open detonation units in accordance with Permit Part 2.5.1.

The Permittees shall document abnormal treatment events in the facility operating record and then report them in accordance with Permit Part 1.9.14.

The Permittees shall design, construct, operate, and maintain run-off control systems (protective berms) at the open detonation units to minimize precipitation run-off and prevent the migration of hazardous waste or hazardous waste constituents from the units (*see* 40 CFR § 264.601(b)).

5.3.2 Restrictions on Operations

5.3.2.1 Hours of Operation

The Permittees shall conduct routine treatment open detonation operations only during daylight hours (i.e., between one hour after sunrise and one hour before sunset), except in an emergency [see 40 CFR § 264.1(g)(8)(i)(D)]. If the Permittees conduct treatment operations in response to an emergency before sunrise or after sunset on a given day, the Permittee shall notify the Department of this fact in writing within five days of conducting such treatment.

5.3.2.2 Weather Conditions

Transportation of or routine operations with explosives waste at the open detonation units shall not be conducted during the following severe conditions:

(1) lightning is within a six mile radius (9.6 kilometers) of the open detonation units;

(2) icy roads (for transport);

(3) any time winds are greater than 20 miles per hour;

(4) winds are greater than 10 miles per hour in drier weather conditions, such as in the spring and summer seasons when fire danger rating is deemed to be "Very High" or "Extreme"; or

(5) during precipitation events.

Should environmental conditions change rapidly and unexpectedly, the waste will remain at the unit under administrative control until treatment can be safely conducted.

5.3.2.3 Operational Restrictions

The Permittees shall comply with the following general requirements concerning operations at the open detonation units:

(1) The access gate at the entry to the firing site shall be closed for the treatment event.
(2) A minimum of 24 hours shall elapse between open detonation treatment events.
(3) Only non-sparking tools shall be utilized at the permitted unit when waste is present.

5.3.2.4 Other Restrictions

During normal treatment activities the explosives wastes shall be treated promptly upon transport to and configuration of the shot at the unit; provided abnormal conditions do not arise.

The Permittees shall cease treatment operations immediately upon the discovery of an unsafe situation including but not limited to an aircraft in dangerous proximity to the hazardous waste management unit.

The firing site leader or explosives safety personnel shall remain on site at the control building for the duration of the treatment operation.

The maximum extent of hazardous waste treatment operations at the open detonation shall be confined to the hazardous waste management unit.

Treatment of waste shall be conducted using a non-continuous (batch) thermal process (40 CFR § 265.373).

5.3.3 Operation Safety

5.3.3.1 Safety Precautions

When escorted visitors are present to observe treatment operations, there shall be at least one firing site leader or qualified explosives personnel present.

In addition to the security requirements set forth in Permit Part 2.5, the qualified personnel shall ensure that the firing area at the open detonation unit has been cleared and all personnel have entered the control building, or have been accounted for outside the clearance area. The Permittees shall not conduct treatment operations if unauthorized personnel are within the clearance area.

The Permittees shall conduct all treatment operations in accordance with all safety precautions required by this Permit.

Initiation of all waste treatment operations shall be performed remotely from inside the control building. After detonation is complete personnel shall inspect the site to ensure that the high explosives are expended. If the inspection confirms the shot fired completely an "All Clear" is signaled. Personnel must remain in the bunker or outside the clearance area until "All Clear" is signaled.

5.3.4 Maintenance

The Permittees shall ensure that all industrial equipment is maintained and repaired to avoid situations that may result in leaks, spills, and other releases of pollutants in storm water discharges to receiving waters. The Permittees shall ensure that all control measures used to mitigate the flow of storm water are maintained in an effective operating condition. The Permittees shall ensure that all nonstructural control measures have also been maintained (e.g., spill response supplies are available and personnel were trained). If control measures require repair or replacement, the Permittees shall ensure that necessary repairs or modifications are made as expeditiously as practicable. The unit shall be inspected in accordance with the requirements of Part 2.6.

5.3.4.1 Untreated Waste and Treatment Residues

Within 24 hours after each treatment operation, the Permittees shall inspect the entire hazardous waste management unit area for untreated reactive waste. Non-reactive waste residues (such as wood or metal fragments) originating from treatment operations shall be removed from the unit as part of good housekeeping practices and will be managed in accordance with appropriate LANL waste management procedures.

5.4 RELEASES AT THE PERMITTED UNIT

The Permittees shall conduct the following notifications in the event of an unexpected event at the permitted unit.

(1) Provide notification via telephone to the Department within 24 hours of an unexpected event at a treatment unit that results in the Permittees calling in emergency services.

(2) Any unexpected release, a permitted treatment unit that the Permittees do not deem a threat to human health or the environment must be reported to the Department in accordance with Permit Section 1.9.13.
(3) The Permittees shall ensure that any unexpected release of waste to the environment (e.g., soil, surface water, groundwater, atmosphere) that may endanger human health or the environment from a permitted treatment unit is reported to the Department within 24 hours of its detection in accordance with Permit Section 1.9.12. Within 5 days of detection of a release to the environment, the Permittees shall submit a written report to the Department containing the information required by Permit Section 1.9.12.2.

5.5 MONITORING REQUIREMENTS

5.5.1 Soil Monitoring Requirements

The Permittees shall conduct a soil sampling and analysis program to monitor for hazardous constituents released to soils during treatment events, and to ensure that any releases do not have an adverse effect on human health or the environment as required in 40 CFR § 264.602. All sampling events shall commence no later than one year of the effective date of the inclusion of the open detonation hazardous waste management units within the Permit. The Permittees shall collect soil samples at a frequency of one, four and seven years after the inclusion of the unit within the Permit. The Permittees shall submit a sampling plan to the Department at least 30 days prior to commencing sampling. The plan shall include locations for surface soil sample collection and analysis. Samples shall be analyzed for total metals, explosives compounds, and semi volatile organic compounds utilizing the analytical methods identified within the Attachment C (Waste Analysis Plan).

The Permittees shall submit to the Department a sampling and analysis report for each sampling event summarizing all sampling activities and the results of the sample analyses by October 1 of each sampling year. The Permittees shall identify in the report any sample analytical results that exceed either the baseline sampling event or any soil cleanup levels established in Permit Section 11.4.2.1, as applicable. Upon review of the report, the Department will determine if further action is needed.

5.6 ASSESSMENT OF ALTERNATIVE TECHNOLOGIES

The Permittees shall submit an open detonation alternative treatment technology assessment report to the Department no later than the 6th anniversary of the effective date of this Permit.

PART 6: ~~(RESERVED)~~TREATMENT BY OPEN BURNING

6.1 MANAGEMENT OF OPEN BURNING UNIT

The Permittees shall utilize the permit open burning unit at TA-16 only for the treatment of explosives waste streams. The Permittees shall treat by open burning only those hazardous wastes that that would result in detonation or deflagration to remove the characteristics of reactivity (D003) and ignitability (D001). Waste shall be treated by open burning only at the permitted unit, known as the TA-16-388 Flash Pad, identified with process code X01 in Attachment J (*Hazardous Waste Management Units*), Table J-1(Active Portion of the Facility). The permitted unit at the TA-16-388 Flash Pad (see Figures 2 and 5 in Permit Attachment N (*Figures*)) shall not treat waste in quantities that exceed the operating capacities identified in Table J-1.

The Permittees shall conduct open burning operations in accordance with this Permit Part; 40 CFR part 265, subpart P; 40 CFR part 264, subpart X; 40 CFR § 268.7(b); and 40 CFR Part 270, which are incorporated by reference.

6.1.1 Maximum Quantity of Waste to be Treated

The Permittees shall treat no more than 6,000 pounds via open burning per year and no more than 200 pounds per individual treatment event at the TA-16-388 Flash Pad (see 40 CFR § 270.32(b)(2)). The weight of any metal equipment or piping that will be recycled after treatment shall not be included in the waste-treated quantity.

6.2 WASTE STREAMS TO BE TREATED AT THE OPEN BURNING UNIT

The Permittees shall limit open burning treatment activities to the explosives waste streams for open burning identified in Attachment C (*Waste Analysis Plan*). The Permittees shall treat only those wastes identified by EPA Hazardous Waste Numbers (waste codes) listed in Attachment B (*Part A Application*) associated with TA-16 and identified as utilizing waste process code X01.

For certain waste streams, the following general provisions should be considered prior to acceptance of waste for treatment at the permitted unit (see 40 CFR §§ 265.382 and 270.32(b)(2)):

(1) Only excess explosives, explosives machining waste, explosives-contaminated combustible debris, explosives-contaminated noncombustible debris, and explosives-contaminated solvent waste may be treated by open burning.
(2) Explosives-contaminated equipment containing asbestos shall not be treated, unless the asbestos concentrations are in de minimis quantities.
(3) Liquids (e.g., water or dimethyl sulfoxide [DMSO]) shall have a minimum of 25% by volume of explosives content to be considered detonable.

(4) Solvents, other than DMSO or water, shall be treated only in de minimis quantities and associated only with explosives-contaminated debris.

The Permittees shall not treat by open burning any of the following wastes or materials (see 40 CFR § 270.32(b)(2)):

(1) the hazardous component of mixed wastes;
(2) biologic or chemical warfare weaponry;
(3) small arms ammunition up to 50 calibers;
(4) beryllium;
(5) ammonium perchlorate;
(6) polyvinyl chloride (PVC);
(7) small control boxes or electronic equipment; and
(8) blasting caps, electric detonators, explosives units containing electric detonators, or mild detonating fuse arrays.

6.3 DESIGN, CONSTRUCTION, OPERATION, AND ROUTINE MAINTENANCE REQUIREMENTS

The Permittees shall operate and maintain the TA-16-388 Flash Pad in accordance with the requirements of this Permit to minimize the possibility of accidental fire, explosion, or any sudden or non-sudden release of hazardous waste or hazardous waste constituents into air, soil, sediment, surface water or groundwater which could threaten human health or the environment, as required by 40 CFR §§ 264.31 and 264.601.

6.3.1 General Requirements

The Permittees shall comply with the following requirements for treatment at the TA-16-388 Flash Pad (see 40 CFR § 270.32(b)(2)).

(1) No fuel other than propane shall support open burning treatment operations.
(2) Wastes shall be placed on the Flash Pad only if treatment is planned within four hours of such placement. However, if oversized equipment requires complex staging, the Permittees may stage the equipment at the TA-16-388 Flash Pad for 48 hours; the Department will not consider this staging inappropriate storage. The equipment and the unit must be covered during staging.
(3) All explosives-contaminated combustible debris shall be covered with a screen prior to treatment.
(4) The Permittees shall place containers holding explosives-contaminated solvent (i.e. DMSO) in steel trays, or some other form of secondary containment (e.g., additional pan, tray) for the duration of the treatment.
(5) Explosives-contaminated equipment to be treated shall be disassembled to the extent practicable prior to treatment.

6.3.2 Operational Restrictions

The Permittees shall comply with the following general requirements concerning operations at the open burning unit:

(4) The access gate at the TA-16-389 control building shall be closed for the duration of treatment.
(5) The gate in front of the unloading area at the TA-16-388 Flash Pad shall be kept closed for the duration of treatment and for the cool-down period after treatment to prevent the entry of unauthorized personnel into the area.
(6) The Permittees shall observe from the control building each treatment event using a computer, video display, or periscope for the duration of treatment.
(7) A minimum of 24 hours shall elapse between open burning treatment events.
(8) Only non-sparking tools shall be utilized at the permitted unit when waste is present.
(9) Open burning treatments shall be conducted only during the time period beginning 1 hour after sunrise and ending 1 hour before sunset.

6.3.3 Environmental Factors

The Permittees shall comply with the following requirements and restrictions with respect to environmental factors. Transportation of or routine operations with explosives waste at the permitted unit shall not be conducted during the following severe conditions:

(1) when lightning is detected within a six mile radius (9.6 kilometers) of the unit;
(2) during precipitation, or if storms are forecasted to occur within 3 hours at the location of the unit;
(3) when roads are icy (for transport);
(4) when wind speeds at the TA-16-389 control building exceed 20 miles per hour; or
(5) winds are greater than 10 miles per hour in drier weather conditions, such as in the spring and summer seasons when fire danger rating is deemed to be “Very High” or “Extreme”.

6.3.4 Run-On and Run Off Controls

The Permittees shall design, construct, operate, and maintain run-off control systems (protective berms and check dams,) at the permitted unit to minimize precipitation run-off and prevent the migration of hazardous waste or hazardous waste constituents from the unit (see 40 CFR § 264.601(b)). The permitted unit’s containment devices (e.g., pans, trays, pads) shall be covered within 10 hours after use and will remain covered when not in use to prevent precipitation collection and runoff.

6.3.5 Routine Maintenance

The Permittees shall conduct the following maintenance and inspection activities prior to treatment events at the TA-16-388 Flash Pad:

(1) Notify TA-16 Access Control Center at the start and end of each treatment event;
(2) Inspect the permitted unit and its associated equipment, within 24 hours preceding a treatment event;
(3) Inspect the video display or periscope (which ever will be used to view the treatment operations) located in the TA-16-389 control building to ensure it is functional before waste is staged for treatment;
(4) Test the propane burners at the permitted unit prior to staging waste. The Permittees shall cancel the planned open burn treatment if the burners firing test fails; and
(5) Patrol the area in the immediate vicinity of the permitted unit to unloading the waste for a scheduled burn to ensure that no large wildlife or unauthorized personnel are present at or around the unit.

6.4 RELEASES AT THE PERMITTED UNIT

The Permittees shall conduct the following notifications in the event of an unexpected event at the permitted unit.

(1) Provide notification via telephone to the Department within 24 hours of an unexpected event at a treatment unit that results in the Permittees calling in emergency services.
(2) Any unexpected release, a permitted treatment unit that the Permittees do not deem a threat to human health or the environment must be reported to the Department in accordance with Permit Section 1.9.13.
(3) The Permittees shall ensure that any unexpected release of waste to the environment (e.g., soil, surface water, groundwater, atmosphere) that may endanger human health or the environment from a permitted treatment unit is reported to the Department within 24 hours of its detection in accordance with Permit Section 1.9.12. Within 5 days of detection of a release to the environment, the Permittees shall submit a written report to the Department containing the information required by Permit Section 1.9.12.2.

6.5 TREATMENT RESIDUES

The Permittees shall clean the waste containment devices of any treatment residues as close to 24 hours after a treatment event as possible. If the Permittees find any untreated explosives waste remaining in the residue during inspection of the unit after treatment, the Permittees shall re-treat the waste on that day subject to the restrictions of this Permit Part. If lightning occurs within 3 miles of the unit during residue collection, the Permittees shall cease collection, and resume no more than 4 hours after the storm passes. The residues shall be managed as waste and characterized in accordance with Attachment C (Waste Analysis Plan) Section C.3.1.2.5.

6.6 MONITORING REQUIREMENTS

6.6.1 Soil Monitoring Requirements

The Permittees shall implement a soil sampling and analysis program to monitor for hazardous constituents released to soils during open burning treatment events and to ensure that any releases do not have an adverse effect on human health or the environment (see 40 CFR § 264.602). All sampling events as described in this section shall commence no later than July 1 of the designated sampling year. Samples shall be collected and analyzed 2, 5, and 8 years after the effective date of this Permit. The Permittees shall provide oral and written notification to the Department of the scheduled sampling activities at least 15 days prior to commencing sampling activity.

The Permittees shall analyze the soil samples collected during each monitoring event for total metals, explosive compounds, semi-volatile organic compounds, perchlorate, and dioxins/furans. Sampling events shall include at a minimum the 0 to 2 inch depth interval at the locations that are determined by the Department and the Permittees to be representative of drainage locations and potential deposition areas around the unit. These locations will be sampled for all three monitoring events. If no treatment was conducted at the open burning unit between sampling events, the Permittees may propose an alternative sampling schedule. The Permittees shall certify in writing no later than July 31 of the scheduled sampling year that treatment was not conducted since the preceding sampling event.

The Permittees shall submit to the Department a sampling and analysis report for each sampling event summarizing all sampling activities and the results of sample analyses by December 15 of each sampling year. The Permittees shall identify in the report any sample analytical results that exceed concentrations detected in previous analyses of soil samples collected at the site.

6.7 ASSESSMENT OF ALTERNATIVE TECHNOLOGIES

The Permittees shall submit an open detonation alternative treatment technology assessment report to the Department no later than the 6th anniversary of the effective date of this Permit.

PART 9: CLOSURE

9.1 INTRODUCTION

This Permit Part addresses the three categories of permitted units at the Facility. They are identified as follows:

(1) regulated units ~~(*i.e.*, material disposal areas G, H, L);~~

(2) indoor units (structures and related equipment); and

(3) outdoor units (asphalt or concrete pads and related structures and equipment):

a. co-located with a regulated unit; and
b. not co-located with a regulated unit.

Attachment J (*Hazardous Waste Management Units*), Table J-1 (*Active Portion of the Facility*), identifies the category of each permitted unit in the column titled *Type of Unit*.

This Permit does not address the closure of interim status units.

The Permittees shall adhere to the closure performance standards in Permit Section 9.2 for all the permitted units addressed in this Permit Section.

The Permittees shall close the permitted storage and treatment units in accordance with the requirements in 40 CFR §§ 264.110 through 264.116, 264.178, and 264.197 (which are incorporated herein by reference), this Permit Part (9), and the procedures described in the permitted unit-specific closure plans in Attachment G (*Closure Plans*).

9.1.1 Regulated Units

The closure requirements for regulated units within MDAs G, H, and L shall ~~not accept hazardous or mixed waste and shall undergo closure. The Permittees shall adhere to~~be addressed under the ~~closure performance standards in~~Consent Order (*see* Permit Section ~~9~~1.4.2~~ and the closure requirements in Permit Sections 9.3 and 9.5 for the closure of these units.~~.1).

9.1.2 Indoor Units

Indoor units are buildings (*e.g.*, TA-54-412 DVRS), structures (*e.g.*, storage sheds, domes, transportainers, canopies, trailers, and permacons), or rooms within a building (*e.g.*, TA-3 Room 9010). The Permittees shall comply with the specific closure requirements in Permit Sections 9.4 and 9.5 for these units and comply with the closure performance standards in Permit Section 9.2.

performance standards at Permit Sections 9.2.2(1) through (3), and a post-closure plan, if necessary, to maintain the measures. The Permittees shall conduct any post-closure care in accordance with Permit Part 10 (*Post-Closure Care*).

The Permittees shall give notice by e-mail to persons on the e-mail notification list, in accordance with Permit Section 1.13, of the notice to the Department under this Permit Section (9.2.2.3).

~~9.3 CLOSURE REQUIREMENTS FOR REGULATED UNITS~~

9.3 ~~CLOSURE OF THE REGULATED UNITS MUST MEET THE CORRECTIVE ACTION REQUIREMENTS OF THE MARCH 1, 2005 COMPLIANCE ORDER ON CONSENT (CONSENT ORDER). THE CONSENT ORDER IS AN ENFORCEABLE DOCUMENT THAT SETS FORTH ALTERNATIVE CLOSURE REQUIREMENTS IN ACCORDANCE WITH 40 CFR § 264.110(C).~~ RESERVED

~~The Permittees shall propose remedies in the Corrective Measures Evaluation Report under the Consent Order that achieve compliance with the closure performance standards at 40 CFR § 264.111. Fulfilling the requirements of the approved Corrective Measures Implementation Plan under the Consent Order shall also satisfy the requirements of 40 CFR Part 264, Subpart G.~~

9.4 CLOSURE REQUIREMENTS FOR INDOOR AND OUTDOOR UNITS

This section specifies the closure requirements for indoor and outdoor (asphalt and concrete pad) permitted units.

9.4.1 Closure Schedule

The Permittees shall notify the Department in writing at least 45 days prior to the date on which they expect to begin closure of a permitted unit in accordance with 40 CFR § 264.112(d)(1), which is incorporated herein by reference. The beginning of closure is marked by initiating removal of waste from a permitted unit for the purpose of closure. In accordance with 40 CFR § 264.112(d)(2), incorporated herein by reference, the date when the Permittees begin closure shall be no later than 30 days after the date on which a permitted unit receives the known final volume of hazardous wastes, or if there is a reasonable possibility that the permitted unit will receive additional hazardous wastes, no later than one year after the date on which the unit received the most recent volume of hazardous wastes. In accordance with 40 CFR § 264.113(a), within 90 days after receiving the permitted unit's final volume of hazardous waste, the Permittees shall remove or treat, as applicable, in accordance with the approved closure plan, all hazardous waste from a permitted unit.

PART 11: CORRECTIVE ACTION

11.1 CORRECTIVE ACTION REQUIREMENTS UNDER THE CONSENT ORDER

The Department and the Permittees have agreed to a Compliance Order on Consent (Consent Order) dated ~~March 1, 2005~~June 2016, which requires the Permittees to conduct corrective action at all solid waste management units (SWMUs) and Areas of Concern (AOCs), at the Facility to fulfill the requirements of 40 CFR § 264.101. The Consent Order is an enforceable document pursuant to 40 CFR §§ 264.90(f), 264.110(c), and as defined in 40 CFR § 270.1(c)(7). Nothing in this Permit Part shall be construed to constitute a change to the Consent Order.

11.2 CORRECTIVE ACTION REQUIREMENTS UNDER THE PERMIT

The Permittees shall conduct corrective action under this Permit (or other enforceable document) rather than under the Consent Order, in the following circumstances:

(1) new releases and newly discovered releases of hazardous waste or hazardous constituents from hazardous waste management units at the Facility;

(2) the closure and post-closure care requirements of 40 CFR Part 264, Subpart G, as they apply to hazardous waste management units at the Facility;

(3) implementation of the controls, including long-term monitoring, for any SWMUs or AOCs ~~on~~listed in the Permit in Attachment K (*Listing of SWMUs and AOCs*), Table K-2 (*Corrective Action Complete with Controls*); ~~and~~

(4) any corrective action conducted under this Part (11) to address releases of hazardous waste or hazardous constituents that occur or are discovered after the date on which the Consent Order terminates~~.~~; and

(5) newly created SWMUs and AOCs from non-permitted operations.

(*see* § ~~III.W.1~~VII.A of the Consent Order)

In circumstances where Corrective Action is required under the Permit, the Permittees shall conduct corrective action pursuant to this Permit in accordance with §§ 74-4-4(A)(5)(h) and (i) and 74-4-4.2(B) of the HWA. The Permittees shall coordinate all corrective action conducted under this Permit with corrective action conducted under the Consent Order. Corrective action for releases from hazardous waste management units that commingle with releases originating from other sources shall be conducted under the Consent Order. Any SWMU or AOC for which corrective action is required that is not subject to corrective action under the Consent Order shall be subject to corrective action under this Permit Part and 40 CFR §§ 264.100 and 264.101, which are incorporated herein by reference.

11.3.1.1 Notification of Detections

By the fifteenth day of each month, the Permittees shall review the analytical data from all groundwater monitoring conducted under this Permit that was received during the previous month, and shall record the date of such review in the Operating Record. If the fifteenth day of a month is a non-business day, then the review shall be conducted by the next business day.

The Permittees shall notify the Department orally within one business day after review of the analytical data if such data show detection of a contaminant in a well screen interval or spring at a concentration that exceeds the groundwater cleanup levels established in Permit Section 11.4.1 if that contaminant has not previously exceeded such water quality standard or cleanup level in such well screen interval or spring.

The Permittees shall notify the Department in writing within fifteen days after review of the analytical data if the data show any of the following:

(1) Detection of a hazardous constituent that is an organic compound in a spring or screened interval of a well if that hazardous constituent has not previously been detected in the spring or screened interval;

(2) Detection of a hazardous constituent that is a metal or other inorganic compound at a concentration above the background level in a spring or screened interval of a well if that hazardous constituent has not previously exceeded the background level in the spring or screened interval;

(3) Detection of a hazardous constituent in a spring or screened interval of a well at a concentration that exceeds one-half the cleanup level established in Permit Section 11.4.1, if that hazardous constituent has not previously exceeded one-half such standard or screening level in the spring or screened interval;

~~(4) Detection of perchlorate in a spring or screened interval of a well at a concentration of 2 μg/L or greater if perchlorate at such concentration has not previously been detected in the spring or screened interval;~~

(~~5~~4) Detection of a hazardous constituent that is a metal or other inorganic compound in a spring or screened interval of a well at a concentration that exceeds two times the background level for the third consecutive sampling of the spring or screened interval; and

(~~6~~5) Detection of a hazardous constituent in a spring or screened interval of a well at a concentration that exceeds one-half the cleanup level established in Permit Section 11.4.1 and that has increased for the third consecutive sampling of that spring or screened interval.

The written notification shall be submitted to the Department in a letter report in table format that includes, but is not limited to, the date or dates of the sampling event, an identification of the well or spring, the location of the well or spring, the depth of the screened interval of the well or zone sampled, a list of the analytical data that triggered the reporting requirement, any known issues with sample quality, and the specific category for which the data is reported under this Permit Section (11.3.1.1).

Previous data to be evaluated under this Permit Section (11.3.1.1) to determine whether specified levels have been exceeded, or to determine trends in data for three consecutive samples shall include only data acquired after September 30, 2009. For the purpose of the notice requirements of this Permit Section (11.3.1.1), the background level of a contaminant shall be the most recent Department-approved 95 percent upper tolerance limit for the background for that contaminant set forth in the *Groundwater Background Investigation Report* approved by the Department, including any approved revisions, as it may be revised or replaced with another document.

The Permittees shall give notice by e-mail to persons on the e-mail notification list of groundwater analytical data reported under this Permit Section (11.3.1.1) in accordance with Permit Section 1.13.

11.3.1.2 Source Identification and Corrective Action

The Permittees shall provide written notification to the Department if a detected concentration exceeds the cleanup levels established in Permit Section 11.4.1, within seven business days of discovery of the exceedance in accordance with 40 CFR § 264.99(h)(1). The Permittees shall include in the notification whether or not they intend to attempt to make a determination that the source of the detected hazardous constituent is not the regulated unit, in accordance with 40 CFR § 264.99(i)(1). The Permittees shall submit a report to the Department within 90 days of such determination that demonstrates that the source of the detected hazardous constituent is not the regulated unit, in accordance with 40 CFR § 264.99(i)(2).

If the source of the detection is the regulated unit, the Permittees shall determine the nature and extent of the release in accordance with Permit Section 11.8.5, and take all steps necessary to contain and otherwise mitigate the release. The Permittees shall conduct a corrective measures evaluation (CME) in accordance with the procedures included in Permit Section 11.8.6 (*Corrective Measures Evaluation*), if the Department determines that such evaluation is necessary in order to select a remedy to achieve the cleanup levels included in Permit Section 11.4.1.

11.3.2 Groundwater Monitoring Reporting

The Permittees shall submit to the Department periodic monitoring reports in accordance with the schedule in the Interim Facility Wide Groundwater Monitoring Plan (IFGMP) or the Department-approved Long-term Groundwater Monitoring Plans. The reports shall be prepared in accordance with Permit Section 11.12. The Permittees shall submit to the Department periodic groundwater monitoring reports for all groundwater monitoring data generated pursuant to this Permit. The Permittees shall propose a schedule for such reporting to the Department for approval. Such reporting shall be coordinated with, and may be combined with, the reporting conducted under § ~~IV.A.6~~XII of the Consent Order.

proposing a cleanup level for the contaminant. If the background concentration of an inorganic constituent, as established in accordance with Permit Section 11.10.6, exceeds the standard then the cleanup level is the background concentration for that specific substance. Any cleanup level based on a risk assessment must be submitted to the Department for its review and approval.

The Permittees shall give notice by e-mail to persons on the e-mail notification list in accordance with Permit Section 1.13 of a submittal to the Department under this Permit Section (11.4.1).

~~11.4.1.1 Groundwater Cleanup Level for Perchlorate~~

~~If, during the term of this Permit, the WQCC adopts a groundwater quality standard for perchlorate, or EPA or the EIB adopts an MCL for perchlorate, such standard or MCL shall be the cleanup level in accordance with Permit Section 11.4.1. If perchlorate is detected, the Permittees shall evaluate the nature and extent of the perchlorate contamination. In the absence of a groundwater quality standard or MCL, if perchlorate is detected at concentrations at or greater than 4 µg/L, then the cleanup level shall be established using a HI of 1.0 in accordance with Permit Section 11.4.1 above.~~

11.4.2 Soil and Sediment

The cleanup levels for soil and sediments shall be the cleanup levels for soil set forth in this Permit Section (11.4.2). Should the Permittees be unable to achieve the Soil Cleanup Levels established under Permit Section 11.4.2.1, they shall conduct risk assessments in accordance with Permit Sections 11.10.4 and 11.10.5. Any cleanup level based on a risk assessment must be submitted to the Department for its review and approval.

11.4.2.1 Soil Cleanup Levels

The Department has specified soil-screening levels that are based on a target total excess cancer risk of 10^{-5} for carcinogenic substances and, for non-carcinogenic substances, a target HI of 1.0 for residential, industrial land use, and the construction worker scenarios. If the potential for migration to groundwater is applicable for a site, the Department may determine that a dilution attenuation factor (DAF) of one or greater, as calculated using the Department-approved methods, for contaminated soils is appropriate to achieve clean closure. This approach may apply at sites where the migration of contaminants through the soil column to groundwater has occurred or when the Department determines that the potential exists for migration of contaminants through the soil column to groundwater. Soil cleanup levels shall be the target soil screening levels listed in the Department's *Technical Background Document for Development of Soil Screening Levels* (as updated). If a Department soil screening level has not been established for a substance for which toxicological information is published, the soil cleanup level shall be established using the most recent version of the EPA RSL for residential and industrial soil for compounds designated as "n" (non-carcinogen effects) or ten times the EPA RSL for compounds designated "c" (carcinogen effects). The cumulative risk shall not exceed a total excess

(2) organic vapors (using a photo-ionization detector with an 11.7 eV (electron volt) lamp, a combustible vapor indicator or other method approved by the Department);

(3) percent carbon dioxide;

(4) static subsurface pressure; and

(5) other parameters (such as carbon monoxide and hydrogen sulfide) as required by the Department.

The Permittees also shall collect vapor samples for laboratory analysis of the following as required:

(6) percent moisture;

(7) VOCs; and

(8) other analytes required by the Department.

Vapor samples analyzed by the laboratory for percent moisture and VOCs shall be collected using SUMMA canisters or other sample collection method approved by the Department. The samples shall be analyzed for VOC concentrations by EPA Method TO-15, as it may be updated or equivalent VOC analytical method.

Field vapor measurements, the date and time of each measurement, and the instrument used shall be recorded on a vapor monitoring data sheet. The instruments used for field measurements shall be calibrated daily in accordance with the manufacturer's specifications and as described in Permit Section 11.10.2.12. The methods used to obtain vapor-phase field measurements and samples shall be approved by the Department in writing prior to the start of air monitoring at each Facility site where vapor-phase monitoring is conducted.

11.10.2.7 Groundwater Monitoring

11.10.2.7.i Groundwater Levels

Groundwater level measurements shall be obtained at intervals required by the Department. Groundwater levels also shall be obtained prior to purging in preparation for a sampling event. Measurement data and the date and time of each measurement shall be recorded on a site monitoring data sheet. The depth to groundwater shall be measured to the nearest 0.01 feet. The depth to groundwater shall be recorded relative to the surveyed well casing rim or other surveyed datum.

Groundwater levels shall be measured in all wells at the facility (or the number of wells otherwise specified in a Department approved groundwater monitoring work plan) within ~~14~~21 days of the commencement of the monitoring activities. The Permittees shall conduct periodic measuring events, the schedule for which shall be provided in the groundwater monitoring work plans.

Attachment 5

Revised Supplement 1-4, Permittees' Proposed Changes to Attachment D, Contingency Plan

ATTACHMENT D

CONTINGENCY PLAN

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ATTACHMENT D
~~GENERAL~~ CONTINGENCY PLAN

This Attachment presents contingency measures applicable to all permitted hazardous ~~or mixed~~ waste management units. The Permittees shall implement the provisions of this Plan and the applicable provisions of Permit Part 2 (*General Facility Conditions*) immediately to minimize hazards whenever there is a fire, explosion, or release of hazardous ~~or mixed~~ waste or hazardous ~~or mixed~~ waste constituents that could threaten human health or the environment.

D.1 HAZARDOUS ~~AND MIXED~~ WASTE EMERGENCY RESPONSE RESOURCES

~~1.~~ The management of hazardous and mixed waste emergency incidents at the Facility resides within the Permittees' emergency management ~~organization.~~and emergency response organizations. During an emergency situation, line management (i.e., the Line Manager of the affected area) works with an Incident Response Commander from the emergency management organization. The Incident Response Commander has primary responsibility for managing emergency response operations, directing the Emergency Operations Support Center (EOSC) to make appropriate notifications, and activating the emergency response organizations. The Incident Response Commander has authority to assume the role of Incident Commander (IC) during an emergency and typically assumes full responsibility for management of the emergency response operations at the scene. (Personnel from other organizations, such as the Federal Bureau of Investigation or the Los Alamos Fire Department [LAFD], may also assume the role of IC, depending upon the type of emergency and responding organizations.) Additional Facility resources that may provide assistance in an emergency include personnel from health physics, industrial hygiene, environment compliance, emergency response, and radiation protection ~~personnel~~ at the Facility. These personnel as well as other resources are discussed in Attachment Sections D.1.2, D.1.3, D.1.~~6~~4, and D.~~5~~1.6 of this Attachment.

~~2.~~ Laboratory-contracted support services and other agencies shall also be available for assistance during emergencies. These are discussed in Attachment Section D.1.5 and include the contracted services for security and the LAFD. These contracted services, if changed, shall be replaced and/or supplemented with functionally equivalent contracted services required to assume the same duties and responsibilities described in this section. Other outside response agencies are discussed in Section D.1.7 and include the Los Alamos Police Department (LAPD) and the Los Alamos Medical Center (LAMC). The LAPD and the LAMC each provide assistance under a memorandum of understanding with the U.S. Department of Energy (DOE).

~~3.~~ The Permittees shall use the Incident Command System (ICS) in response to all emergencies. The ICS is based on the on-scene management response structure protocols of the National Incident Management System (NIMS). The NIMS is a national standard that provides a solid foundation for an effective and integrated emergency response both locally and nationally, if necessary.

~~4.~~ The IC (e.g., Incident Response Commander) coordinates all groups and agencies responding to the emergency and personnel operating at the scene using the ICS. The General Hazardous Waste Emergency Notification System, illustrated on Figure D-1, is designed to expand and contract, as appropriate, to include the response groups/agencies needed to address any particular emergency. The EOSC provides notification to on-site and off-site groups and agencies for both response requests and information.

~~5.~~ The IC may appoint and utilize a network of support personnel to assess, plan for, and mitigate emergencies. These personnel can include, but are not limited to, a Safety Officer, a Public Information Officer, and a Liaison Officer that report directly to the IC and are responsible for issues related to safety, information, and the interaction of various groups associated with the overall emergency. Also reporting directly to the IC are an Operations Section Chief, Logistics Section Chief, Planning Section Chief, and an Administrative Section Chief. The Operations Section Chief oversees the Fire Branch, the Emergency Medical Services Branch, and the emergency response organization, and is responsible for mitigating the emergency response. The Logistics Section Chief is responsible for providing support personnel and equipment necessary for the emergency response. The Planning Section Chief is responsible for planning the mitigation and recovery activities for the emergency. The Administrative Section Chief is responsible for keeping records of expenditures. These ICS positions are listed in Figure D-1. The appropriate ICS positions will be activated as the emergency warrants. During an emergency at the Facility, assistance may be provided to the IC and the IC's appointees by a large variety of response groups/agencies. The responsibilities and/or assistance available from the various response groups/agencies are discussed briefly in Attachment Sections D.1.2 through D.1.7 and the appropriate representatives will be contacted during an emergency as appropriate.

~~6.~~ The Permittees shall provide a copy of this Contingency Plan and any revisions to each of the emergency response groups/agencies (including the LAPD, LAFD, LAMC, and the State of New Mexico’s Department of Homeland Security and Emergency Management (DHSEM) Area 3 Emergency Management Coordinator).

D.1.1 Emergency Management

~~1.~~ The Permittees shall delegate the authority and responsibility for administering and implementing the Facility’s emergency management program to the emergency management organization. Emergency management personnel shall coordinate and issue the Facility’s Los Alamos National Laboratory and Los Alamos Field Office Hazardous Materials Program Plan; emergency management personnel provide response coordination for emergencies. Emergency management personnel provide a 24-hour EOSC for the Facility and a 24-hour Incident Response Commander to respond to emergencies, including hazardous and mixed waste releases. The Incident Response Commander is the functional equivalent of the Emergency Coordinator (40 CFR § 264.55). The emergency management organization maintains an Emergency Operations Center (EOC) in a ready condition, should a center be required. The primary EOC is located at TA-69, Building 33 (TA-69-33). An alternate mobile EOC is equipped and ready for immediate deployment. Should an EOC be activated during an emergency, additional emergency personnel can be requested by the IC through the EOSC.

~~2.~~ Assignment as the Incident Response Commander is rotated. The Incident Response Commander can be reached 24 hours a day by contacting the EOSC at 505-667-2400.

~~3.~~ The Incident Response Commander ~~will respond~~responds to emergency incidents involving the release of hazardous ~~or mixed~~ waste to the environment, including spills, fires, and explosions. With input from the appropriate Facility groups, the Incident Response Commander shall initially assess the possible hazards to human health or the environment and, if assuming incident command, shall use whatever response personnel and/or emergency equipment necessary to control and contain the waste. In the event of an emergency, the Incident Response Commander typically becomes the IC with full responsibility for field activities. As described previously, the exception to this is when on-site personnel can adequately address the emergency and maintain incident command internally.

~~4.~~ The Incident Response Commander responding to an emergency shall have access to various tools to include Emergency Actions Levels with prescribed protective actions and ~~ChemLog with~~ a current chemical inventory of the appropriate building(s) in the area in which the incident is occurring. Access to these tools shall be maintained at the facility and made available to the Incident Response Commander and other emergency response members at the EOC. Additionally, this information may be gained from the facility manager where a waste management unit is located. The various response groups shall obtain specific information, if necessary, relating to the facilities involved (including the layout of all affected buildings; the location of evacuation routes, equipment, and personnel; properties of the materials/wastes managed at the facility; and the hazards associated with these materials/wastes) from other site-specific information.

~~5.~~ The Permittees shall ensure that the names, addresses, and telephone numbers listed below are the current Primary and Alternate Incident Response Commanders.

Primary:

Ted Ulibarri
County Road 88
Santa Fe, NM 87506
(W) 505-667-3463
(C) 505-412-8737
(H) 505-852-0286

Alternates:

Steve Mullins
112 Azure
White Rock, NM 87547
(W) 505-667-2400
(C) 505-695-3161
(H) 505-514-1116

J. Ted Collins (Ted)
3230 Nizhone
Santa Fe, NM 87507
(W) 505-606-9730
(C) 505-695-3004
(H) 505-309-2761

~~6.~~ To assure timely notifications and immediate response during an emergency, the Permittees shall ensure that the telephone numbers 911 or 505-667-2400 are contacted to obtain the on-call Incident Response Commander.

D.1.2 Hazardous Materials Response

~~1.~~ Hazardous Materials (HAZMAT) personnel are responsible for the aggressive mitigation of chemical, radiological, and hazardous ~~waste, and mixed~~ waste emergencies, including field decontamination of responders and response equipment. At the request of the IC, the HAZMAT personnel may provide limited field decontamination support for victims. HAZMAT personnel are capable of providing a decontamination station at the scene of a hazardous material incident to process people working in a contaminated area and ~~is~~are prepared to perform decontamination of personnel. HAZMAT personnel shall meet the training criteria for emergency response personnel specified in the Code of Federal Regulations, Title 29, §1910.120(q)(6)(iii), (iv), and (v). HAZMAT personnel act as part of the ICS reporting directly to IC, or the Operations Section Chief if the position is staffed.

~~2.~~ During an emergency response, the HAZMAT personnel may also provide site field monitoring to determine the nature and extent of contamination, provide information on correct handling of chemicals, make recommendations on protective clothing and equipment, and provide exposure and treatment information to responders. The field monitoring team leader supervises field monitoring activities to determine the boundaries of the potential release. The HAZMAT personnel may obtain resources from environmental monitoring groups, such as health physics and industrial hygiene personnel.

D.1.3 Environmental Regulation and Waste Management Compliance Response

At the scene, representatives and technical advisors from the environmental regulation and waste compliance personnel and other response personnel are coordinated by the IC. In addition to their post-emergency duties, they may also be responsible for on-scene emergency operations such as planning. Depending on the type of emergency and the associated hazards, an individual from the most relevant personnel shall provide technical support and shall ensure the Permittees' compliance with applicable federal, state, and local regulations.

D.1.3.1 Ecology Personnel

Ecology personnel provide field surveys of soil, foodstuffs, and biota to determine environmental effects of exposure after an emergency.

D.1.3.2 Meteorology and Air Quality Personnel

Meteorology and air quality personnel provide field surveys of air to determine environmental impacts and dose equivalent to members of the public after a radiological emergency. In addition, they provide expertise in meteorology to project short- and long-term environmental effects of emergency conditions.

D.1.3.3 Hazardous Waste Compliance Personnel

Hazardous waste compliance personnel provide guidance on regulatory requirements for proper treatment, storage, and transportation of hazardous ~~and mixed~~ wastes to other Facility groups. After an emergency, waste management sampling personnel may provide field sampling (e.g., of soil, spills, or potentially hazardous waste) to determine environmental effects of exposure.

D.1.3.4 Water Quality and Hydrology Personnel

After an emergency, water quality and hydrology personnel provide sampling of surface water runoff and sediments to determine the environmental effects of an emergency and perform assessments for regulatory reporting requirements. They also provide expertise in hydrogeology to establish short- and long-term environmental effects of emergency conditions.

D.1.4 Other Facility Response Resources

Emergency response personnel at TA-55 are trained to respond to emergencies at that facility. Personnel from the Los Alamos National Laboratory (LANL) Transuranic Program may provide guidance on proper treatment, storage, and transportation of hazardous ~~and mixed~~ waste at TA-50 and TA-54.

D.1.5 Contracted Response

Contracted response groups' representatives may report directly to the Incident Command Post (ICP), if requested. If the IC deems it necessary, the IC may designate an Operations Section Chief to aid in the coordination and direction of these groups. In addition, contracted response groups may report to a staging area, with a representative going either to the ICP or, if activated, to the EOC.

D.1.5.1 Security Services

Security personnel provide security service to the Facility. During an emergency, these activities include maintaining security, directing traffic within the Facility, and controlling access to the emergency scene. Security personnel maintain the necessary equipment (such as crowd-control equipment and patrol vehicles) to perform these functions.

D.1.5.2 Maintenance and Site Services

Maintenance and Site Services (MSS) provides a maintenance support force to the Facility. This support force is under the Permittees' direction in an emergency. MSS also provides a representative to the Facility in the event of an emergency and participates, as necessary, in post-emergency cleanup under the direction of a Recovery Manager designated by the IC. The duties of the Recovery Manager are discussed in Attachment Section D.10.

D.1.5.3 Los Alamos Fire Department

The LAFD provides fire protection and ambulance coverage for the residential communities of Los Alamos and White Rock and for the Facility. In the case of an emergency within the Facility, the LAFD coordinates fire suppression and Emergency Medical Services. The IC retains overall responsibility for the emergency response effort.

D.1.6 Facility Support

D.1.6.1 Health Physics Operations

Radiation protection personnel perform routine site evaluation and monitoring to determine radiological conditions in facilities. They also provide guidance on radiological decontamination. In addition, this group augments the assessment and monitoring functions of the HAZMAT personnel.

D.1.6.2 Occupational Medicine Personnel

~~1.~~ The Facility maintains its own medical facility operated by occupational medicine personnel. Occupational medicine personnel provide appropriate medical treatment for occupation-related illnesses and injuries and monitors employees to assess the effectiveness of health protection programs.

~~2.~~ Although occupational medicine personnel are not routinely involved with on-scene emergency response, the group maintains a central medical facility with a fully equipped emergency room and decontamination facilities at TA-3, Building 1411. The ~~location~~locations of this and other emergency facilities are shown on Figure ~~49 in Attachment N (*Figures*).~~D-2, *Emergency Facilities at Los Alamos National Laboratory*. Medical staff at these facilities includes physicians, physician assistants, nurse practitioners, nurses, technicians, psychologists, and counselors. All full-time medical providers and nurses receive radiation accident training. Occupational medicine personnel also maintain access to a database that provides the clinical staff with timely toxic exposure and treatment information.

D.1.6.3 Industrial Hygiene and Safety Personnel

Industrial hygiene and safety personnel assist occupational medicine personnel with their ability to obtain additional exposure and treatment information. In addition, they maintain computer access to the National Institute of Occupational Safety and Health Technical Information Center and the Registry of Toxic Effects of Chemical Substances. During routine operations, these personnel perform site evaluations and field testing to determine the nature and extent of chemical contamination and specify protective clothing and equipment.

D.1.6.4 Performance Assurance Office

The Performance Assurance Office assists the facility manager in investigating all adverse environmental, safety, health, and operational occurrences (on-site and off-site), determining the causal factors, identifying the appropriate corrective actions, and assisting in the preparation of reports documenting the occurrence to DOE. This group tracks corrective actions associated with such occurrences and maintains the information in an on-site database.

D.1.7 Outside Response Agencies

During an emergency, outside response agencies report directly to the IC. A Liaison Officer or an Operations Section Chief, designated by the IC, may aid in coordinating and directing the groups responding to an emergency.

D.1.7.1 Los Alamos Police Department

The Los Alamos Police Department (LAPD) may assume IC under unique circumstances, but usually has only minimal interaction with the Facility in an on-site emergency. This interaction normally involves traffic control on DOE roads with public access, handling criminal activity, and criminal investigations.

D.1.7.2 Los Alamos County Emergency Management Coordinator

Los Alamos County has an agreement with the Facility’s emergency management organization to provide assistance in certain emergency situations. If an emergency occurs on Facility property that may affect the communities of Los Alamos and White Rock, emergency management personnel will notify the Los Alamos County Consolidated Dispatch Center which in turn will notify the Los Alamos County Emergency Management Coordinator, who will coordinate necessary emergency actions throughout the county.

D.1.7.3 Los Alamos Medical Center

The Facility maintains a fully equipped decontamination room adjacent to the emergency room at LAMC. In the event that a case is sent to LAMC, support for the emergency room staff is provided by Facility occupational medical personnel. Radiation protection, industrial hygiene, and HAZMAT personnel also provide assistance to the emergency room staff; assistance from additional Facility resources is provided, as necessary. Assistance is coordinated through emergency management personnel.

D.2 EMERGENCY EQUIPMENT AND COMMUNICATIONS

D.2.1 Emergency Equipment

The Permittees shall make available the lists of emergency equipment listed in Table D-1 for use at any of Permittees' hazardous ~~or mixed~~ waste management units. The list includes emergency equipment available in the HAZMAT vehicles and trailers as well as supplemental emergency equipment maintained by the LAFD, MSS, and occupational medicine personnel. A list of emergency equipment available for use at specific hazardous ~~and/or mixed~~ waste management units is identified in Attachment Tables ~~TA~~D-3~~, D-1; TA-50,~~ through D-~~1; TA-54, Area L, D-1; TA-54, Area G, D-2; TA-54 West, D-3; TA-55 Building 4 First Floor, D-1; TA-55 Building 4 Basement, D-2; TA-55 Container Storage Pad, D-3; TA-55-0355 Pad, D-4; and TA-63 Transuranic Waste Facility, D-1~~15. Emergency equipment listed in these tables may be replaced and/or upgraded with functionally equivalent components and equipment, as necessary, for routine maintenance and repair.

D.2.2 Emergency Communications

The initial phase of an emergency may involve a small number of individuals at the affected area and that requires notification of the Incident Response Commander, utilizing local communication equipment and/or systems. When responding to hazardous ~~and/or mixed~~ waste emergencies, the Permittees shall ensure that emergency management personnel can provide communications between response units and emergency organizations.

D.2.2.1 Fire Alarms

Fire alarms are monitored 24 hours per day by trained personnel in the EOSC. Both the primary and backup buildings where the monitoring takes place have emergency power systems. The Incident Response Commander is notified when there is confirmed fire or smoke by the EOSC.

D.2.2.2 Power Dispatch

The Permittees shall maintain the Power Dispatch facility 24 hours a day. Alarms at this facility are connected to Facility experiments, equipment, and/or buildings to record outages and hazardous conditions. Any conditions that activate these alarms shall be reported immediately to the building management or to the EOSC operator for notification and response.

D.2.2.3 Additional Communication Systems

Internal communication systems at the Facility include:

1. Preprogrammed telephone system
2. Private telephone lines
3. A variety of frequency-modulated very high frequency simplex repeater systems, including:
   - Multiple base stations

- Mobile and hand-held units
- Links to New Mexico public safety agencies

4. An ultrahigh-frequency radio system, including:
   - Multiple antenna sites
   - Mobile and base units
   - Links with the LAPD, the LAFD, and the State Medical System
5. A trunked radio system that includes a link with the LAFD
6. Transmission and reception (through the EOC) for:
   - Secure telephone
   - Secure fax
   - Secure still video
   - Secure videoconference system (to all DOE EOCs and DOE Headquarters)
7. Access to all radio systems outlined above (through the EOC).
8. Mass Notification System

~~2.~~ Off-site communications with federal, state, tribal, county, and other agencies are available through the following:

1. A preprogrammed telephone system
2. Private telephone lines
3. Trunked radio system
4. Mass Notification System

~~3.~~ The Permittees' EOC, maintained by emergency management personnel, operates radio systems on key Facility and off-site channels. Emergency personnel responding to on-site incidents have the benefit of wide-area radio coverage using EOC facilities. The Incident Response Commander is responsible for activating whatever support personnel, equipment, or services are needed 24 hours a day.

D.3 CONTINGENCY PLAN IMPLEMENTATION

The following sections discuss requirements used to implement this Plan, emergency notification, and Incident Response Commander activities and actions to be taken in response to fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents into the environment at the Facility.

D.3.1 Requirements for Implementation

~~1.~~ The decision to implement this Plan depends upon whether an emergency exists, which for the purposes of this section is defined as an imminent or actual incident arising from fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents that could threaten human health or the environment. The Incident Response Commander or IC will use the guidelines listed below to decide whether to implement this Plan. The Permittees shall investigate all adverse environmental, safety, health, and operational occurrences (on-site and off-site) resulting in implementation of the ~~contingency plan~~Contingency Plan to determine causal factors and identify the appropriate corrective actions.

~~2.~~ This Plan shall be implemented immediately in the following situations involving releases or potential releases of hazardous ~~or mixed~~ waste:

1. Spills:
   - If a hazardous ~~or mixed~~ waste spill cannot be contained with secondary containment or application of sorbents
   - If a hazardous ~~or mixed~~ waste spill causes the release of flammable material, creating a fire or explosion hazard
   - If a hazardous ~~or mixed~~ waste spill results in toxic fumes that threaten human health
2. Explosions:
   - If an unplanned explosion involving hazardous ~~or mixed~~ waste occurs
   - If an imminent danger of an explosion involving hazardous ~~or mixed~~ waste exists~~.~~
3. Fires:
   - If a fire involving hazardous ~~or mixed~~ waste occurs
   - If any building, grass, forest, or nonhazardous waste fire exists that threatens to volatilize or ignite hazardous ~~or mixed~~ waste~~.~~
4. Other Acts of Force Majeure
   - If an earthquake or other natural disaster threatens containment integrity, including precipitation that threatens to move spilled material off site~~.~~

D.3.2 Emergency Notification

~~1.~~ Emergency notification requires immediate notification of 505-667-2400 or emergency management personnel upon discovery of an imminent or actual incident involving hazardous ~~and/or mixed~~ waste. During nonworking hours, personnel will report all imminent or actual incidents involving hazardous ~~and/or mixed~~ waste to the Incident Response Commander at 505-667-2400. In the case of fire, notification of these individuals is superseded by the Facility fire alarm system. A fire is reported by dialing 911, activating automatic alarms, or activating a fire alarm pull box. All fire alarms alert EOSC. The EOSC alerts the Incident Response Commander and the Los Alamos County Consolidated Dispatch Center, who contacts the LAFD.

~~2.~~ Upon recognition of a hazardous ~~or mixed~~ waste emergency, the first arriving emergency-trained person will become the Facility Command Leader. Once emergency management personnel are notified of the emergency, the Incident Response Commander will proceed to the scene and be briefed by the Facility Command Leader, building/area personnel, and/or other emergency units/teams. The Incident Response Commander will then assume the position of IC. If necessary, the IC may recommend activation of the EOC and the emergency management team. The IC will assign ICS positions ~~and~~, update the EOSC, and request necessary resources. The EOSC will notify the appropriate emergency response groups. The IC may determine from the list of response groups described in Attachment Sections D.1.2 through D.1.7 which groups to contact in an emergency. Each response group maintains an on-call person and/or a call-down procedure to respond to emergencies.

~~3.~~ Emergency management personnel shall be notified of any potential hazardous ~~or mixed~~ waste emergency. The IC will use whatever means are available (including the assistance of other response groups, computer data searches, and sampling) to determine if a hazardous ~~or mixed~~ waste emergency exists.

~~4.~~ The Facility Incident Response Commander or his or her designee shall make best efforts to timely communicate the nature of the emergency and the hazards that may be present to any outside response agency whose assistance may be required.

D.3.3 Incident Response Commander Actions

~~1.~~ Upon notification of an emergency incident, the Incident Response Commander may:

- Make an initial assessment of the incident and, in conjunction with the Facility Command Leader, obtain resources to determine the source, quantities, and types of hazardous ~~and/or mixed~~ waste involved and the areal extent of any released materials.
- Request resources needed and have EOSC staff begin notifications.
- Proceed directly to the scene, if safe to do so.
- Assess the nature of the incident (e.g., through communication with the IC).
- Assume incident command after a direct briefing with the Facility Command Leader.
- Based on the guidelines in Attachment Section D.3.1 of this Plan, determine if implementation of this Plan is warranted.
- Activate the EOC, if necessary.

~~2.~~ Upon deciding to implement this Plan, the IC will, when appropriate:

- Assess the hazards to human health and the environment, including both direct and indirect effects, such as generation of toxic, irritating, or asphyxiating gases and/or hazards of runoff of water or chemicals used for fire suppression. An individual designated by the IC will use the guidelines in Section D.3.1 to assess the hazards to human health and the environment. If any of the criteria under Section D.3.1 are met and if the responsible Line Manager (or his/her designee) has not already accomplished evacuation of the area, the IC will initiate shelter in place or evacuation of the immediate area.

- Direct the EOSC staff to initiate protective actions and immediately notify appropriate response groups and personnel as per the emergency operations organization Guidelines. The Los Alamos County Emergency Coordinator may activate one or more of the following community alert mechanisms: reverse 911, the AM 1490 KRSN radio, or the cable television capture system, site-wide area network radios, and public radio and television channels.

- In the case of fire or release of any type, make reasonable efforts to confirm that all response personnel at the scene are aware of actual or imminent special hazards associated with hazardous ~~or mixed~~ waste.

- In emergency situations, contact the appropriate environmental or waste compliance representative to notify the Department's Hazardous Waste Bureau and the National Response Center at (800) 424-8802, reporting:

- The name and telephone number of the environmental or waste compliance representative
- The name and address of the facility
- The time and type of incident
- The name and quantity of material involved, to the extent known
- The extent of injuries, if any
- The possible hazards to human health or the environment outside the facility~~.~~

- When an emergency occurs at hazardous ~~or mixed~~ waste treatment units, ensure that appropriate Facility personnel monitor for leaks, pressure buildup, gas generation, or equipment ruptures.

~~3.~~ Once control of the emergency is established, the IC will take all reasonable measures to minimize the occurrence, recurrence, or spread of fires, explosions, or releases. In addition, the IC will delegate cleanup and decontamination responsibilities to the Recovery Manager. These responsibilities may include the following:

- Arranging for site cleanup~~.~~
- Assisting with arrangements for proper handling of recovered waste, contaminated soil, or contaminated surface/groundwater~~.~~
- Assisting with arrangements for decontamination of equipment, as needed~~.~~
- Arranging for replacement and/or repair of equipment, as needed~~.~~
- Requesting that testing is conducted to verify successful cleanup~~.~~

~~4.~~ The Permittees shall report implementation of this Plan in accordance with Permit Sections 1.9.12, 1.9.13, and 2.11.6.3.

D.4 SPILLS

~~1.~~ Sudden releases may include spills of hazardous ~~or mixed~~ waste that pose a significant threat to human health or the environment. Spill incidents resulting in a sudden release of hazardous ~~or mixed~~ waste that present a potential threat to human health or the environment, as listed in Attachment Section D.3.1, require implementation of this Plan.

~~2.~~ Hazardous and mixed wastes are stored on site at the Facility in a variety of containers. The general steps in handling hazardous ~~and/or mixed~~ waste spills are as follows:

1. Isolate the immediate area and deny entry to all unauthorized personnel;
2. Contain the spill by spreading sorbents or forming temporary dikes to prevent further migration (performed by properly trained personnel, if safe);
3. Monitor the spill area and sample the spilled waste and contaminated media~~.~~;
4. Package the waste and contaminated media in sound containers;
5. Decontaminate the area and all involved equipment and personnel (followed by testing to assure adequate cleanup); and
6. Remove the waste and contaminated media (performed by appropriate waste management personnel).

~~3.~~ The IC will determine the steps to be taken for spill mitigation. If initial mitigation of the spill is necessary and can be accomplished safely (by appropriately trained personnel) before the Incident Response Commander arrives, a qualified member of the affected area's operating group will serve as the Facility Command Leader.

~~4.~~ The Permittees shall ensure that hazardous ~~and/or mixed~~ waste spills are stabilized and cleaned up. During spill control and cleanup, all personnel shall wear appropriate personal protective equipment (PPE). Monitoring will be conducted to ensure that chemical and, as appropriate, radiological exposure is minimized. The collected material may be treated as hazardous ~~or mixed~~ waste, depending on the components present. Runoff from spills of listed hazardous ~~or mixed~~ waste that ~~have~~has migrated outside hazardous waste management areas must be contained and managed as hazardous ~~or mixed~~ waste, as appropriate. If the spill was from a characteristic hazardous ~~or mixed~~ waste and if it is determined by analysis that the runoff does not exhibit the characteristic (i.e., ignitability, corrosivity, reactivity, and/or toxicity), the runoff need not be managed as characteristic waste. Temporary dikes may be constructed to contain runoff.

D.4.1 Spill Control Procedures

When a flammable organic solvent spill, a highly acidic spill, or a highly caustic spill has been stabilized with the contents of an organic solvent spill kit, an acid spill kit, or a caustic spill kit, respectively, the resulting material may be sorbed using a nonbiodegradable sorbent. Nonbiodegradable sorbent can be used to control any spill if it is known to be compatible with the spilled material. Appropriate containers or packaging shall be used to collect all spilled material and contaminated sorbent. ~~Attachment Tables TA-3, D-1; TA-50, D-1; TA-54, Area L, D-1; TA-54, Area G, D-2; TA-54 West, D-3; TA-55 Building 4 First Floor, D-1; TA-55 Building 4 Basement, D-2; TA-55 Container Storage Pad, D-3; TA-55-0355 Pad, D-4; and TA-63 Transuranic Waste Facility, D-1~~Attachment Tables D-3 through D-15 list emergency equipment available for spill control at specific units. The ultimate disposition of any contaminated sorbent or waste material shall be determined by appropriate waste management personnel, and in accordance with hazardous waste management regulatory requirements.

D.4.1.1 Tank System Spill Control and Reporting

~~1.~~ The Permittees shall remove a tank system from service immediately using approved shutdown procedures if a leak or spill occurs from the tank system or its secondary containment system or if the system is determined to be unfit for use. Further addition of waste to the tank system or containment system will cease and the system shall be visually inspected to determine the cause of the leak or spill. If a leak occurs from a tank system, as much of the waste as is necessary to prevent further release of waste will be removed within 24 hours after detection or as early as practicable, and the system will be inspected and repaired. All released waste will be removed within 24 hours or as soon as possible if a leak occurs to a tank's containment system.

~~2.~~ If a spill from a tank is not immediately contained and cleaned up and exceeds a quantity of one pound, the release will be reported to the Department within 24 hours of its detection in accordance with the requirements of 40 CFR § 264.196(d)(1). In addition, the Permittees shall report in accordance with Permit Section 1.9.12 and 2.11.6.3. That report shall describe the likely migration route of the release; soil characteristics at the site; monitoring and sampling data relevant to the release; proximity to down-gradient drinking water, surface water, and populated areas; and response actions taken or planned.

D.4.1.2 Tank System/Secondary Containment Repair and Closure

If the integrity of a tank system, including its secondary containment, has not been damaged by a spill, the system may be returned to service. Service may not resume until after all released waste is removed and repairs, if necessary, are made. Any tank system that cannot satisfy the criteria described above shall undergo closure in accordance with the requirements of 40 CFR § 264.197.

D.4.1.3 Certification of Major Repairs

If a tank system undergoes extensive repairs (e.g., installation of an internal liner, tank system piping retrofit), the tank system will not be returned to service until a certification by an independent, qualified registered professional engineer is obtained, verifying that the repaired system is capable of handling wastes without release for the intended life of the system. This certification will be submitted to the Department within seven days after returning the tank system to use.

D.4.1.4 Unexpected Events Reporting

If a spill at open burning or open detonation treatment unit is not immediately contained, or emergency services are called to an unexpected event at an open burning or open detonation treatment unit, the event will be reported to the Department within 24 hours in accordance with Permit Sections 5.3 and 6.4.

D.4.2 Decontamination Verification

~~1.~~ Decontamination will be accomplished at the spill site by removal of all contaminated material. After the spilled material has been sorbed, the material will be containerized. If the spill occurs on a concrete or asphaltic-concrete area, water or an appropriate solvent will be used to clean the area. Liquids (i.e., spilled material and cleaning water or solvents used to clean a spill) may be sorbed with a compatible, nonbiodegradable sorbent and containerized. If a spill is from an identifiable source, the spilled material may be characterized as a newly-generated waste using acceptable knowledge or may be analyzed, as applicable, for the hazardous waste constituents known to be components of the waste managed at that unit. ~~Analytical method(s) given in Table D-3~~Appropriate analytical method(s) given in the most recent version of the U.S. EPA's *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846) will be utilized, as appropriate. If the spill is from other than an identifiable source, the spilled material will be analyzed for the appropriate parameters listed in ~~Table D-3.~~40 CFR 261, Subpart C. All personnel conducting decontamination verification will wear appropriate PPE. Radiation protection personnel will conduct health physics monitoring whenever mixed waste is involved to ensure that radiation exposure is maintained as low as reasonably achievable. Any hazardous ~~or mixed~~ waste collected from decontamination activities will be handled appropriately.

~~2.~~ In order to establish baseline data, a sample of decontamination water or solvent (and nonbiodegradable sorbent material, as applicable) will be taken prior to the start of the decontamination effort. A sample of the final washwater (or the used sorbent) will then be taken. The baseline samples and final washwater/used sorbent samples will be analyzed for the applicable parameters ~~given in Attachment Table D-2.~~within 40 CFR 261, Subpart C, and analyzed using the appropriate devices and methods as described in the most recent version of the SW-846. These and other approved methods approved by the Department will be used as necessary to determine whether a waste stream is hazardous and to identify underlying hazardous constituents. If the decontamination samples contain hazardous constituents that are not present in the baseline samples, the decontamination procedure shall be repeated. An alternative demonstration of decontamination may be proposed and justified to the Department, who will evaluate the proposed alternative in accordance with the standards and guidance currently in effect. If the proposed alternative is accepted, decontamination levels will meet the levels approved by the Department. ~~Each sample will be collected with an appropriate sampling device (*e.g.*, a thief or trier) as specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1986), and approved updates, as applicable.~~

~~3.~~ If a hazardous~~/mixed~~ waste spill occurs on soil, any free liquid present will be collected and containerized. Liquids may be sorbed with a compatible nonbiodegradable sorbent prior to containerization. For such a spill, contaminated soil will either be excavated and containerized or remediated in situ. Industrial health and safety personnel will conduct industrial hygiene monitoring and, if mixed waste is involved, radiation protection personnel will conduct health physics monitoring, if deemed necessary, to minimize exposure during soil removal or remediation operations. Excavation or remediation will continue until soil contaminant concentrations are at a level approved by the Department.

~~4.~~ If a hazardous~~/mixed~~ waste spill occurs in an area with flooring, the floor will either be removed in lieu of decontamination, or the floor will be decontaminated. If the decision is made to decontaminate the floor, swipe samples or other types of sampling appropriate for the contaminant will be collected at random and characterized for decontamination verification. If, after several decontamination efforts, it is subsequently determined that the affected floor area cannot be decontaminated, the floor material will be removed. In all cases, wastes generated during the decontamination and/or removal process will be managed appropriately.

D.5 EXPLOSION

~~1.~~ Explosions and resultant releases may result in a significant threat to human health or the environment. The potential exists for hazardous ~~or mixed~~ waste to be released during an explosion. Implementation of this Plan is required whenever there is an explosion at a permitted unit.

~~2.~~ In the event of an explosion at the Facility, all personnel will immediately evacuate the area. Any injured personnel will be decontaminated at the site, if required and if time allows. An

LAFD ambulance will transport these personnel to LAMC for treatment. If an injury is severe and requires immediate medical evacuation, the injured person will be wrapped to contain contamination, if necessary. In the case of an actual or potential explosion, on-site personnel will contact emergency management personnel immediately so that the Incident Response Commander can ensure that all necessary emergency response personnel are alerted. The LAFD is notified automatically upon fire alarm activation. The Incident Response Commander assumes incident command and will remain near but at a safe distance from the site in order to inform personnel responding to the explosion of the known hazards. Where there is more than one agency (personnel from other organizations, such as the Federal Bureau of Investigation, or the Los Alamos Fire Department) with incident jurisdiction or when incidents cross political jurisdictions, agencies will work together through the designated member of the unified command to establish a common set of objectives and strategies and single incident Action Plan.

~~3.~~ If a fire results from an explosion, the LAFD Senior Officer will, upon arrival at the scene, evaluate all available information and determine the appropriate firefighting methods and tactics. The LAFD Senior Officer will direct firefighting operations under a unified command.

D.6 FIRE

~~1.~~ Fires and resultant releases of hazardous ~~or mixed~~ waste may result in a significant threat to human health or the environment. Implementation of this Plan is required whenever there is a fire at a permitted unit.

~~2.~~ Fire alarms will be sounded automatically or manually to alert personnel that a fire hazard exists and to evacuate the area immediately if in the vicinity. Information related to the various fire alarms at the specific units is included in Attachment Tables ~~TA-3, D-1; TA-50, D-1; TA-54, Area L, D-1; TA-54, Area G, D-2; TA-54 West, D-3; TA-55 Building 4 First Floor, D-1; TA-55 Building 4 Basement, D-2; TA-55 Container Storage Pad, D-3; TA-55-0355 Pad, D-4; and TA-63 Transuranic Waste Facility, D-1~~D-3 through D-15.

~~3.~~ Depending on the size of the fire and the fuel source, portable fire extinguishers may be used. However, Facility policy does not encourage the use of portable fire extinguishers by employees unless they are properly trained. Instead, Facility policy encourages immediate evacuation of the area and notification of the Los Alamos County Dispatch Center by dialing 911. For any fire, including a fire that involves hazardous ~~or mixed~~ waste, the responsible Line Manager and emergency management personnel must be contacted immediately. The Incident Response Commander will alert the LAFD and all other necessary emergency response personnel. If the fire spreads or increases in intensity, all personnel must follow protective actions as designated by the Incident Response Commander. The Incident Response Commander assumes incident command or enters unified command and will remain near the scene to advise personnel responding to the fire of the known hazards.

~~4.~~ Upon arrival at the scene, the LAFD Senior Officer will evaluate all available information and determine the appropriate firefighting methods and tactics. The LAFD Senior Officer will direct firefighting operations under a unified command.

D.7 UNPLANNED NONSUDDEN RELEASES

Nonsudden releases include those incidents that, if uncontrolled, impact the environment over a long period of time. Such incidents include minor leaks from containers and loss of secondary containment integrity.

D.7.1 Responsibility

Appropriate Facility personnel are responsible for correction of a nonsudden release from a hazardous ~~or mixed~~ waste unit if the correction can be performed safely with normal maintenance and management procedures. Emergency management personnel may provide assistance in mitigating releases. Any correction methods for nonsudden releases that have resulted in an impact to the environment will be coordinated with the Department.

D.7.2 Nonsudden Releases

~~1.~~ In general, the response to a nonsudden release will be to contain the release, to correct the cause of the release, and to clean up any release to a level that protects human health and the environment.

~~2.~~ Appropriate Facility personnel shall conduct regularly scheduled inspections to detect failure of containment at the unit(s) addressed in this Permit. Secondary containment systems shall be inspected regularly to ensure that the integrity of the containment systems has not deteriorated. If an inspection reveals that containers are leaking or that secondary containment has deteriorated, Facility personnel shall ensure that maintenance or replacement of containment is performed, as appropriate. Inspections will be conducted in accordance with the facility's inspection plan.

D.7.3 Nonsudden Release Surveillance

~~1.~~ In addition to routine inspection and site-specific sampling and testing, the Permittees shall maintain an area-wide environmental monitoring network. Monitoring and sampling locations for various types of measurements are organized into three main groups. Regional monitoring stations located within the counties surrounding Los Alamos County are placed up to 80 kilometers (50 miles) from the Facility. These stations serve to determine background conditions. Perimeter stations are generally located within four kilometers (2.5 miles) of the Facility boundary and document conditions in residential areas surrounding the Facility. On-site stations, most of which are accessible only to employees during normal working hours, are within the Facility boundary.

~~2.~~ Different types of surveillance sampling conducted at these stations include measuring radiation and collecting samples of air particulates, surface waters, groundwater, soil, sediment, and foodstuffs for subsequent analysis. Additional samples provide information about particular events, such as major runoff events and nonroutine releases. Data from these efforts are used for comparison with standards, for determining background levels, and for radiation dose calculations.

D.8 EXPOSURE TO HAZARDOUS ~~OR MIXED~~ WASTE

~~1.~~ If a person is exposed to hazardous ~~or mixed~~ waste, the affected person, a co-worker, or line management will notify emergency management personnel. Appropriate first aid should be administered immediately. An emergency management representative will make appropriate notifications as soon as possible so that exposure levels and decontamination requirements can be established. The affected person will then be transported to the occupational medical facility or to LAMC for evaluation. If possible, the material involved in the exposure will be ascertained, and the information will be given to the medical staff.

~~2.~~ Other potential exposures will necessitate evacuation of the area, if appropriate, or under any of the following conditions:

1. Irritation of the eyes, breathing passages, or skin
2. Difficulty in breathing
3. Nausea, lightheadedness, vertigo, or blurred vision~~.~~

~~3.~~ The affected person will be transferred to the occupational medical facility or to LAMC if there is a serious injury. An industrial health and safety, radiation protection, or HAZMAT representative will attempt to ascertain what, if any, exposure occurred and what corrective measure is appropriate.

D.9 PROTECTIVE ACTIONS

A permitted unit shall be evacuated upon the voice command to evacuate the area or upon the sounding of the evacuation or fire alarm. The IC may call for sheltering in place when evacuation is impractical due to significant airborne hazards. Shelter in place may be possible in a designated area or in a building where all exterior windows and doors may be closed and outdoor air ventilation equipment turned off. Once the airborne hazard has decreased, personnel would then be evacuated.

D.9.1 Emergency Process Shutdown Prior To Evacuation

Personnel are instructed to shut down equipment prior to evacuating a building/area unless an immediate building/area evacuation is announced or signaled. To ensure efficient shutdown, training and exercises addressing the shutdown process are performed. In the case of an immediate evacuation, a selected team may shut down designated equipment in an evacuated area upon approval of command. The team will be equipped with proper equipment and PPE. If they are on location, radiation protection, industrial health and safety, and/or HAZMAT personnel will provide advice and assistance.

D.9.2 Evacuation Plan

~~1.~~ Emergency situations may warrant the shutdown and evacuation of areas or buildings in order to protect personnel and property, to anticipate the emergency condition, or to enhance the appropriate response. Attachment Table D-~~3~~2 lists the criteria for evacuation, persons responsible for initiating evacuations, and reentry conditions.

~~2.~~ To initiate the evacuation of a building/area, the evacuation or fire alarm is sounded and/or the public address (PA) system may be used. Evacuation alarms cannot be silenced and reset by site personnel. Only the Fire Alarm Maintenance Section and the LAFD Battalion Chief can silence and reset alarms. To evacuate a portion of a building or area, use of the PA system may be more appropriate. The PA system will notify the occupants of the area to be evacuated and will advise personnel throughout the building of the existence of a problem in a specific area. Once evacuation has been initiated and if conditions allow, personnel will turn off all equipment that could contribute to the hazard if left unattended. All personnel will then proceed from the affected area to the assembly/muster area.

~~3.~~ In the event of evacuation of a building, an outbuilding, or an outlying work area, the responsible Line Manager (or his/her designee) will determine a control point at the closest safe location (e.g., considering wind direction). The designated area will be outside the affected area and will serve as an assembly/muster area where the Line Manager (or designee) can oversee evacuation operations and work to prevent further spread of the hazard.

~~4.~~ As personnel exit an affected building/area, a primary sweep of the building/area may be performed to ensure that all personnel have evacuated. If the building/area is evacuated, a Group Leader designee will take attendance at the assembly/muster area and report personnel accountability to the IC. The evacuation procedure is as follows:

1. The person discovering the accident or emergency will call 911 if the event is life-threatening or LAFD is required, or 505-667-2400 for all other evacuations. The person will then notify line management.
2. Site-specific Building Emergency Plans (BEPs) and/or emergency action procedures will be followed concerning evacuation, sweep, personnel accountability, and equipment shutdown procedures.

~~5.~~ A responsible on-site person may direct the initial evacuation and the fire alarm system may be activated. Emergency operations personnel will be notified and dispatched immediately. A responsible on-site person may implement and direct the evacuation process until the Incident Response Commander or LAFD arrives at the scene to assume that responsibility.

D.10 SALVAGE AND CLEANUP

~~1.~~ Appropriate environmental compliance representatives will survey the affected area before salvage and cleanup begin. They will conduct visual inspections and sampling, as appropriate, of the affected area to determine whether cleanup is complete. If gases or fumes, electrical or radiological problems, or other conditions present a hazardous situation, personnel or selected teams equipped with proper PPE will reenter the area to perform designated decontamination tasks, repairs, and salvage to allow the return to normal operations. After an emergency, the IC will turn the operation over to a designated Recovery Manager, who will~~:~~ perform the following activities.

1. Provide for proper handling of recovered waste, contaminated soil or surface water, or any other material that results from a spill, fire, or explosion. Contaminated material will be managed appropriately and temporarily stored at one of the hazardous ~~or mixed~~

waste storage areas at the Facility. Waste management personnel will be responsible for determining the final disposition of the waste. This determination will be made in compliance with hazardous waste management regulations.

2. Arrange to monitor for damage or improper operation of the unit and associated equipment as a result of the emergency or of plant shutdown in response to the emergency.
3. Arrange for site cleanup procedures to be completed and ensure that no waste that may be incompatible with the released material is treated or stored in the same area.
4. Ensure that emergency equipment is cleaned, decontaminated, and fit for its intended use before operations are resumed. Equipment will be inspected visually and then sampled, if necessary, to determine the type and degree of contamination and to determine appropriate cleanup measures.

~~2.~~ Prior to resuming operations, the Permittees shall verify that the previously mentioned tasks have been performed. The Permittees shall notify appropriate state and local authorities that cleanup procedures are completed and that emergency equipment is clean and fit for its intended use.

~~3.~~ The IC assumes the coordination of post-emergency actions (particularly during the time period immediately following the emergency) until a Recovery Manager is appointed. The Recovery Manager then assumes this coordination role. The Recovery Manager is the functional equivalent of the Emergency Coordinator for post-emergency actions. The post-emergency actions include cleanup operations, vital equipment repair, or interim hazard-removal operations (such as arranging for demolition of unstable walls). The services of affected operational organizations, environmental compliance personnel, waste management compliance personnel, maintenance personnel, and other on-site resources will also be used to estimate cleanup costs and operational impact.

D.11 EMERGENCY RESPONSE RECORDS AND REPORTS

The Permittees shall ensure that any emergency that requires implementation of this Plan will be documented and reported in accordance with requirements of 40 CFR § 264.56 and Permit ~~Section~~Sections 1.9.12, 1.9.13, and 2.11.6.3. This information will be maintained in the facility operating record.

D.12 CONTINGENCY PLAN AMENDMENT

The Permittees shall review this Plan at a minimum annually. The Plan will be amended immediately if determined to be inadequate to handle releases (spills, explosions, and/or fires) and whenever:

1. The facility permit is revised;
2. There is change in the design or operation of the facility (e.g., quantities of waste handled and handling techniques) that increases the likelihood of an emergency and requires changes in emergency response;
3. The Primary Incident Response Commander changes; and

4. The list of emergency equipment changes significantly.

~~D.13 REFERENCES~~

~~EPA, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *EPA SW-846*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.~~

~~LANL, 2014. *LANL Emergency Procedures and Protective Actions, P1201-4, R3.* Los Alamos National Laboratory, Security and Emergency Operations Division, Los Alamos, New Mexico~~

~~LANL, 2002, "Los Alamos National Laboratory General Part B Permit Renewal Application", Revision 2.0, August 2002, LA-UR-03-5923, Los Alamos National Laboratory, Los Alamos, New Mexico.~~

Table D-1
Los Alamos National Laboratory-Wide Emergency Equipment

Hazardous Materials (HAZMAT) Vehicles and Associated Emergency Equipment

HAZMAT vehicles and trailers are located at Technical Area (TA) 64, Building 39 (TA-64-39). They are available to emergency management ~~organization~~organizations for emergency response to all of the TAs at the Facility. Emergency management personnel are responsible for maintaining the supplies of appropriate emergency equipment in each vehicle and trailer.

The HAZMAT vehicles and trailers are equipped with safety and emergency equipment, personal protective clothing, and other supplies, which may include, but are not limited to, some or all of the following:

Assorted personal protective equipment, T-shirts, and gloves
Safety goggles, safety glasses, and face shields
Boots and booties
Totally encapsulating suits and boots
Level A and B suits
Flash suits
Self-contained breathing apparatus (SCBA) and SCBA bottles
Respirators and cartridges
Hazardous chemical reference books and other reference materials
Shovels
Siphon pumps
Assorted spill kits and sorbents
Neutralizing solutions: acids, bases, and caustics
Two-way radios, cellular phones, facsimile, and other communication equipment
Bottles of leak detector and leak repair kits
Emergency repair packs
HAZMAT bags
Gas detectors and chemical monitoring equipment
Radiological monitoring equipment
Sponges and cleaners
Warning signs and barricade tape
Traffic control barriers
Flashlights
Cameras and film
Knives
Portable power supplies
Warning and signal horns
Harnesses and belts

Table D-1 (Continued)
Los Alamos National Laboratory-Wide Emergency Equipment

Decontamination equipment
Sampling equipment
Lifting equipment and vetter bags
Assorted tools, tape, and other supplies
Non-sparking tools
Biological detection equipment
Chemical vacuums
Sandia foam
Plugging and diking equipment
Sample van equipped with a glovebox and analysis equipment
Environmental continuous air monitoring equipment
Robot
National Atmospheric Release Advisory Center-Internet Client (NARAC Client)
Hotspot plume modeling program
Mass decontamination trailer with tent and supplies
Portable decontamination trailer
Portable structures
Tents
Trucks
Trailers
International Shipping Units
Portable hot water heater
Forklift
Automated external defibrillators

Supplemental Emergency Equipment and Personnel Available From the Los Alamos Fire Department (LAFD)

Supplemental emergency equipment available from the LAFD may include, but is not limited to, some or all of the following:

Fire engines
Mini-tankers with compressed air foam capability
Modular ambulances
Rescue vehicles
Crash-Fire-Rescue (CFR) unit
Water tankers with compressed air foam capability
Incident Command vehicles
SCBA units
SCBA air tanks
Remote air system for confined space rescue
Ladder truck with pump
Personnel with Hazardous Material First Response Operational Level training
Personnel with Basic Emergency Medical Technician training

Table D-1 (Continued)
Los Alamos National Laboratory-Wide Emergency Equipment

Personnel with Advanced Life Support training

Supplemental Emergency Equipment and Personnel from Maintenance and Site Services (MSS)

Supplemental emergency equipment may include, but is not limited to, some or all of the following:

~~**TRANSPORTATION EQUIPMENT**~~

Transportation Equipment

Pickups, 1/2 through 3/4 ton
Trucks, 1 through 3 ton
Vans, panels, and carryalls
Buses

~~**SPECIAL EQUIPMENT**~~

Special Equipment

Graders
Loaders
Snowplows and snow blowers
Bulldozers
Scrapers
Semitrailers
Chain saws
Street flushers
Mobile transceivers
Generators
Handsets (2-way)
Pageboys (1-way)
Welders
Mobile site logistics support equipment/associated heavy equipment
Fully equipped spill response unit
Utilities equipment and emergency utility support
Fuel trucks
Light banks
Dump trucks
Backhoes
Potable water trucks
Cranes
Forklifts

Table D-1 (Continued)
Los Alamos National Laboratory-Wide Emergency Equipment

~~TRAINED PERSONNEL~~

Trained Personnel

Heavy equipment operators
Dispatchers
Mechanics
Power saw operators
Radio and telephone operators
Truck drivers
Rodent/Pest Control personnel
HAZMAT response/cleanup personnel
Welders
Electricians

Emergency Equipment and Personnel at the Occupational Medicine Clinic-Occupational Medicine Group (OM)

At TA-3 (SM-1411) Central Clinic

Emergency equipment and supplies available from OM may include, but are not limited to, some or all of the following:

~~PERSONNEL~~

Personnel

Physicians
Physician Assistants
Nurse Practitioners
Nurses
X-ray Technician
Clinical Laboratory Technicians
Clinical Testing Technicians
Clinical Psychologist
Counselors

~~SPECIAL EQUIPMENT-PORTABLE~~

Special Equipment—Portable

Multichannel emergency receiver-base station
Two-way radio on the State Med Net, the Facility Emergency Management channel, and the Facility Health-Safety Net
Cardiac monitors and defibrillators
Crash cart emergency equipment with E-tank oxygen (O_2)
Portable physicians' bag with medications

Table D-1 (Continued)
Los Alamos National Laboratory-Wide Emergency Equipment

Portable suction unit
Portable stretchers (ambulance, gurney, folding)
Wheelchairs
O_2 tanks
Manual resuscitators
Intravenous (IV) stands
IV solutions
Otoscopes/ophthalmoscopes
Portable sphygmomanometers
Stethoscopes
Anticontamination apparel
Eye irrigation solution
First-aid kits
Extrication and cervical collars, crutches, canes
Suture sets
Protective apparel
Morgan lens irrigation sets
Decontamination equipment (portable)

~~**SUPPLIES-GENERAL**~~

Supplies—General

Bedding/pillows
Rescue blankets
Burn blankets
Thermal/icing pouches
Multitrauma dressings, surgical and first aid supplies
Disposable ice bags

~~**SPECIAL FACILITIES - NONPORTABLE**~~

Special Facilities—Nonportable

Fully equipped decontamination room at the Occupational Medicine Clinic
Completely equipped emergency room with ambulance entrance
Emergency lighting system
Complete ~~X~~x-ray suite
Protective clothing and wound counters
12-lead electrocardiograph
Fully equipped crash cart with Life Pak defibrillator/external pacer, intubation equipment, emergency medications
Fully equipped decontamination room at Los Alamos Medical Center (LAMC) adjacent to the LAMC emergency room

~~**TRANSPORTATION**~~

Table D-1 (Continued)
Los Alamos National Laboratory-Wide Emergency Equipment

Transportation

Full ambulance service is available within minutes to the central facility.

~~**COMMUNICATION**~~

Communication

Base station on State Medical Net and Los Alamos Fire Department trunked radio system.

Table D-2
~~Waste Analysis Parameters and Test Methods[a]~~

~~Parameter~~	~~Test Method~~	~~Referer~~
~~Ignitability~~	~~Pensky-Martens closed-cup method~~ ~~Setaflash closed-cup method~~ ~~Ignitability of solids~~	~~(L, S) SW1~~ ~~(S) SW103~~ ~~(L, S) AST~~
~~Reactivity~~	~~Test method to determine hydrogen cyanide released from waste~~ ~~Test method to determine hydrogen sulfide released from waste~~	~~(L, S) SW,~~
~~Corrosivity~~	~~Electrometric (pH of aqueous solution)~~	~~(L) SW904~~
~~Toxicity characteristic (TC)~~	~~Toxicity characteristic leaching procedure (TCLP) extraction~~	~~(S) SW131~~
~~TC Metals:~~	~~Graphite furnace atomic absorption (AA) spectroscopy, gaseous hydride AA, or direct aspiration AA, manual cold-vapor technique~~	
~~Arsenic~~		~~(L, S) SW7~~
~~Barium~~		~~(L, S) SW7~~
~~Cadmium~~		~~(L, S) SW7~~
~~Chromium~~		~~(L, S) SW7~~
~~Lead~~		~~(L, S) SW7~~
~~Selenium~~		~~(L, S) SW7~~
~~Silver~~		~~(L, S) SW7~~
~~Mercury~~	~~Manual cold-vapor technique~~	~~(L) SW747~~
~~Volatile organics~~	~~Gas chromatography (GC)/mass spectrometry (MS)~~ ~~GC/MS capillary column technique~~	~~(L, S) SW8~~
~~Semivolatile organics~~	~~GC/MS~~ ~~GC/MS capillary column technique~~	~~(L, S) SW8~~ ~~(S) SW827~~
~~Organochlorine Pesticides~~	~~Thermal extraction/GC/MS~~	~~(L, S) SW8~~
~~Chlorinated Herbicides~~	~~GC~~	~~(L, S) SW8~~
~~Cyanide, free and total~~	~~Distillation and colorimetric ultraviolet~~	~~(L, S) SW9~~
~~Total chromium~~	~~Colorimetric method for hexavalent chromium~~	~~(L, S) SW7~~
~~Sulfide~~	~~Colorimetric titration~~	~~(L, S) SW9~~

~~Table D-2 (Continued)~~

~~Parameter~~	~~Test Method~~	~~Reference[b]~~
~~Total RCRA metals[c,d]~~	~~Acid digestion~~ ~~Inductively coupled plasma atomic emission spectroscopy~~	~~(L) SW3010A, (S) SW3050B~~ ~~(L, S) SW6010B~~
~~Arsenic~~		~~(L, S) SW6010B~~
~~Barium~~		~~(L, S) SW6010B~~
~~Cadmium~~		~~(L, S) SW6010B~~
~~Chromium~~		~~(L, S) SW6010B~~
~~Lead~~		~~(L, S) SW6010B~~
~~Selenium~~		~~(L, S) SW6010B~~
~~Silver~~		~~(L, S) SW6010B~~
~~Mercury~~	~~Manual cold-vapor technique~~	~~(L) SW7470A, (S) SW7471A~~
~~Free liquids~~	~~Paint Filter Liquids Test~~	~~(L, S) SW9095A~~

[a] ~~At Los Alamos National Laboratory, current analytical capabilities include limited analyses of mixed waste samples. These analyses include gross alpha, beta, and gamma screening.~~

[b] ~~"A" (*e.g.*, A006) refers to U.S. Environmental Protection Agency, 1984, "Sampling and Analysis Methods for Hazardous Waste Combustion," *EPA-600/8-84-002*.~~
~~"ASTM" refers to American Society for Testing and Materials standards.~~
~~"SW" refers to U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.~~
~~(L) refers to liquid waste.~~
~~(S) refers to solid waste.~~

[c] ~~See also atomic absorption methods. Total metals may be substituted for TCLP metals, if appropriate.~~

[d] ~~RCRA = Resource Conservation and Recovery Act.~~

~~Table D-3~~

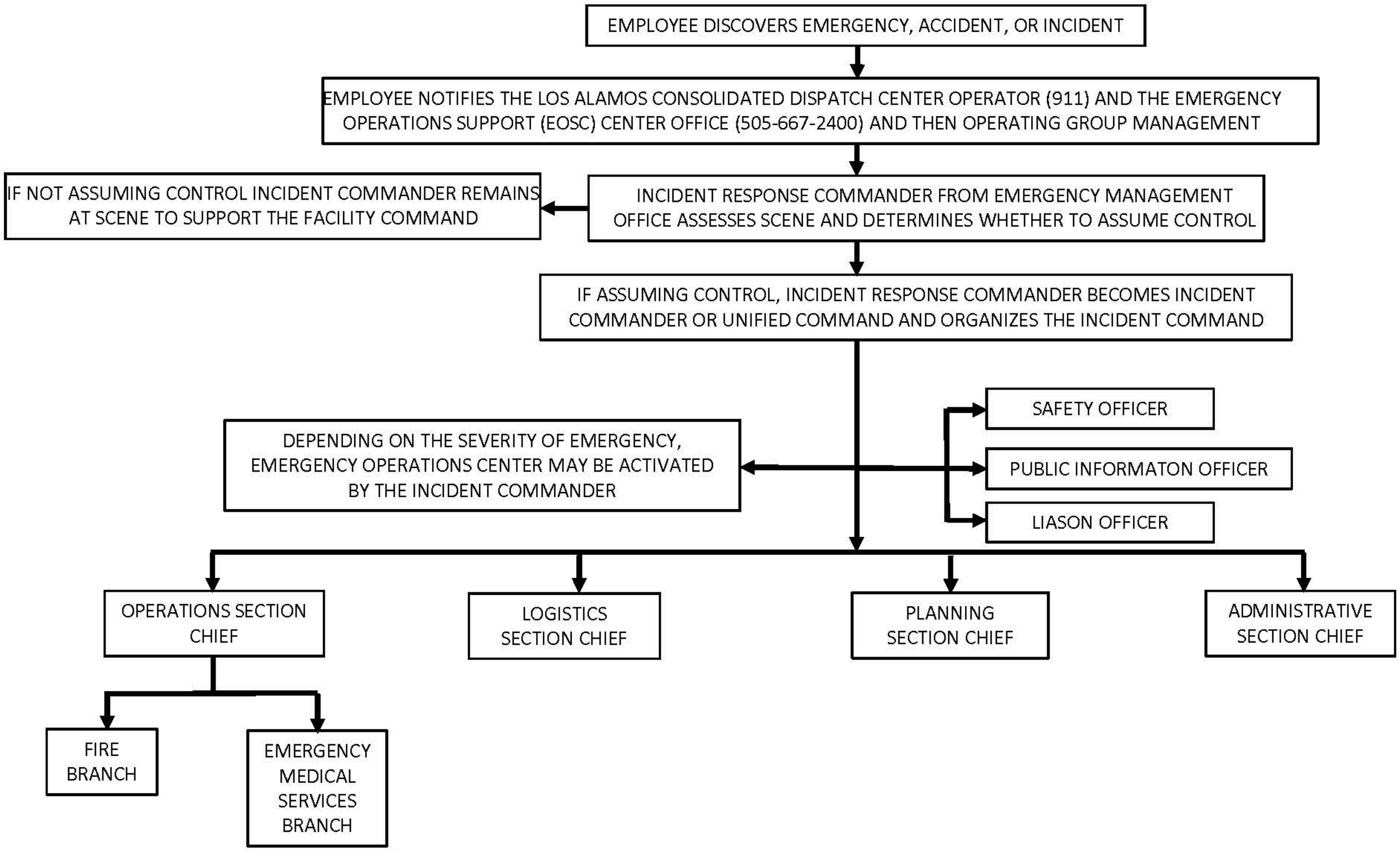
Evacuation Determination and ~~Re-Entry~~Reentry Conditions

Reason for Evacuation	Evacuation Determination Made by	Reentry Conditions[a]
Fire	[1]Fire or evacuation alarm, Line Manager or alternate, Lead Engineer, Senior Staff Member present, Senior Technician, or Incident Response Commander	Following survey by the person designated by the IC[b]
Explosion	Same as 1 above	Same as above
Loss of ventilation	[2]Line Manager or alternate, Senior Staff Member, Lead Engineer, ~~or~~ Senior Technician, or Incident Response Commander	Same as above
Loss of electric power	Same as 2 above	Same as above
Extensive contamination	Same as 2 above or health physics representative	Same as above
Airborne contamination	Same as 2 above or Radiation Monitor	Same as above
Escape or release of toxic or hazardous gas or fumes	Line Manager or alternate, Senior Staff Member, Lead Engineer, Senior Technician, or Incident Response Commander	Same as above
Bomb or bomb threat	Emergency management or security personnel, R&D[c] Section Leader or alternate, Senior Staff Member, or Lead Engineer	Same as above

[a] All reentries are authorized by the emergency management.
[b] "IC" refers to the Incident Commander as defined in 29 CFR § 1910.120.
[c] "R&D" refers to the Research and Development Section.

Figure D-1

General Hazardous Waste Emergency Notification System



~~TA~~Table D-3

~~ATTACHMENT D~~

~~CONTINGENCY PLAN~~

TA-3

~~ATTACHMENT D~~

~~CONTINGENCY PLAN~~

~~Specific information on emergency response resources and release prevention/mitigation at TA-3 is provided below.~~

~~The CMR~~, **Building** ~~at the Facility has a facility-specific Alarm/Emergency Response Instruction (AERI) to ensure that emergency planning and preparedness for the CMR Building are commensurate with the facility and the nature of work performed there and to provide sufficient subject matter experts at the facility, should an emergency occur.~~

~~The Alarm/Emergency Response Instruction (AERI) establishes emergency response activities at the CMR, which is comprised of a Facility Command Leader, and the CMR Operations Center. The Facility Command is comprised of division and line managers and key personnel who respond to pre-designated locations for the purpose of initial command and control of events that occur during CMR Building emergencies. The CMR Operations Center is the emergency communications focal point and has the responsibility of development and maintenance of alarm response instructions, notification lists, and call-out lists. When mitigation of the emergency is beyond the capabilities of CMR or when injuries occur or could potentially occur due to the emergency, emergency management personnel and the Incident Response Commander are required to respond.~~

~~The EMP has been superseded by the AERI which includes information on emergency equipment (*see* Table TA-3, D-1 of this Attachment Section); evacuation routes and primary and secondary evacuation assembly areas; and evacuation procedures for the Facility Command Leader, persons wearing anti-C clothing, and persons in non-anti-C clothing. The CMR EMP also includes emergency categorization, lists of potential facility emergencies, their associated alarms, and the appropriate response to the emergency and/or the alarms. Evacuation routes, evacuation area locations, and emergency equipment are subject to change.~~

~~TABLE D-1~~

~~TA-3~~

29 Emergency Equipment

FIRE CONTROL EQUIPMENT

Fire extinguishers are available in Rooms 9010, 9020, and 9030.

Description of General Capabilities:

Each fire extinguisher has a 10-pound minimum capacity and may be used by any qualified employee in the event of a small fire.

Twelve fire hydrants are located around the outside perimeter of Technical Area (TA) 3, Building 29 (TA-3-29). The nearest fire hydrants to Rooms 9010, 9020, and 9030 are located on the south side of Wing 9 and west side of Wing 5.

Description of General Capabilities:

The fire hydrants supply water at an adequate volume and pressure to satisfy the requirements of 40 CFR § 264.32(d).

Fire alarm pull boxes are located in Rooms 9010 and 9020.

Description of General Capabilities:

Manually-operated fire alarms may be activated by any employee in the event of fire to notify the Los Alamos Fire Department (LAFD) and the Emergency Operations and Support Center (EOSC).

Sprinkler systems are located in Rooms 9010, 9020, and 9030.

Automatic thermal alarm systems are located in Rooms 9010, 9020, and 9030.

Description of General Capabilities:

The sprinkler systems and thermal alarm systems are heat activated. The EOSC and the LAFD are alerted when a system has been activated.

SPILL CONTROL EQUIPMENT

Spill control kits are located in Rooms 9010, 9020, and 9030. Spill kits include (but are not limited to) sorbent pillows, and/or ~~absorbent~~absorbents.

Description of General Capabilities:

Sorbent is used in the event of a small spill.

COMMUNICATION EQUIPMENT

Telephones are located in the north enclosure of Room 9010, in Room 9020, and in Room 9030.

Paging phones and evacuation alarms are located in Rooms 9010, 9020, and 9030.

Description of General Capabilities:

Telephones are used for internal and external communication and have paging capabilities. The evacuation alarm is a pulsating sound that can be heard over the public address system. The fire alarm is a double slow-whoop sound.

DECONTAMINATION EQUIPMENT

Emergency shower and eyewash stations are located in the two enclosures in Rooms 9010, 9020, and in Room 9030.

Safety ~~data sheets (SDS~~Data Sheets (SDSs) are available hard copy or via online database.

Description of General Capabilities:

Emergency shower and eyewash stations are used by personnel who receive a chemical splash to the skin or eyes. Specific SDSs for the chemicals should be obtained prior to working with hazardous ~~or mixed~~ waste to determine if the application of water is indicated for decontamination.

PERSONAL PROTECTIVE EQUIPMENT

Personnel at TA-3-29 are required to use appropriate personal protective equipment (PPE) to protect themselves from hazards found in the workplace under normal conditions. This PPE may include gloves, steel-toed shoes, and safety glasses. Additional PPE may be required during an unusual hazardous situation or during sampling activities.

Self-contained breathing apparatus are made available if necessary in the event of an emergency by HAZMAT Personnel.

Room 9102 is a change room with protective clothing available.

Full-mask negative pressure respirators are available as needed; radioactive particulate filters are available.

OTHER

See Table D-1 of this Contingency Plan for equipment available in the HAZMAT vehicles and trailers.

Table D-4

TA-~~50~~

~~ATTACHMENT D~~

~~CONTINGENCY PLAN~~

~~**TA-50**~~

~~**ATTACHMENT D**~~

~~**CONTINGENCY PLAN**~~

~~Specific information on emergency response resources and release prevention/mitigation at TA-50 is provided below.~~

16 Emergency ~~equipment currently available for use at the permitted units at TA-50-69 are included in Table D-1 below. A list of emergency equipment (including spill equipment) available from the emergency management organization is presented in Table D-1 in this Attachment.~~ Equipment

~~Hazardous and mixed waste spills are managed by type and severity of the incident. If a hazardous/mixed waste spill occurs, the Incident Commander evaluates the type and severity of the spill and determines if assistance from emergency management personnel is required. If not, the spill is managed internally by TA-50 personnel.~~

~~REFERENCES~~

~~LANL, 1998, "Los Alamos National Laboratory General Part B Permit Application," Revision 1.0, Los Alamos National Laboratory, Los Alamos, New Mexico.~~

~~LANL, 2002, "Los Alamos National Laboratory Technical Area 50 Part B Permit Renewal Application", Revision 3.0, August 2002, LA-UR-02-4739, Los Alamos National Laboratory, Los Alamos, New Mexico~~

~~**TABLE D-1**~~

~~**TA-50**~~

~~**EMERGENCY EQUIPMENT**~~

FIRE CONTROL EQUIPMENT

- ~~**FIRE EXTINGUISHERS**~~

ABC- and/or BC-rated fire extinguishers are located at or in:

- Tank-truck garage (TA-16-1507)
- Control Building (TA-16-389)
- High Explosives Wastewater Treatment Facility (TA-16-1508)
- Each of the vehicles used to transport explosives

Description of General Capabilities:

The fire extinguishers may be used by any employee in the event of a small fire. For larger fires the Los Alamos Fire Department is alerted. LANL workers are trained not to fight a fire involving explosives.

Three fire hydrants are located in the vicinity of the unit and a water spigot is located at the TA-16-388 Flash Pad.

Description of General Capabilities:

The fire hydrants will supply water at adequate volume and pressure to satisfy the requirement of 40 CFR § 264.32.

SPILL CONTROL EQUIPMENT

Portable berms to contain spills are stored in an all-weather cabinet near the center of the TA-16 Burn Ground, at TA-16-386, and next to the TA-16-389 control building.

Description of General Capabilities:

Spill control equipment is available for use at the open burning unit in the event of a small spill.

COMMUNICATION EQUIPMENT

Telephones are located inside the TA-16-389 control building, at TA-16-1508, and at the railroad gate at the entrance to the TA-16 Burn Ground.

Personnel working at the TA-16 Burn Ground are assigned a site-specific pager for emergencies and lightning warnings.

Personnel working at the site have access to two-way radios.

Description of General Capabilities:

Telephones for internal and external communication are available for use by any employee. Employees can be notified of an emergency situation and appropriate response action through the use of two-way radios and pagers.

A fire alarm pull station is located at TA-16-1508.

Description of General Capabilities:

Manually-operated fire alarms may be activated by any employee in the event of a fire to notify the Emergency Operations Center. If fire danger level is “High”, Los Alamos Fire Department presence may be required on-site during the burn.

DECONTAMINATION EQUIPMENT

Eyewash stations are located in the tank-truck garage and in TA-16-1508. A portable eyewash is available in the immediate area of TA-16-388, when workers will be handling liquids or dusty materials.

Description of General Capabilities:

Eyewashes may be used by personnel who receive an accidental chemical splash to the eyes. Specific Safety Data Sheets (SDSs) can be obtained prior to working with hazardous waste to determine if the application of water is indicated for decontamination. SDSs are also maintained to provide information during emergency response.

PERSONAL PROTECTIVE EQUIPMENT

Appropriate personal protective equipment (PPE) will be worn, when necessary, to protect from hazards found in the workplace under normal conditions. PPE includes respirators, coveralls, and safety glasses that are available for TA-16 personnel during waste-handling operations.

All vehicles are equipped with first-aid kits.

Description of General Capabilities:

First aid kits may be used by personnel who sustain minor injuries at the unit in the course of operations.

Table D-5
TA-36 Emergency Equipment

FIRE CONTROL EQUIPMENT

Fire extinguishers (carbon dioxide and water) are located in Building TA-36-8 (control building). An additional fire extinguisher is located in each vehicle used to transport explosive material.

Description of General Capabilities:

The fire extinguishers may be used by any employee in the event of a small fire. The water fire extinguisher is for use on wood or brush fires. The CO_2 fire extinguisher is for use on electrical fires.

An automatic thermal alarm system is located in the TA-36-8 control building.

Description of General Capabilities:

Two alarms are connected to this system. One alarm is located on the ceiling of the main chamber and the other alarm is located on the ceiling of the camera room.

In the event that treatment by open detonation should result in a potential fire hazard, local fire department personnel may be asked to stand by during treatment to control any fires that may be started.

SPILL CONTROL EQUIPMENT

A spill control kit is located within the TA-36-8 control building.

Description of General Capabilities:

The spill control kits may contain items such as absorbents (i.e., pillows and pigs) or weighted tarps. Emergency management personnel provide additional spill control and cleanup equipment as needed.

COMMUNICATION EQUIPMENT

Telephones are located inside the control building and a portable telephone is available at the firing site.

Two-way radios are located in TA-36-7 (the make-up building), and inside the control building. A two-way radio is also issued to each firing site vehicle.

Description of General Capabilities:

Telephones for internal and external communication are available for use by any employee. Employees can be notified of an emergency situation and appropriate response action through the use of two-way radios.

A fire alarm pull station is located in the control building.

Description of General Capabilities:

Manually-operated fire alarms may be activated by any employee in the event of a fire to notify security personnel and the Los Alamos County Consolidated Dispatch Center.

The evacuation alarm, which consists of horns and sirens, is used during routine operations at the TA-36-8 open detonation unit to alert personnel to clear the area and/or to warn of test operations.

DECONTAMINATION EQUIPMENT

A portable eyewash station and Safety Data Sheets (SDSs) are available in the control building and a portable eyewash station is available in the immediate area, when required or needed.

Description of General Capabilities:

Eyewashes may be used by personnel who receive an accidental chemical splash to the eyes. Specific SDSs can be obtained prior to working with hazardous waste to determine if the application of water is indicated for decontamination.

PERSONAL PROTECTIVE EQUIPMENT

First aid kits and hearing protection are also located in the control building. A self-contained breathing apparatus shall be provided when necessary.

Description of General Capabilities:

The use of a self-contained breathing apparatus is determined by industrial hygiene personnel and will be provided as necessary. First aid kits may be used by personnel who sustain minor injuries at the unit in the course of operations. Hearing protection may be used by personnel during open detonation operations to mitigate noise impacts.

OTHER

If transportation is needed for evacuation, vehicles may be obtained through the Emergency Operations Support Center.

Table D-6
TA-39 Emergency Equipment

FIRE CONTROL EQUIPMENT

A fire extinguisher is located in the TA-39-6 control building. An additional fire extinguisher is located in each vehicle used to transport explosives.

Description of General Capabilities:

The fire extinguishers may be used by any employee in the event of a small fire. Fire extinguishers are never used to extinguish controlled fires at the open detonation unit.

A fire hydrant is located near TA-39-98.

Description of General Capabilities:

The fire hydrant supplies water at an adequate volume and pressure to satisfy the requirements of 40 CFR § 264.32.

SPILL CONTROL EQUIPMENT

A spill control kit is located within the TA-39-6 control building.

Description of General Capabilities:

The spill control kits may contain items such as absorbents (i.e., pillows and pigs) or weighted tarps. Emergency management personnel provide additional spill control and cleanup equipment as needed.

COMMUNICATION EQUIPMENT

Telephones are located in the TA-39-6 control building.

Two-way radios are located in the TA-39-6 control building. A two-way radio is also issued to each firing site vehicle.

Description of General Capabilities:

Telephones are used for internal and external communication. Two-way radios allow personnel in the field to maintain contact with various operations personnel and may be used to request emergency personnel and equipment, if necessary.

DECONTAMINATION EQUIPMENT

Safety Data Sheets (SDSs) are available in the control building.
Description of General Capabilities:

Specific SDSs can be obtained prior to working with hazardous waste to determine if the application of water is indicated for decontamination.

PERSONAL PROTECTIVE EQUIPMENT

First aid kits and hearing protection are also located in the control building. A self-contained breathing apparatus shall be provided when necessary.

Description of General Capabilities:

The use of a self-contained breathing apparatus is determined by industrial hygiene personnel and will be provided as necessary. First aid kits may be used by personnel who sustain minor injuries at the unit in the course of operations. Hearing protection may be used by personnel during open detonation operations to mitigate noise impacts.

OTHER

If transportation is needed for evacuation, vehicles may be obtained through the Emergency Operations Support Center.

Table D-7
TA-50 Emergency Equipment

FIRE CONTROL EQUIPMENT

Fire Extinguishers

Description of General Capabilities:

The fire extinguishers are portable, manually-operated units and may be used by any employee in case of fire. They consist of Class ABC- or ~~BC~~B- rated.

Locations:

2 fire extinguishers are located in TA-50-69~~,~~ Indoor Unit (Room 102~~)~~).

~~1 fire extinguisher is~~Fire extinguishers are located in each of the transportainers at the TA-50-69~~,~~ Outdoor Unit.

- ~~**FIRE ALARM PULL BOXES CONNECTED TO THE EMERGENCY OPERATIONS SUPPORT CENTER**~~

Fire Alarm Pull Boxes Connected To The Emergency Operations Support Center

Description of General Capabilities:

Fire alarms may be activated by any employee in the event of fire to notify the Emergency Operations Support Center. Upon activation, fire alarm horns and strobes provide audible and visual signals for personnel notification. The fire alarm is a pulsing sound.

Locations:

Three fire alarm pull stations are located in the TA-50-69~~,~~ Indoor Unit. Personnel working at the TA-50-69~~,~~ Outdoor Unit may use the pull stations at TA-50-69 in the event of a fire.

- ~~**AUTOMATIC FIRE SUPPRESSION SYSTEM**~~

Automatic Fire Suppression System

Description of General Capabilities:

A wet-pipe automatic sprinkler system that is hydraulically designed for ordinary hazard Group II coverage is in place throughout TA-50-69. This system is activated at 100°C (212°F).

Locations:

Throughout TA-50-69, as described above.

- ~~**FIRE HYDRANT**~~

Fire Hydrant

Description of General Capabilities:

Fire hydrants provide water for ~~fire fighting~~firefighting. All fire hydrants are supplied by an 8-inch (in.) water line connected to the 12-in. water main on Pecos Drive.

Location:

A fire hydrant is located approximately 55 ft west of TA-50-69.

SPILL CONTROL EQUIPMENT

~~**SPILL CONTROL EQUIPMENT**~~

Description of General Capabilities:

The spill control kits may contain items such as absorbents (i.e., pillows and pigs) or weighted tarps. The emergency management organization provides additional spill control and ~~clean up~~cleanup equipment as needed.

Spill Control Kit Location:

The spill kits are located in TA-50-69 and at the TA-50-69 Outdoor Unit.

COMMUNICATION EQUIPMENT

Description of General Capabilities:

Telephones for internal and external communication are available for use by employees. Alphanumeric pagers or cellular phones with page/text capabilities are also utilized by employees. Employees can be notified of an emergency situation and appropriate response actions through the use of a text message sent to the pagers, phones, or via two-way radios that may also be utilized for communication. Employees can reach emergency personnel in the time of an emergency through cellular telephones and two-way radios. Fire alarms are activated in the event of a fire. The fire alarm is a double slow-whoop sound. When working at the permitted units, personnel will have immediate access to emergency communication equipment either directly or through visual or voice contact with another employee.

Location of Communication Equipment:

Personnel working at the permitted units at TA-50-69~~,~~ will carry cellular phones, pagers, or two-way radios, or will have immediate access to communication equipment through visual or voice contact with another employee.

~~**DECONTAMINATION EQUIPMENT**~~

- ~~**SAFETY SHOWERS**~~

DECONTAMINATION EQUIPMENT

Safety Showers

Description of General Capabilities:

Safety showers are available to personnel who receive a chemical splash to the skin.

Location of Safety Showers:

A safety shower is located in TA-50-69, Room 102. One standard shower is located adjacent to the change room in TA-50-69.

Eyewashes

Description of General Capabilities:

- ~~**EYEWASHES**~~

~~Description of General Capabilities~~
Eyewashes are available to personnel who receive a chemical splash to the eye(s). Specific Safety Data Sheets (SDSs) for the chemicals being managed are available hard copy or via online database to personnel working with hazardous ~~or mixed~~ waste to determine if the application of water is indicated for decontamination.

Location of Eyewashes and Safety Data Sheets:

An eyewash is located in the TA-50-69~~,~~ Indoor Unit (Room 102). A portable eyewash station will be available during active waste management operations at the Outdoor Unit if waste with free liquids is being managed.

PERSONAL PROTECTIVE EQUIPMENT

Appropriate personal protective equipment (PPE) will be worn to protect from hazards found in the workplace under normal conditions. This PPE may include gloves, steel-toed shoes, and safety glasses. Additional PPE may be required during an unusual hazardous situation and may be found in the spill kits at various locations throughout the site.

OTHER

Continuous air monitors, giraffe monitors, or other ~~appropriated~~appropriate air monitoring equipment (as ~~determine~~determined by health physics personnel) may be located in the container storage units for detection of airborne radioactive constituents.

Table D-8
TA-54

~~ATTACHMENT D~~

~~CONTINGENCY PLAN~~

~~TA-54~~

~~ATTACHMENT D~~

~~CONTINGENCY PLAN~~

~~Specific information on emergency response resources and release prevention/mitigation at TA-54 is provided below.~~

~~Listings of emergency equipment currently available for use at~~ **Area L** ~~, Area G, and TA-54 West are presented in Tables D-1 through D-3 below.~~

~~REFERENCES~~

~~LANL, 2002, "Los Alamos National Laboratory General Part B Permit Renewal Application", Revision 2.0, August 2002, LA-UR-03-5923, Los Alamos National Laboratory, Los Alamos, New Mexico~~

~~LANL, 2003, "Los Alamos National Laboratory Technical Area 54 Part B Permit Renewal Application", Revision 3.0, June 2003, LA-UR-03-3579, Los Alamos National Laboratory, Los Alamos, New Mexico~~

~~TABLE D-1~~

~~TA-54 AREA L~~

Emergency Equipment

FIRE CONTROL EQUIPMENT

Class ABC- and BC-rated fire extinguishers are located at Area L. Class D-rated fire extinguishers are available at Area L if combustible metals are being managed. A dry-pipe sprinkler system is located at TA-54-215.

Dry chemical fire-suppression systems are located in storage sheds TA-54-68, TA-54-69, and TA-54-70.

Description of General Capabilities:

Fire extinguishers may be used by any qualified employee in the event of a small fire. The automatic dry-pipe sprinkler system is heat activated. Emergency Operations Support Center (EOSC) and the Los Alamos Fire Department (LAFD) are alerted when this system has been activated.

Fire alarm pull boxes are located inside TA-54-37, TA-54-39, TA-54-51, TA-54-60, TA-54-117, TA-54-210, and TA-54-221.

Description of General Capabilities:

Fire alarms may be activated by any employee in the event of a fire to notify the LAFD and the Emergency Operations Support Center (EOSC).

Fire hydrants are located near the main site entrance to Area L and at the southeast corner of TA-54-62 inside Area L. These fire hydrants supply water at an adequate volume and pressure to satisfy 40 CFR § 264.32(d).

Freeze-proof faucets are located east of TA-54-31.

SPILL CONTROL EQUIPMENT

Spill equipment at TA-54 Area L includes the following:

- Shovels
- Oversized drums
- Absorbent (various locations on site)
- Heavy equipment from Area G available for any emergencies at Area L

Spill kits are located throughout Area L. Each kit includes bags of absorbent, caustic neutralizer, acid neutralizer, and an inventory of tools and supplies.

COMMUNICATION EQUIPMENT

~~Alpha numeric emergency pagers, cellular~~Cellular telephones with ~~page/~~text capabilities, and/or two-way radios are given to employees working in the area. Personnel will carry cellular telephones~~, pagers~~ or two-way radios or will have immediate access to communication equipment through visual or voice contact with another employee.

A fire alarm pull box is located at TA-54-215.

Emergency ~~paging~~alarm system-loud ~~speaker~~speakers are located throughout the site. Evacuation alarms are located adjacent to the fenceline crash gates at Area L, at the northeast end of TA-54-32, the exterior west end of TA-54-215, and at TA-54-62.

Description of General Capabilities:

External and internal Laboratory communications which may be used in emergency situations are listed.

Fire alarm may be activated by any employee in the event of a fire to notify the LAFD and security personnel.

Employees can be notified of an emergency situation and appropriate response actions through the use of a text message sent on ~~the emergency alpha-numeric pagers or~~ cellular telephones with ~~page/~~text capabilities.

The evacuation alarm is a pulsating sound that can be heard throughout Area L. The fire alarm is a double slow-whoop sound.The emergency ~~paging~~notification system can be utilized to alert workers of an emergency situation as well as appropriate response actions.

DECONTAMINATION EQUIPMENT

Emergency shower and eyewash stations are located immediately east of TA-54-31, at TA-54-215, at TA-54-39, and outside TA-54-39.

Safety Data Sheets (SDSs) are available hard copy or via online database at the facility.

Description of General Capabilities:

Emergency shower and eyewash stations are used by personnel who receive a chemical splash to the skin or eyes. Specific SDSs for the chemical(s) should be obtained prior to working with the chemical to determine if the application of water is indicated for decontamination.

PERSONAL PROTECTIVE EQUIPMENT

Personnel at Area L are required to use appropriate personal protective equipment (PPE) to protect themselves from the hazards found in the workplace under normal conditions. This PPE may include gloves, steel-toed shoes, and safety glasses. Additional PPE may be required during an unusual hazardous situation or during sampling activities.

Spill kits throughout Area L may contain PPE items such as~~:~~ gloves, goggles, safety glasses, coveralls, and face shields.

Table D-~~2~~9
TA-54 ~~AREA~~Area G Emergency Equipment

~~**FIRE CONTROL EQUIPMENT**~~

FIRE CONTROL EQUIPMENT

ABC- and/or BC-rated fire extinguishers are available at TA-54-8, TA-54-33, TA-54-48, TA-54-49, TA-54-153, TA-54-224, TA-54-229, TA-54-230, TA-54-231, TA-54-232, TA-54-283, TA-54-375, and TA-54-412, and on Pads 1, 9, and 10.

Description of General Capabilities:

These portable, manually-operated fire extinguishers may be used by any qualified employee in the event of a small fire. For larger fires, the Emergency Operations and Support Center (EOSC) and the Los Alamos Fire Department (LAFD) are alerted.

Flame or smoke detection equipment and fire alarm pull stations are located within structures at TA-54-229, TA-54-230, TA-54-231, and TA-54-232.

~~Ultra-violet~~Ultraviolet detectors, smoke detectors and audible devices are located within structure TA-54-153.

Dry-chemical fire suppression systems are available at TA-54-1027, TA-54-1028, TA-54-1030, and TA-54-1041.

A dry-pipe fire suppression system is available at TA-54-412.

Fire alarm pull stations are available at TA-54-33, TA-54-48, TA-54-49, TA-54-153, TA-54-224, TA-54-229, TA-54-230, TA-54-231, TA-54-232, TA-54-283, TA-54-375, and TA-54-412.

Description of General Capabilities:

Fire alarms may be activated by any employee in the event of a fire to notify the LAFD and the EOSC. The EOSC and LAFD are also notified upon activation of the flame or smoke detectors.

Several fire hydrants are located in Area G. These fire hydrants will supply water at an adequate volume and pressure to satisfy the requirements of 40 CFR 264.32(d~~)~~).

SPILL CONTROL EQUIPMENT

Spill control stations and/or portable spill kits are located at TA-54-8, TA-54-33, TA-54-48, TA-54-49, TA-54-153, TA-54-224, TA-54-229, TA-54-230, TA-54-231, TA-54-232, TA-54-283, TA-54-375, and TA-54-412.

Each spill kit generally includes bags of absorbent and an inventory of tools and supplies.

COMMUNICATION EQUIPMENT

~~Alpha-numeric emergency pagers are given to employees working in the area. Additional equipment includes portable two-way radios and cellular telephones.~~ Personnel will carry cellular telephones, ~~pagers, to~~or two-way radios or will have immediate access to communication equipment through visual or voice contact with another employee.

Emergency ~~paging~~alarm system- loud speakers are located throughout the site.

Evacuation alarm buttons are located at or near TA-54-33, TA-54-48, TA-54-49, TA-54-153, TA-54-224, TA-54-229, TA-54-230, TA-54-231, TA-54-232, TA-54-283, TA-54-375, TA-54-412, Pads 1, 9, and 10 and at various muster stations.

~~Description of General Capabilities:~~

~~Loud speakers, paging~~Description of General Capabilities:

Cellular telephones ~~equipped with public address capabilities~~, two-way radios, and alarms located throughout Area G can be used to notify personnel of an emergency. The emergency ~~paging~~notification system can also be utilized to alert workers of appropriate response actions. Evacuation alarms have horns mounted on telephone poles throughout Area G that emit an audible alarm that can be heard throughout Area G. Employees can also be notified of an emergency situation and appropriate response action through the use of a text message sent on the emergency ~~alpha-numeric pagers or~~ cellular telephone texting system, or by two-way radio.

DECONTAMINATION EQUIPMENT

Portable eyewash stations are located at permitted units located at TA-54 Area G during waste management operations involving free liquids.

One permanent, hard-plumbed eyewash station and a safety shower ~~is~~are located in TA-54-33.

Safety Data Sheets (SDSs) are available hard copy or via online database.

Description of General Capabilities:

Emergency shower and eyewash stations are used by personnel who receive a chemical splash to the skin or eyes. Specific SDSs for the chemical(s) being managed should be obtained prior to working with hazardous ~~or mixed~~ waste to determine if the application of water is indicated for decontamination.

PERSONAL PROTECTIVE EQUIPMENT

Personnel at Area G are required to use appropriate personal protective equipment (PPE) to protect themselves from the hazards found in the workplace under normal conditions. This PPE may include gloves, steel-toed shoes, and safety glasses. Additional PPE may be required during an unusual hazardous situation and can be found in the spill kits or at various locations throughout the site.

OTHER

Continuous air monitors and giraffe monitors (or other appropriate air monitoring equipment*)* are located in many of the container storage units for detection of airborne radioactive constituents.

Heavy equipment available on site includes:

- Scraper
- Back hoe
- Bulldozer
- Front-end loader

Vehicles available to evacuate personnel from Area G include:

- All-terrain vehicles
- Pickup truck
- Flat-bed truck
- Micro trucks
- Vans

~~TABLE~~Table D-~~3~~10
TA-54 ~~WEST~~
West Emergency Equipment

FIRE CONTROL EQUIPMENT

ABC and/or BC fire extinguishers are available at TA-54-38 in the high and low bays and at the outdoor container storage unit.

> Description of General Capabilities:
>
> Fire extinguishers may be used by any employee in the event of a small fire. The Emergency Operations and Support Center (EOSC) and the Los Alamos Fire Department (LAFD) are alerted when the automatic dry-pipe sprinkler system has been activated.

A pre-action sprinkler system is available throughout TA-54-38, including the loading dock area. The sprinkler system is activated by loss of compressed air pressure (e.g., an open sprinkler) anywhere in the system or by heat detection in the high bay and at the loading dock and by smoke detection in the remainder of the building.

Fire alarm pull boxes are available inside TA-54-38 at the main entrance, in the high bay, and in the low bay.

> Description of General Capabilities:
>
> Fire alarms may be activated by any employee in the event of a fire to notify the LAFD and the EOSC.

A fire hydrant is located west of TA-54-38 near the entrance to TA-54 West. This fire hydrant supplies water at adequate volume and pressure to satisfy 40 CFR § 264.32(d).

A wall hydrant is located on the west side of TA-54-38.

Freeze-proof faucets are located on the west, south, and east sides of TA-54-38.

SPILL CONTROL EQUIPMENT

A mobile response kit is located at TA-54-38. The kit includes absorbent socks, pillows, and sheets; goggles; and large plastic bags.

COMMUNICATION EQUIPMENT

Evacuation alarm buttons are located at the high bay, the low bay, and the main entrance to TA-54-38.

Public address (PA) capabilities are located in TA-54-38 in the high bay, in the low bay, and outside the main entrance.

Alpha-numeric emergency pagers are given to employees working in the area.

Additional equipment includes portable two-way radios and cellular phones. Personnel will carry cellular telephones, pagers, or two-way radios or will have immediate access to communication equipment through visual or voice contact with another employee.

Description of General Capabilities:

PA capabilities for internal communication are available for use by any employee. Employees can be notified of an emergency situation and appropriate response actions through the use of a text message sent on the emergency alpha-numeric pagers, cellular telephones~~,~~ or by two-way radio. The evacuation alarm can be heard throughout TA-54-38. The fire alarm is a double slow-whoop sound. Fire and evacuation alarms are activated in the event of a fire or evacuation. The emergency PA can be utilized to alert workers of an emergency situation as well as appropriate response actions.

DECONTAMINATION EQUIPMENT

Safety showers and portable eyewash stations are located in TA-54-38 in the high bay and on the loading dock. The portable eyewash stations will be present during active waste management operations involving free liquids at these locations.

Safety Data Sheets (SDSs) are available hard copy or via online database.

Description of General Capabilities:

Safety showers and eyewashes are used by personnel who receive a chemical splash to the skin or to the eyes. Specific SDSs for the chemical(s) being managed should be obtained prior to working with mixed waste to determine if the application of water is indicated for decontamination.

PERSONAL PROTECTIVE EQUIPMENT

Personnel at TA-54 West are required to use appropriate personal protective equipment (PPE) to protect themselves from the hazards found in the workplace under normal conditions. This PPE includes gloves, steel-toed shoes, and safety glasses. Additional PPE may be required during an unusual hazardous situation and can be found in the spill kits or at various locations throughout the site or at adjacent TA-54 facilities.

Gloves and goggles are found in the spill kits located at TA-54-38.

All workers located within the operating limits of a crane (fixed or mobile) wear hard hats.

~~TA-55~~

~~ATTACHMENT D~~

~~CONTINGENCY PLAN~~

~~TA-55~~

~~ATTACHMENT D~~

~~CONTINGENCY PLAN~~

~~Specific information on emergency response resources and release prevention/mitigation at TA-55 is provided below.~~

~~Emergency equipment currently available for use at TA-55 are included as Tables D-1 through D-4 in this Attachment. A list of emergency equipment (including spill control equipment) available from the TA-55 Emergency Management Team is presented in Table D-1 of this Attachment's General Section. Emergency equipment discussed in this Plan may be replaced and/or upgraded with functionally equivalent components and equipment as necessary for routine maintenance and repairs.~~

~~Hazardous waste spills are managed by type and severity of the incident. If a hazardous waste spill occurs, the facility line management evaluates the type and severity of the spill and determines if assistance from emergency management organization and the Incident Response Commander is required. If not, the spill is managed internally by TA-55 personnel.~~

~~REFERENCES~~

~~LANL, 2002, "Los Alamos National Laboratory General Part B Permit Renewal Application", Revision 2.0, August 2002, LA-UR-03-5923, Los Alamos National Laboratory, Los Alamos, New Mexico~~

~~LANL, 2003, "Los Alamos National Laboratory Technical Area 54 Part B Permit Renewal Application", Revision 3.0, June 2003, LA-UR-03-3579, Los Alamos National Laboratory, Los Alamos, New Mexico~~

~~**TABLE D-1**~~

Table D-11
TA-55 Building 4, First Floor Emergency Equipment

FIRE CONTROL EQUIPMENT

Dry-chemical fire extinguishers are located in Room 401.

Description of General Capabilities:
The fire extinguishers are portable, manually-operated units and can be used by any employee in case of fire. The fire extinguishers in Room 401 are for use only in case of fire outside the gloveboxes.

Fire alarm pull boxes and push button stations are available in Room 401.

Description of General Capabilities:
Fire alarms can be activated by any employee in the event of fire to notify the Emergency Operations and Support Center (EOSC).

An automatic fire suppression sprinkler system is located in Room 401.

Automatic thermal alarms are located in the gloveboxes in Room 401.

Fire hydrants are located outdoors on the north, south, and west sides of TA-55-4.

SPILL CONTROL EQUIPMENT

Room 401 provides secondary containment for the storage tank system and cementation unit.

COMMUNICATION EQUIPMENT

Telephones are located in Room 401. The telephones are capable of handling incoming/outgoing calls and paging.

A telephone is located at each of the two west exit doors of TA-55-4.

Two-way radios are available from the TA-55 Operations Center located at TA-55, Building 0004, Room 218, for personnel working in Room 401.

Alarms at TA-55-4:
The fire alarm is a zone-wide whooping sound. If a drop-box pushbutton station is used, a zone-wide, high-pitched constant tone will be activated and then switch to the standard whooping sound.

The evacuation alarm is a facility-wide mid-range pulsating tone.

The continuous air monitor alarm is a local high-pitched pulsating tone.

The ventilation alarm is a local slow, repeating chime tone.

The public address system may also be used to announce an evacuation.

DECONTAMINATION EQUIPMENT

Safety showers and eyewash stations are located in Room 401.

Description of General Capabilities:
Safety showers and eyewashes are available for decontamination of personnel who receive a chemical splash to the skin or eyes.

Electronic versions of Safety Data Sheets (SDSs) are available in Room 401 and at TA-55-4, the TA-55 Operations Center located at TA-55, Building 0004, Room 218, for personnel working in Room 401.

Specific SDSs may be obtained prior to working with any hazardous waste to determine if the application of water is indicated for decontamination.

PERSONAL PROTECTIVE EQUIPMENT

Self-contained breathing apparatus (SCBA) are located in the southside hallway outside of Room 401, in the northside hallway of TA-55-4, and in TA-55-3, Room 179. The SCBAs are available for personnel working in or near Room 401.

Change/decontamination rooms with protective clothing available are located on the first floor of TA-55-4 and in TA-55-3. Protective clothing is also available in a locker located in the hallway near Room 401 for use by personnel working in or near Room 401.

Respirators located in TA-55-3 (Room 107) and in TA-55-4 (Room 515) are available for all personnel working in or near TA-55-4. Respirators are re-issued on a regular basis to TA-55-4 personnel for radiation work. These respirators are stored in the personnel's individual lockers. Combination gas canisters (particulate, organic, and acid) are available in TA-55-4 (Room 515).

OTHER:

If transportation is needed for evacuation, the request for additional assistance should be sent through emergency management organization.

~~TABLE~~Table D-~~2~~12
TA-55 Building 4, Basement Emergency Equipment

FIRE CONTROL EQUIPMENT

Halon, dry chemical, and/or carbon dioxide fire extinguishers are available near B40, B05, K13, B45, B13, G12, and the Vault.

Description of General Capabilities:

The fire extinguishers are portable, manually-operated units and can be used by any employee in case of fire.

Fire alarm pull boxes are located at B05, K13, B45, the Vault, and on each side of the fire door.

Description of General Capabilities:

Fire alarms can be activated by any employee in the event of fire to notify the Emergency Operations Support Center (EOSC).

An automatic fire suppression sprinkler system is located throughout the basement at TA-55-4, including the Vault and the office and corridor associated with the Vault.

Fire hydrants are located outdoors on the north, south, and west sides of TA-55-4.

SPILL CONTROL EQUIPMENT

Self-containment pallets or cabinets are provided for containers of liquid and/or potentially liquid-bearing wastes stored at B40, K13, and the Vault.

COMMUNICATION EQUIPMENT

Telephones and intercom stations are located throughout the basement of TA-55-4. The telephones are capable of handling both incoming and outgoing calls. The intercom system is connected to the TA-55-4 Operations Center and allows the Operations Center to easily mobilize emergency response support.

Two-way radios are available from the TA-55 Operations Center located at TA-55, Building 0004, ~~room~~Room 218, for personnel working in the basement at TA-55-4.

Personal pagers are issued to and carried by assigned personnel working in the basement of TA-55-4. These pagers are accessed by telephone.

Alarms at TA-55-4:

The fire alarm is an area-wide whooping sound.
The evacuation alarm is a facility-wide mid-range pulsating tone.
The continuous air monitor alarm is a local high-pitched pulsating tone.
The ventilation alarm is a local slow, repeating chime tone.

The public address system activated from the TA-55-4 Operations Center may be used to announce an evacuation.

A site-wide paging system activated from the TA-55-4 Operations Center can be heard throughout TA-55-4.

DECONTAMINATION EQUIPMENT

Eyewashes are located throughout the basement of TA-55-4.

Description of General Capabilities:
The eyewash stations are available for decontamination of personnel who receive a chemical splash to the eyes.

Safety showers are located near B40, K13, and in the office for the Vault.

Description of General Capabilities:
The safety showers are available for decontamination of personnel who receive a chemical splash to the skin.

Safety Data Sheets (SDSs) are available at TA-55-4. Specific SDSs may be obtained prior to working with any hazardous waste to determine if the application of water is indicated for decontamination.

PERSONAL PROTECTIVE EQUIPMENT

Change/decontamination rooms with protective clothing available are located on the first floor of TA-55-4 and in TA-55-3.

Respirators located in TA-55-4 and in TA-55-3 are available for all personnel working in or near TA-55-4. Particulate and toxic gas canisters are available in TA-55-4.

Self-contained breathing apparatus are located in the TA-55~~,~~ Basement.

OTHER:

If transportation is needed for evacuation, vehicles may be obtained through the emergency management organization.

Forklifts stored in the basement are available for use in the basement and are stored near the north basement doorway.

~~TABLE~~Table D-~~3~~13
TA-55 ~~CONTAINER STORAGE PAD~~
Outdoor Storage Pad Emergency Equipment

FIRE CONTROL EQUIPMENT

A dry chemical fire extinguisher is located on the ~~Container~~Outdoor Storage Pad.

Description of General Capabilities:
The fire extinguishers are portable, manually-operated units and can be used by any employee in case of fire.

Fire hydrants are located along the north, south, and west sides of TA-55-4.

One fire hydrant is located just south of the ~~Container~~Outdoor Storage Pad.

Fire alarm pull boxes are located in TA-55-42 at the northwest corner of TA-55-4.

One fire alarm pull box is located outside on the south side of TA-55-4.

COMMUNICATION EQUIPMENT

A telephone is located on the east side of TA-55-11, and additional phones are located on the south side of TA-55-4.

Two-way radios are available from the TA-55 Operations Center located at TA-55, Building 0004, Room 218, for personnel working at the ~~Container~~Outdoor Storage Pad.

Personal pagers are issued to and carried by assigned personnel working at the ~~Container~~Outdoor Storage Pad. These pagers are accessed by telephone.

Alarms at TA-55:
The fire alarm is an area-wide whooping sound.
The evacuation alarm is a facility-wide mid-range pulsating tone.

The public address (PA) system activated from the TA-55-4 Operations Center may be used to announce an evacuation. PA speakers are located on the west side of TA-55-4.

Two intercom systems to the TA-55-4 Operations Center are located on the south and north sides of TA-55-4.

DECONTAMINATION EQUIPMENT

A safety shower and eyewash station are located outdoors on the ~~Container~~Outdoor Storage Pad.

Description of General Capabilities:
The safety shower and eyewash are available for personnel who receive a chemical splash to the skin or eyes.

Safety Data Sheets (SDSs) are available at TA-55-2. Specific SDSs may be obtained prior to working with any hazardous waste to determine if the application of water is indicated for decontamination.

PERSONAL PROTECTIVE EQUIPMENT

Change rooms with protective clothing available are located on the first floor of TA-55-4 and in TA-55-3.

Respirators are located in TA-55-4 and in TA-55-3 for all personnel working in or near TA-55-4.

OTHER:

If transportation is needed for evacuation, vehicles may be obtained through the emergency management organization. Two forklifts are available for TA-55 personnel use.

~~TABLE~~Table D-414
TA-55-0355 ~~PAD~~
Pad Emergency Equipment

FIRE CONTROL EQUIPMENT

Four ABC-rated fire extinguishers are located at the TA-55-0355 Pad. An ABC-rated fire extinguisher is located in each vehicle used to transport waste containers to the unit.

Description of General Capabilities:

Portable and manually-operated fire extinguishers may be used by any qualified employee in the event of a small fire. For larger fires, the Los Alamos Fire Department (LAFD) is alerted and requested to respond.

COMMUNICATION EQUIPMENT

A telephone is located on the ~~North~~north side of the TA-55-0355 Pad and within the High Energy Neutron Counter (HENC) unit. The ~~facilities~~facility's public address (PA) system can be heard from the TA-55-0355 Pad.

Description of General Capabilities:

A telephone for internal and external communication is available for use by any employee. Employees can be notified of an emergency situation and appropriate response action through the PA system.

Alarms at TA-55-0355:
No fire alarm station is located at the TA-55-0355 Pad. The nearest fire alarm pull box is located outside of PF-4 on the ~~South~~south dock. In the ~~cased~~case of fire, notification will be made via telephone.

Description of General Capabilities:

Manually-operated fire alarms may be activated by any employee in the event of a fire to alert fire personnel, LANL Emergency Response ~~Personnel~~personnel, and the LAFD.

Fire and PA systems are located throughout the facility.

Description of General Capabilities:

The fire and PA system are activated or used to provide a sound signal to alert personnel of fires or the need to clear the area.

DECONTAMINATION EQUIPMENT

An ~~Eyewash~~eyewash station and any applicable Safety Data Sheets (SDSs) are available at the TA-55-0355 Pad or at the Operation Support Building. SDS information is maintained where appropriate for personnel accessibility and is used for chemicals that will be needed to support operations or emergency activities.

Description of General Capabilities:

The eyewash station may be used by personnel who receive a chemical splash to the eyes. Specific SDSs should be reviewed prior to working with chemicals. No free liquids will be stored on the Pad.

PERSONAL PROTECTIVE EQUIPMENT

Personnel at the TA-55-0355 Pad will be required to use appropriate PPE to protect themselves from hazards found under normal conditions. This PPE may include gloves, steel-toe shoes, and eye protection. Additional PPE may be required during unusual hazardous situations. First aid kits and hearing protection will be available.

Description of General Capabilities:

To prevent undue exposure of personnel to hazardous ~~or mixed~~ waste, PPE appropriate for the waste containers being managed will be worn by all on-site personnel at the TA-55-0355 Pad. First aid kits are available and may be used by personnel who sustain minor injuries at the unit in the course of operations. Hearing protection may be used by operations personnel to mitigate noise impacts.

OTHER~~:~~

If transportation is needed for evacuation, vehicles may be obtained through the emergency management organization.

Table D-15
TA-63 Transuranic Waste Facility Emergency Equipment

~~**TA-63**~~

~~**ATTACHMENT D**~~

~~**CONTINGENCY PLAN**~~

~~TA-63~~

~~ATTACHMENT D~~

~~CONTINGENCY PLAN~~

~~Specific information on emergency response resources and release prevention/mitigation at TA 63 is provided below.~~

~~Listings of emergency equipment currently available for use~~**FIRE CONTROL EQUIPMENT**

ABC- and/or BC-rated fire extinguishers are available at TA-63-0149, TA-63-0150, TA-63-0151, TA-63-0152, TA-63-0153, TA-63-0154, TA-63-0155, TA-63-0156, and TA-63-0157~~ are presented in Table D-1 below~~.

~~TABLE D-1~~

~~TA-63 Transuranic Waste Facility~~

~~Emergency Equipment~~

~~FIRE CONTROL EQUIPMENT~~

~~ABC and/or BC rated fire extinguishers are available at TA-63-0149, TA-63-0150, TA-63-0151, TA-63-0152, TA-63-0153, TA-63-0154, TA-63-0155, TA-63-0156, and TA-63-0157.~~

Description of General Capabilities:

These portable, manually-operated fire extinguishers may be used by any qualified employee in the event of a small fire. For larger fires, the Emergency Operations and Support Center (EOSC) and the Los Alamos Fire Department (LAFD) must be alerted.

Flame or smoke detection equipment and fire alarm pull stations are located within structures at TA-63-0149, TA-63-0150, TA-63-0151, TA-63-0152, TA-63-0153, and TA-63-0154.

Dry-pipe fire suppression systems are available at TA-63-0149, TA-63-0150, TA-63-0151, TA-63-0152, TA-63-0153, and TA-63-0154.

Fire alarm pull stations are available at TA-63-0149, TA-63-0150, TA-63-0151, TA-63-0152, TA-63-0153, TA-63-0154, TA-63-0155, TA-63-0156, and TA-63-0157.

Description of General Capabilities:

Fire alarms may be activated by any employee in the event of a fire to notify the LAFD and the EOSC. The EOSC and LAFD are also notified upon activation of the flame or smoke detectors.

Two fire hydrants are located in TWF. These fire hydrants supply water at an adequate volume and pressure to satisfy the requirements of 40 CFR 264.32(d~~)~~).

SPILL CONTROL EQUIPMENT

Spill control stations and/or portable spill kits are located at TA-63-0149, TA-63-0150, TA-63-0151, TA-63-0152, TA-63-0153, TA-63-0154, TA-63-0155, TA-63-0156, and TA-63-0157. Each spill kit generally includes bags of absorbent and an inventory of tools and supplies.

COMMUNICATION EQUIPMENT

Telephones and the public address system are located inside the Operations Support Building.

Description of General Capabilities:

Telephones and portable two-way radios for internal and external communication are available for use by any employee. Employees can be notified of an emergency situation and appropriate response action through the public address system.

Fire alarm pull stations are located in the storage buildings~~,~~ and at ~~operations support building~~the Operations Support Building.

Description of General Capabilities:

Manually-operated fire alarms may be activated by any employee in the event of a fire to alert TWF site personnel, LANL Emergency Response Personnel, and the LAFD.

Fire and public address system alarms:

Description of General Capabilities:

The fire and public address system are activated or used to provide a sound signal to alert personnel of fires or the need to clear the area.

DECONTAMINATION EQUIPMENT

Eyewash/emergency shower stations are available at TA-63-0149, TA-63-0150, TA-63-0151, TA-63-0152, TA-63-0153, and TA-63-0154. SDSs are available in the Operation Support Building. SDS information is maintained where appropriate for personnel accessibility and ~~are~~is used for chemicals that will be needed to support operations or emergency activities.

Description of General Capabilities:

~~Description of General Capabilities:~~

Eyewashes and emergency showers may be used by personnel who receive a chemical splash to the eyes or body. Specific SDSs should be reviewed prior to working with chemicals.

PERSONAL PROTECTIVE EQUIPMENT

Personnel at TWF are required to use appropriate personal protective equipment (PPE) to protect themselves from hazards found under normal conditions. This PPE may include gloves, steel-toe shoes, and eye protection~~, additional~~. Additional PPE may be required during unusual hazardous situations. First aid kits and hearing protection are also available.

Description of General Capabilities:

To prevent undue exposure of personnel to hazardous ~~or mixed~~ waste, personal protective equipment (PPE) appropriate for the waste containers being managed is worn by all on-site personnel at the TWF~~ (see section 2.5.6).~~. First aid kits may be used by personnel who sustain minor injuries at the unit in the course of operations. Hearing protection may be used by operations personnel to mitigate noise impacts.

Figure D-1

General Hazardous Waste Emergency Notification System

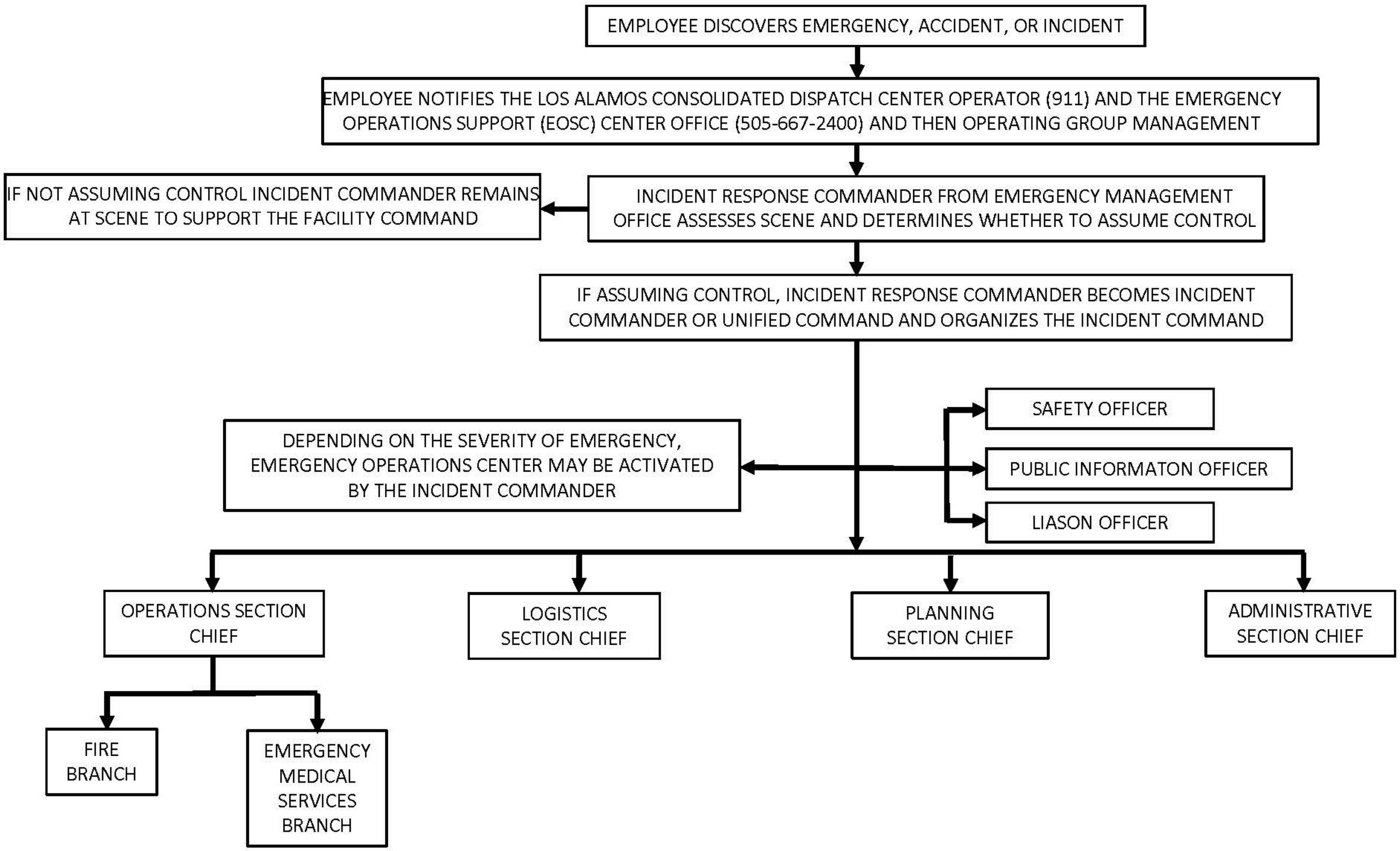
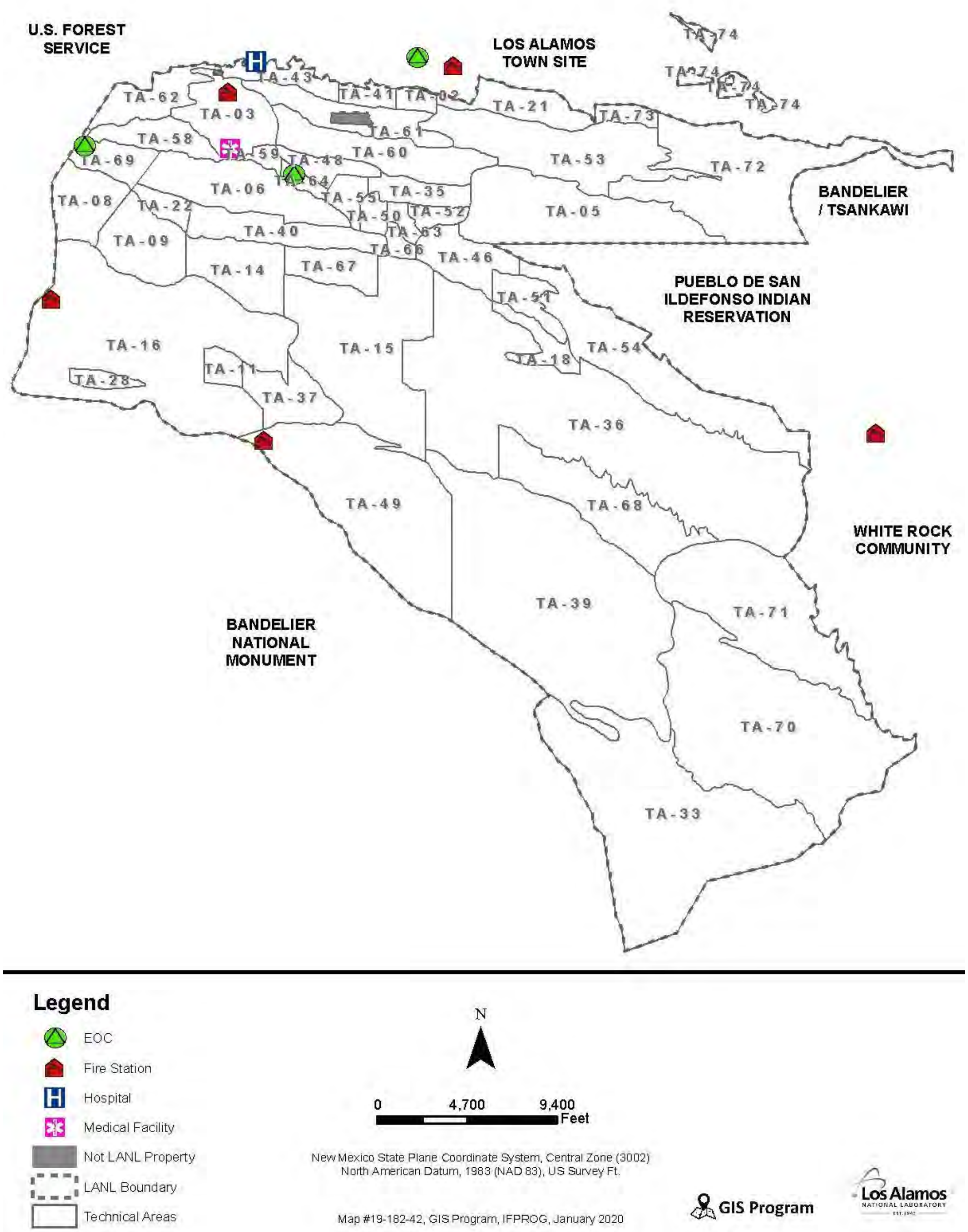


Figure D-2

Emergency Facilities at Los Alamos National Laboratory


U.S. FOREST SERVICE
LOS ALAMOS TOWN SITE
BANDELIER / TSANKAWI
PUEBLO DE SAN ILDEFONSO INDIAN RESERVATION
WHITE ROCK COMMUNITY
BANDELIER NATIONAL MONUMENT
TA-74
TA-62
TA-43
TA-41
TA-02
TA-21
TA-73
TA-03
TA-61
TA-58
TA-60
TA-69
TA-59
TA-48
TA-53
TA-72
TA-64
TA-08
TA-06
TA-35
TA-22
TA-55
TA-50
TA-52
TA-05
TA-40
TA-63
TA-09
TA-66
TA-46
TA-14
TA-67
TA-51
TA-16
TA-15
TA-18
TA-54
TA-28
TA-11
TA-37
TA-36
TA-49
TA-68
TA-39
TA-71
TA-70
TA-33
Legend
EOC
Fire Station
Hospital
Medical Facility
Not LANL Property
LANL Boundary
Technical Areas
N
0
4,700
9,400
Feet
New Mexico State Plane Coordinate System, Central Zone (3002)
North American Datum, 1983 (NAD 83), US Survey Ft.
Map #19-182-42, GIS Program, IFPROG, January 2020
GIS Program
Los Alamos NATIONAL LABORATORY

Attachment 6

Revised Supplement 1-5,
Permittees' Proposed Changes to Attachment E, Inspection Plan

ATTACHMENT E

INSPECTION PLAN

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LIST OF ~~FIGURES~~FORMS

ATTACHMENT E

INSPECTION PLAN

This Attachment presents inspection requirements applicable to ~~all~~active hazardous~~ or mixed~~ waste management units (permitted units) at Los Alamos National Laboratory (LANL). Inspection schedules for the units have been developed to identify equipment malfunctions and deterioration, operator errors, and discharges that ~~might~~may cause or lead to a release of hazardous~~ or mixed~~ waste and pose a threat to human health and the environment.

~~The Permittees shall conduct~~ Inspections shall be conducted at the schedule specified herein to identify problems in time to correct them before they ~~harm~~may adversely impact human health or the environment. Inspection schedules or methods may differ at certain hazardous waste management units based upon worker safety issues or the nature of the safety and emergency equipment.

E.1 GENERAL INSPECTION SCHEDULES AND REQUIREMENTS

The Permittees shall follow this Inspection Plan for the inspection of monitoring equipment, safety and emergency equipment, security devices, and operating and structural equipment that are important to preventing, detecting, and responding to environmental or human health hazards. Inspections may be conducted at any time during the applicable day or week, as specified in the inspection schedule.

A copy of this Inspection Plan, which includes inspection schedules, shall be maintained by the Permittees' hazardous waste compliance personnel and by the site operator (i.e., the division or operating group that is responsible for or manages the permitted unit), as ~~required~~outlined in Permit Section 2.6, *General Inspection Requirements*.

~~The Permittees~~Hazardous waste management unit personnel shall follow the inspection schedules outlining the items to be addressed on the Permittees' Hazardous Waste Facility Inspection Record Form (IRF~~)~~), and inspection frequencies for the unit types are provided in ~~this Attachment's~~ Sections E.2 through E.8, and in Technical Area (TA-~~)~~-specific Attachment E sections. The IRF and instructions for its completion are provided at the end of this Attachment ~~Section~~; the form may be supplemented, changed, or otherwise replaced through a permit modification pursuant to 40 CFR § 270.42(a). The IRF lists the items to be inspected.

E.1.1 Inspection Records

The Permittees shall ~~insure~~ensure that permitted unit personnel conduct inspections and record the information on IRFs or equivalent forms. The Permittees shall retain inspection records until closure of the associated permitted unit. The Permittees shall maintain an electronic version of the records through the closure or post-closure periods dependent upon the type of facility. The Permittees shall make inspection records available for review in the event that the Department or the U.S. Environmental Protection Agency inspects the facility for compliance with inspection requirements.

The IRF encompasses requirements for permitted hazardous and mixed waste management units, and additional requirements directed by the Permittees' policy. Instructions included with the IRF provide specific guidance for each inspection item listed.

The Permittees shall ~~complete~~ensure the IRF or equivalent form is completed according to the daily and/or weekly schedules provided in ~~Attachment~~ Sections E.2 through E.8. The Permittees shall conduct and record inspections in Parts I and II of the IRF for each working day or week that waste is opened, moved, received, stored, treated, removed, or remains open, as appropriate. The Permittees may use other records, such as a memo to file, to document a condition of "No Use" at a unit.

For every item requiring inspection, the Permittees shall enter a response indicating the condition of each item in the column under the appropriate day of the week. Responses may include ~~"OK," "~~"Yes," "No," "NA~~"~~" (Not Applicable), ~~or "~~"AR~~"~~" (Action Required~~).~~), or "Comment". If the response is AR, the Permittees shall note the action required in Part II of the IRF. If more than one AR is listed, the Permittees shall number the ARs. The Permittees shall identify and number all ARs, even if corrected immediately by the inspector. If inspection results indicate that corrective measures are warranted, ~~the Permittees~~ actions shall ~~record~~ be recorded along with any and all actions taken (along with time, date, and other pertinent information) in Part II of the IRF and the ARs shall ~~note the AR~~be noted on all subsequent IRFs until corrective measures are completed. When corrective measures ~~have been~~are completed and recorded on an IRF, ~~the Permittees~~"Yes" shall ~~enter an "OK"~~be indicated in the ~~"Condition"~~appropriate column on the IRF. Comments may be noted on the IRF in the same fashion as ARs, designating a condition at the unit that should be noted or other activities that may be occurring at the unit that do not require corrective action.

~~The Permittees~~At least monthly, fire protection maintenance specialists shall conduct and document monthly inspections ~~of the items listed below to ensure that the equipment is fully functional for its intended purpose:~~

~~1.~~ to verify evacuation alarms~~;~~
~~2.~~ , ventilation alarms~~;~~
, fire alarms~~;~~, and fire pumps~~.~~ are fully functional for the intended purpose(s).

E.1.2 Actions Resulting from Inspections

~~If~~When the Permittees discover any defects, deterioration, operator errors, discharges, or potential hazards during an inspection, the Permittees shall complete appropriate corrective measures (e.g., transfer of waste from a defective container to an appropriate container in good condition, repair or replacement of nonfunctioning equipment and/or systems, or removal of any accumulated liquids) promptly so that the problem does not lead to an environmental or human health hazard. The Permittees shall note any action taken in response to an inspection on the IRF or IRF documentation.

If a hazardous condition is imminent or has already occurred, the Permittees shall assess the condition immediately and follow up with appropriate remedial action. If this assessment indicates that human health or the environment may be or may have been adversely affected, the

Permittees may implement Permit Attachment D~~,~~ (*Contingency Plan*). In any case, the Permittees shall document the remedial action ~~that is required~~ and ~~is taken~~the outcome.

E.1.3 Training

The Permittees shall provide inspection training to appropriate Facility personnel, and ensure that training is repeated, as necessary.

E.2 INSPECTION SCHEDULE AND REQUIREMENTS FOR CONTAINER STORAGE UNITS

The Permittees shall inspect hazardous waste management units utilized for container storage ~~units (CSU)~~ according to the schedule provided below.

E.2.1 On Day(s) of Waste Handling

The Permittees shall conduct inspections every day of, or the day after, waste handling, with special attention placed on areas subject to spills, such as loading and unloading areas. The IRF will be filled out as appropriate for each specific unit or portion of a unit, as appropriate. Waste handling includes when waste is received at, moved or opened within, treated at, or removed from a ~~CSU~~unit. With respect to each container, the Permittees shall inspect and record the following items, as applicable:

- General IRF information (Items 1-~~7~~6)
- Secondary containment structures
- (Un)loading area(s)
- Run-on and runoff control
- Covers and lids of containers
- ~~1.~~ Labels
- ~~Accumulation~~ (including accumulation start date)
- Compatibility
- Structural integrity of containers
- ~~(Un)loading area(s)~~
- Presence and condition of shaft cover

E.2.2 Weekly

The Permittees shall conduct weekly inspections of ~~CSUs~~storage units every week that waste remains in storage. The Permittees shall inspect and record the following items, as applicable:

- General IRF information (Items 1-~~7~~6)
- Communications equipment
- Warning signs
- Security
- Work surfaces/floors
- Spill/fire equipment
- Eyewashes/safety showers
- Wind sock

- Secondary containment structures
- (Un)loading area(s)
- Run-on and runoff control
- Covers and lids of containers
- ~~1.~~ Labels
- ~~Accumulation~~ (including accumulation start date)
- Compatibility
- Structural integrity of containers
- ~~(Un)loading area(s)~~
- Aisle space/stacking
- Pallets/raised containers
- Presence and condition of shaft cover

E.2.3 Special Inspection Requirements at Technical Area 55

The Vault is a container storage hazardous waste management unit located in the basement at TA-55-4 and waste containers in the Vault shall only contain mixed waste. The following special inspection requirements are applicable to those rooms in the Vault that store mixed waste.

E.2.3.1 Non-Intrusive Inspection Systems

Inspection requirements are satisfied in part by the use of continuous air monitors (CAM) located in each individual storage room within the Vault to continuously monitor airborne radioactivity levels. If a problem with a container is identified by a CAM, the Permittees shall remove that container from the Vault and inspect it in an open-front hood.

The Permittees shall ensure that information obtained during inspections and all container transfers are noted on the Vault Traffic Log Book maintained at TA-55. The Permittees shall inspect the Vault Traffic Log Book weekly to verify receipt or transfer of mixed waste from the Vault. If mixed waste is not currently being stored in the Vault and the weekly inspection indicates that no mixed waste has been received, the Permittees shall mark the Inspection Record Form (IRF) "No Use" and complete it according to the IRF instructions.

E.2.3.2 Intrusive Inspection Procedures

The Permittees shall ensure that the central hallway of the Vault is inspected weekly when mixed waste is in storage. The Permittees shall inspect and note the following items in weekly inspections:

- Vault Traffic Log Book (inspected for receipt or transfer of waste)
- Communications equipment
- Warning signs
- Security
- Work surfaces and floors in central corridor and a visual inspection of storage rooms from hallway

- Spill and fire equipment
- Secondary containment
- (Un)loading area
- Confirm communication with Nuclear Materials Custodian that there are no alarms or problems at the unit

When containers are placed into or removed from a storage room within the Vault, the Permittees shall inspect the following items in that storage room, as appropriate:

- Vault Traffic Log Book (inspected for receipt or transfer of waste)
- Communications equipment
- Warning signs
- Security
- Work surfaces and floors
- Spill and fire equipment
- Secondary containment
- (Un)loading area
- Confirm communication with Nuclear Materials Custodian that there are no alarms or problems at the unit
- Emergency equipment/lighting
- Covers/lids of containers
- Labels (including accumulation start date)
- Compatibility
- Structural integrity of containers
- Aisle spacing/stacking
- Pallets/raised containers

The Permittees shall record inspection results on the IRF maintained at TA-55.

E.3 INSPECTION SCHEDULE AND REQUIREMENTS FOR TANK SYSTEMS

The Permittees shall inspect tank systems according to the schedule provided below.

E.3.1 Daily (During Operation)

The Permittees shall inspect tank systems (including ancillary equipment) at least once each operating day. An operating day includes ~~when~~all days that waste is present in the tank. The Permittees shall inspect tank systems for the items listed below, as appropriate:

- General IRF information (Items 1-~~7~~6)
- Secondary containment structures
- Labels
- Structural integrity of tanks and ancillary equipment
- Visible~~(Un)loading area~~

- ~~Aboveground~~ portions of tank systems to detect corrosion or releases of waste and to detect any possible malfunctions to overfill and spill control equipment, tank monitoring and leak detection systems, and data from these systems
- Proper operating condition of treatment tank (if applicable)

E.3.2 Weekly

The Permittees shall conduct weekly inspections of tank systems every week that waste ~~are~~is managed in the systems. Weekly inspection requirements for tank systems include the following items, as appropriate:

- General IRF information (Items 1-~~7~~6)
- Communications equipment
- Warning signs
- Security
- Work surfaces/floors
- Spill and fire equipment
- Eyewashes and safety showers
- ~~1. Wind sock, if applicable~~
- Secondary containment structures
- ~~2. Run on and runoff controls, if applicable~~
- ~~3.~~ Labels
- ~~Accumulation~~ (including accumulation start date~~, if appropriate~~)
- Structural integrity of tanks and ancillary equipment
- ~~4. (Un)loading areas~~
- ~~Aboveground~~Visible portions of tank systems to detect corrosion or releases of waste, overfill and spill control equipment, tank monitoring and leak detection systems, and data from these systems
- Proper operating condition of treatment tank (if applicable)

E.4 INSPECTION SCHEDULE AND REQUIREMENTS FOR OPEN BURNING AND OPEN DETONATION UNITS

The open burning and open detonation units will be inspected according to the schedule below.

E.4.1 On the Day of Treatment

Inspections will be conducted every day of operation (i.e., every day that open burning treatment or open detonation occurs). For inspections conducted on the day of treatment, the following items will be inspected, as appropriate:

- General IRF information (Items 1-6)
- (Un)loading area
- Open burning unit or open detonation unit area

E.4.2 Weekly

Weekly inspections of the active open burning or open detonation units will be conducted even if no treatment will occur during that week or when waste is present at the treatment unit and awaiting treatment. Weekly inspections will address the following items, as appropriate:

- General IRF information (Items 1-6)
- Communications equipment
- Warning signs
- Security
- Work surfaces/floors/roads
- Spill/fire equipment
- Eyewashes/safety showers
- Wind sock
- (Un)loading area

~~E.4 (Reserved)~~

- Run-on/off control
- Open burning unit or open detonation unit area

E.5 INSPECTION SCHEDULE AND REQUIREMENTS FOR STABILIZATION UNITS

The Permittees shall inspect stabilization units according to the schedule provided below.

E.5.1 Daily (During Operation)

The Permittees shall inspect stabilization units each operating day (i.e., when waste is treated in the unit). The Permittees shall inspect and record the following items, as applicable~~.~~:

- General IRF information (Items 1-~~7~~6)
- Warning signs
- Work surfaces and floors
- Secondary containment structures
- Covers and lids of containers
- Labels (including accumulation start date)
- ~~(Un)loading area~~

- Structural integrity of cementation unit

E.5.2 Weekly

The Permittees shall conduct weekly inspections of the stabilization unit including weeks when no treatment occurs. The Permittees shall inspect and record the following items, as applicable:

- General IRF information (Items 1-~~7~~6)
- Communications equipment

- Warning signs
- Security
- Work surfaces and floors
- Spill/fire equipment
- Eyewashes and safety showers
- Secondary containment structures
- Covers and lids of containers
- Labels (including accumulation start date)
- ~~(Un)loading area~~

- Structural integrity of cementation unit

E.6 INSPECTION AND MONITORING FOR UNITS SUBJECT TO SUBPART AA REQUIREMENTS

Inspection and monitoring requirements for units subject to 40 CFR Part 264, Subpart AA, are ~~addressed, if~~currently not applicable~~, in~~ at any hazardous waste management units located at the ~~TA-specific Sections of this Attachment.~~Facility. If applicable, these requirements would be addressed.

E.7 INSPECTION AND MONITORING FOR UNITS SUBJECT TO SUBPART BB REQUIREMENTS

The Permittees shall inspect units subject to 40 CFR Part 264, Subpart BB, according to the schedule and procedures provided below. There are currently no hazardous waste management units located at the Facility where these inspections are required.

E.7.1 Requirements for Pumps in Light Liquid Service

- ~~1.~~ The Permittees shall perform leak detection monitoring monthly using Reference Method 21 in 40 CFR Part 60.
- ~~2.~~ The Permittees shall perform visual inspection for liquids dripping from the pump seal each week.
- ~~3.~~ If a leak is detected, the Permittees shall initiate repairs no later than within 5 days and complete them as soon as possible, but no later than 15 days.
- ~~4.~~ A delay of repair is allowed if the repair is technically infeasible without shutting down the unit, and/or if the leaking equipment is isolated from the unit and does not contain or contact hazardous waste with greater than or equal to 10% by weight organics.

E.7.2 Requirements for Pressure Relief Devices In Gas/Vapor Service

- ~~1.~~ The Permittees shall measure and monitor devices to ensure that they are operated with no detectable emissions (less than 500 parts per million (ppm) above background) using Reference Method 21 in 40 CFR Part 60.
- ~~2.~~ The Permittees shall perform measurement and monitoring as soon as practicable, but no later than 5 days after a pressure release.

- ~~3.~~ A delay of repair is allowed if the repair is technically infeasible without shutting down the unit, or if the leaking equipment is isolated from the unit and does not contain or contact hazardous waste with greater than or equal to 10% by weight organics.

E.7.3 Requirements for Open-ended Valves or Lines

- ~~1.~~ The Permittees shall ensure that open-ended valves or lines are equipped with a cap, blind flange, or plug.
- ~~2.~~ The Permittees shall ensure that all caps, blind flanges, or plugs are sealed except during operations requiring movement of hazardous waste through the open-ended valve or line.

E.7.4 Requirements for Valves in Gas/Vapor or Light Liquid Service

The Permittees shall perform leak detection monitoring monthly using Reference Method 21 in 40 CFR Part 60. If no leaks are detected for two successive months, monitoring frequency may be changed to the first month of every succeeding quarter unless a leak is detected. Should that occur, monitoring frequency shall return to monthly until no leaks are detected for two successive months.

Alternatively, and following notification to the Department, if 2% or fewer valves are found to be leaking after two consecutive quarters, monitoring frequency may be changed to once every six months. If 2% or fewer valves are found to be leaking after five consecutive quarters, monitoring frequency may be changed to annually. Should the percentage of leaking valves exceed 2%, the Permittees shall perform monitoring monthly.

Alternatively, and following notification to the Department, no more than 2% of valves may be allowed to leak if the Permittees conduct performance testing pursuant to 40 CFR § 264.1061 initially, annually, and upon the Department's request to ensure that the leak percentage is being met. Should use of this alternative discontinue, the Permittees shall notify the Department within 15 days.

If a leak is detected, the Permittees shall initiate repair(s) no later than within 5 days and complete them as soon as possible, but no later than 15 days. A delay of repair is allowed if the repair is technically infeasible without shutting down the unit, if the leaking equipment is isolated from the unit and does not contain or contact hazardous waste with greater than or equal to 10% by weight organics, if purged emissions from immediate repair would exceed emissions from delaying repair, or if insufficient valve repair supplies exist although adequately stocked normally and the next unit shutdown is within 6 months.

E.7.5 Requirements for Pressure Relief Devices in Light Liquid Service, Flanges, and Other Connectors

The Permittees shall conduct monitoring within 5 days of identifying a potential leak by visual, audible, olfactory, or other method. If a leak is detected by an instrument reading of 10,000 ppm or greater, the Permittees shall initiate repairs within 5 days and complete them as soon as possible, but no later than 15 days. No monitoring is required for inaccessible, glass, or glass-lined connectors.

E.8 INSPECTION AND MONITORING FOR UNITS SUBJECT TO SUBPART CC REQUIREMENTS

The Permittees shall inspect units subject to 40 CFR Part 264, Subpart CC, according to the schedule and procedures provided below.

Container Levels that may be present at the storage areas are defined as follows:

Container Level 1~~-~~: The volume of the container in direct contact with waste is greater than 0.~~1m^3~~1 m^3 and less than or equal to 0.~~46m^3~~46 m^3, or the volume of the container is greater than 0.~~46m^3~~46 m^3 and not in light material service. The container must also be either: (1) compliant with the applicable Department of Transportation (DOT) regulations (40 CFR § 264.1086(f)); (2) equipped with a cover and closure devices that form a continuous barrier so that, when closed, no visible holes, gaps, or open spaces into the interior of the container are evident; or (3) an open-top container with an organic vapor suppressing barrier that precludes exposure of waste to the atmosphere.

Container Level 2~~-~~: The volume of the container in direct contact with waste is greater than 0.~~46m^3~~46 m^3 and is in light material service. The container also must be either: (1) compliant with the applicable DOT regulations (40 CFR § 264.1086(f)); (2) capable of operation with no detectable organic emissions as determined by the procedure specified at 40 CFR § 264.1086(g); or (3) demonstrated to be vapor-tight within the past 12 months using 40 CFR 60, Appendix A, Method 27, and the procedure specified at 40 CFR § 264.1086(h).

Container Level 1 Inspection Requirements

The Permittees shall inspect and maintain containers in Container Level 1 as follows:

If waste is already in the container when received:

1. On or before the date the container is accepted at the facility, the Permittees shall perform a visual inspection of the container, cover, and closure devices for visible cracks, holes, gaps, and other open spaces into the interior when cover and closure devices are secured in closed position.
2. If a defect is detected, the Permittees shall initiate repair(s) within 24 hours and complete them as soon as possible, but no more than 5 days. If a defect(s) ~~are~~is not completely repaired within 5 days, the Permittees shall remove waste and the container shall not be used until the defect(s) has been repaired.

If waste remains in storage for greater than or equal to 1 year:

1. The Permittees shall perform a visual inspection of the container at initial receipt and at least once every 12 months.
2. If a defect is detected, the Permittees shall initiate repair(s) within ~~the~~ 24 hours and complete them as soon as possible, but no later than 5 days. If the defect(s) is not

completely repaired within 5 days, the Permittees shall remove the waste and the container shall not be used until the defect(s) ~~have~~has been repaired.

Container Level 2 Inspection Requirements

The Permittees shall inspect and maintain containers in Container Level 2 as follows:

If waste is already in the container when received:

1. On or before the date the container is accepted at the facility, the Permittees shall perform a visual inspection of the container, cover, and closure devices for visible cracks, holes, gaps, and other open spaces into the interior when cover and closure devices are secured in a closed position.
2. If a defect(s) is detected, the Permittees shall initiate repair(s) within 24 hours and complete them as soon as possible, but no later than 5 days. If a defect(s) ~~are~~is not completely repaired within 5 days, the Permittees shall remove waste and the container shall not be used until the defect(s) ~~have~~has been repaired.

If waste remains in storage for greater than or equal to 1 year:

1. The Permittees shall perform a visual inspection of the container at initial receipt and at least once every 12 months.
2. If a defect(s) is detected, the Permittees shall initiate repair(s) within 24 hours and complete them as soon as possible, but no later than 5 days. If a defect(s) ~~are~~is not completely repaired within 5 days, the Permittees shall remove the associated waste and the container shall not be used until the defect(s) ~~have~~has been repaired.

The Permittees shall minimize exposure of hazardous waste to the atmosphere in the process of waste transference in or out of containers.

E.9 ADDITIONAL INSPECTIONS REQUIRED

This section outlines other inspections as required by Sections of the Permit other than Permit Section 2.6, *General Inspections*.

E.9.1 Technical Area 50, Building 69 Storm Water Drainage

The storm water drainage swales located in the vicinity of the TA-50-69 Outdoor hazardous waste management unit are utilized to divert storm water away from the TA-50-69 pad. One drainage swale is located just south of the permitted unit or between it and the Material Disposal Area (MDA) C. A second drainage swale is located on the west side of the permitted unit between Pecos Drive and the TA-50 fence line.

HAZARDOUS AND MIXED WASTE FACILITY INSPECTION RECORD FORM

[1] FACILITY:	[2] Site ID #:	TREATMENT, STORAGE, OR DISPOSAL UNIT (TSD)	[3] START DATE:	[4] END DATE:

[5] ☐Containers ☐Landfill ☐Chemical Treatment ☐Tank ☐Miscellaneous Unit (OB/OD, Cementation)

PART I- Enter condition of the item inspected (i.e. **OK**, **NA** [Not Applicable], or **AR** [Action Required]) in column for day inspected.

ITEM	INSPECTED FOR:	MON	TUE	WED	THU	FRI	SAT	SUN
	All TSDs							
[6] NO UNIT USE	No waste stored							
[7] NO WASTE HANDLING	No waste handled/treated (see instructions)							
[8] COMMUNICATIONS EQUIPMENT	Availability and proper operating condition							
[9] WARNING SIGNS	Posted, legible, and bilingual							
[10] SECURITY	Good condition of fences, gates, locks, and other access control equipment							
[11] WORK SURFACES/ FLOORS/ROADS	Absence of conditions that could lead to an accident or spill							
[12] SPILL/FIRE EQUIPMENT	Present, appropriate, and in proper operating condition							
[13] EYEWASHES/ SAFETY SHOWERS	Proper operating condition							
[14] WIND SOCK	Proper operating condition and no damage							
[15] SECONDARY CONTAINMENT	Integrity- No standing water/waste, erosion, or other signs of a spill							
[16] (UN)LOADING AREA	No spills or deterioration							
[17] RUN-ON/OFF CONTROL	Integrity- no ponding, erosion, or damage							
	Container Storage Units and/or Tanks (see instructions)							
[18] COVERS/LIDS OF CONTAINERS	Closed and secured properly							
[19] LABELS	Proper labels with start date, present & legible							
[20] COMPATIBILITY	Separated according to compatibility							
[21] INTEGRITY	No leakage, deterioration, corrosion, or damage							
[22] AISLE SPACE/STACKING	Appropriateness and adequacy							
[23] PALLETS AND RAISED CONTAINERS	Absence of conditions that could result in failure							
[24] TANK SYSTEMS	Discharge controls and fill level and no corrosion or leakage							
	Other TSDs							
[25] SHAFTS/LANDFILL COVERS	Presence and condition of cover							
[26] OPEN BURNING UNITS	Condition of cover, and no erosion, leakage, or deterioration							
[27] OPEN DETONATION UNITS	Unit and vegetation condition and no erosion							
[28] CEMENTATION UNITS	Structural integrity and condition of equipment and systems							

HAZARDOUS AND MIXED WASTE FACILITY INSPECTION RECORD FORM

FACILITY:	Site ID #:	START DATE:	END DATE:

	MON	TUE	WED	THU	FRI	SAT	SUN
29 DATE							
30 TIME							
31 INSPECTOR(S)							

Part II- For any AR (Action Required) in PART I, describe below: action required, action taken, date, and time of action. Attach additional sheets if necessary. If more than one action is required, number each AR.

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Part III- Comments.

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The storm water drainage area is inspected annually for signs of deterioration to ensure that potential run-on is directed away from the facility for the following areas:

- South of TA-50-69 between TA-50-69 and MDA C
- West of TA-50-69 between Pecos Drive and the TA-50 fence line

The form utilized to document this inspection is included as Form E-2 of this Attachment.

E.9.2 Technical Area 54, Area L Dome 215 Holding Tank

The 10,000-gallon holding tank is located at Area L, Dome 215. The tank is used to collect liquid that may result from fire-suppression activities and that is in excess of the capacity inside the rind wall located around the dome to prevent run-on into the dome. The tank is inspected monthly for any detectable fluids. If any fluids are detected in the holding tank, the Waste Management Coordinator and the Shift Operations Manager will ensure that a chemical analysis of the fluid is performed and fluid is removed within 3 days. The inspection requirements should be applied to the monthly inspections conducted on the 10,000-gallon holding tank and documented on Form E-3 as included within this Attachment.

E.9.3 Open Burning/Open Detonation Treatment

Before treatment activities commence at the open burning and open detonation treatment units, an inspection shall be conducted to ensure that operational restrictions required by Permit Parts 5 and 6 are met. The inspection is documented on Form E-4 as included within this Attachment.

<u>FORM E-1</u>

<u>Hazardous Waste Facility Inspection Record Form</u>

HAZARDOUS WASTE FACILITY INSPECTION RECORD FORM

[1] FACILITY:	[2] SITE ID #:	[3] START DATE:	[4] END DATE:

Part I: Answer **YES, NO,** or **N/A** for each item inspected. If an action is required, mark **AR** (Action Required) and describe the AR in **Part II**.

ITEM	**INSPECTION:**	**MON**	**TUE**	**WED**	**THU**	**FRI**	**SAT**	**SUN**
[5] UNIT IN USE	Is hazardous waste stored at the unit?							
[6] WASTE HANDLING ACTIVITIES	Were waste-handling activities performed?							
[7] COMMUNICATIONS EQUIPMENT	Available and in proper operating condition?							
[8] WARNING SIGNS	Posted, legible, and bilingual?							
[9] SECURITY	Proper administrative/physical controls implemented?							
[10] WORK SURFACES/ FLOORS/ROADS	Absence of conditions that could lead to a spill or accident?							
[11] SPILL/FIRE EQUIPMENT	Is equipment present, appropriate, and in proper operating condition?							
[12] EYEWASHES/ SAFETY SHOWERS	Is equipment present, appropriate, and in proper operating condition?							
[13] WIND SOCK	Present and in proper operating condition?							
[14] SECONDARY CONTAINMENT	In good condition and properly maintained?							
[15] (UN)LOADING AREA	Safe from hazards, in good condition, and properly maintained?							
[16] RUN-ON/OFF CONTROL	Controls are intact and properly maintained?							
[17] COVERS/LIDS OF CONTAINERS	Properly closed and securely in place?							
[18] LABELS	Labels have all required information and visible for inspection?							
[19] COMPATIBILITY	Compatibility was evaluated and containers separated if needed?							
[20] INTEGRITY OF CONTAINERS	In good condition with no signs of damage, leakage, or corrosion?							
[21] AISLE SPACE/STACKING	Adequate for movement of personnel, fire protection, spill control, & decontamination equipment?							
[22] PALLETS AND/OR RAISED CONTAINERS	In good condition with no signs of damage or corrosion?							
[23] TANK SYSTEMS	Are tank, ancillary equipment, & leak detection controls all in proper operating condition?							

HAZARDOUS WASTE FACILITY INSPECTION RECORD FORM

[1] FACILITY:	[2] SITE ID #:	[3] START DATE:	[4] END DATE:

ITEM	INSPECTION:	MON	TUE	WED	THU	FRI	SAT	SUN
[24] SHAFTS/LANDFILL COVERS	Securely in place with area free of evidence of erosion?							
[25] OPEN BURNING UNITS	Covered when not in use, in good condition, and free of deterioration & explosives?							
[26] OPEN DETONATION UNITS	In good condition and free of erosion, vegetation, & explosives?							
[27] CEMENTATION UNITS	Good structural integrity and good condition of equipment with no signs of damage?							

	MON		TUE		WED		THU		FRI		SAT		SUN	
[28] INSPECTOR(S) NAME / DATE AND TIME	Name	Date and Time	Name	Date and Time	Name	Date and Time	Name	Date and Time	Name	Date and Time	Name	Date and Time	Name	Date and Time

Part II: For any comment(s) or AR (Action Required) in Part I, describe the item(s) below. Document: action required, action taken, status, date, and time of action. Attach additional sheets if necessary. If more than one action is required, number each AR.

[29]

Part I

Weekly and daily inspection of ~~TSDs~~hazardous waste management units will be conducted in accordance with the ~~inspection plan~~Inspection Plan in the LANL Hazardous Waste Facility Permit, (Attachment E) or in the most recent permit application for interim status units, as appropriate. Not all items in this section will apply to all facilities. An "NA" (not applicable) is required if the item does not apply. Facilities may shade parts of the form to indicate items that need to be completed only on a weekly basis. Holidays and Laboratory closures may also be noted (e.g., by writing "H" (for holidays) or "Closed" in the first box and drawing a line all the way down the page).

All boxes within the column for the day of the inspection are required to be filled. However, a column may be left blank on days when operations are not conducted.

1. Location information, including TA, building, room (if applicable), and any other location descriptors that may be necessary (e.g., TA-~~59-3-114~~50-69 Indoor or TA-~~59-1-S, Dock~~16-388 Flash Pad).
2. A site identification number is assigned to every facility by the ~~Resource Conservation and Recovery Act (RCRA)~~waste management compliance personnel. This allows for ease in identification.
3. Start date~~ of ~~: Indicate week start date beginning on Monday for the week of record.
4. End date~~ of ~~: Indicate week end date ending on Sunday for the week of record.
5. ~~Check the appropriate box for the type of operation. Several boxes may be checked, if necessary, for those locations where inspections are combined on a single sheet. You must have prior approval from RCRA compliance personnel to combine inspections for more than one unit.~~

~~6.~~5.Unit in Use: For container storage units only~~ "NO UNIT USE" may be checked (or marked "OK") if~~: If any hazardous waste is stored at the unit at the time of inspection, mark "Yes" and continue to the next item. If the unit is empty (no hazardous waste stored at time of inspection), mark "No". If waste was not stored at the unit for the week in question~~. When this box is checked, the individual responsible for the inspection must~~, only complete this box, the items related to site location (Items 1-5), and the inspector name section for that week (~~Items 29-31~~Item 28). If any hazardous~~ or mixed~~ waste is subsequently placed at the site for any reason, a full inspection must be performed immediately ~~and then subsequently ~~according to the ~~appropriate~~container storage inspection ~~plan~~schedule.

~~7. a. At a container storage unit if waste is in storage but no waste is handled at the unit for the week "NO WASTE HANDLING" may be checked, but a weekly inspection in accordance with the appropriate inspection plan must be conducted.~~

~~b. If a treatment unit is not conducting treatment for the week "NO WASTE HANDLING" may be checked, but a weekly inspection in accordance with the appropriate inspection plan must be conducted.~~

~~c. For a tank storage system unit, if no waste is being stored and the tank system is empty, "NO WASTE HANDLING" may be checked. However, a weekly inspection in accordance with the appropriate inspection plan must be conducted. (If any hazardous or mixed waste is subsequently placed in the tank for any reason, full~~

~~inspection must be performed immediately and then subsequently according to the appropriate inspection plan.~~

6. ~~Communication equipment must be inspected in order to ensure availability and proper operating condition for each piece of~~Waste-Handling Activities: Indicate whether waste-handling activities were performed on the day of or the day before inspection. IF YOU bring containers into an empty unit, add or remove waste to/from a container, label a container, move a container within the unit, take a container out, open/close or tighten/loosen a container lid, transfer waste from one container to another, tilt/shake a container, or treat hazardous waste—YOU ARE HANDLING the waste and/or CONDUCTING WASTE MANAGEMENT ACTIVITIES. (This includes Tank Systems accordingly.)
   a. If the unit is empty, mark "No" and continue to the next item.
   b. If the unit is storing hazardous waste but you are not HANDLING/CONDUCTING WASTE MANAGEMENT ACTIVITIES, mark "No" and continue to the next item.
   c. If any items in #6 above were performed during your weekly inspection, mark "Yes" and continue to the next item.
   d. If your weekly inspection was completed at an earlier date in the week but you performed any item listed in #6 above, you must complete another full inspection on or by the end of the next day (and mark "Yes" on item #6 on the IRF and continue to the next item).

~~8.~~7.Communications Equipment: All equipment (e.g., telephones, radios, and alarms~~).~~) must be inspected for availability and operability. Equipment must be present in accordance with the appropriate contingency plan.

~~9.~~8.Warning Signs: Required signs must be legible and prominently posted in accordance with 40 CFR § 264.14(c) and/or the ~~permit~~Permit as applicable. Warning signs at all gates and perimeter fences where present around permitted units~~,~~ must be ~~posted in~~ bilingual (~~In~~in English and Spanish~~),~~) and must be visible from a distance of at least 25 feet and from all angles. Warning signs along shared boundaries with the ~~Facilities~~Facility's permitted unit and the ~~pueblo of~~Pueblo de San Ildefonso shall be posed in the appropriate dialect of Tewa, equivalent to the bilingual warning signs (~~See~~see Permit Section 2.5.1~~(~~, *Warning Signs*~~)).~~). Signs at large outdoor storage areas will be inspected no less than two times per year to evaluate for deterioration.

~~10.~~9. ~~Site security must be verified. Items such as fences, gates, locks, and other access control equipment (as appropriate) should be checked for~~Security: Verify proper operating condition or mitigative measures (e.g., attendants, locks, prohibited or controlled roadway access). (See Permit Section 2.5~~(~~, *Security*~~)).~~)

~~11.~~10. Work Surfaces/Floors/Roads: Roads, process floors, and other work surfaces at ~~TSDs~~hazardous waste management units must be inspected for any conditions that could lead to a ~~spill~~release or ~~an~~ accident~~.~~, or cause an environmental or human health hazard. Inspection includes structures and base materials ~~and~~for malfunctions, deterioration (e.g., tears in dome fabric), operator errors, and discharges.

~~12.~~11. Spill/Fire Response Equipment: Hazardous ~~or mixed~~ waste ~~TSDs~~management units must have ~~fire~~spill control and ~~spill control~~fire response equipment~~. Equipment must be present,~~ readily available in proper operating condition, and appropriate for the material in question. Hose bibs, where present, should be inspected for proper operating condition and adequate pressure. Outdoor fire-water supply systems must be checked for freezing and damage.

Equipment must be inspected and present in accordance with the appropriate inspection and contingency plans. ~~(~~Attachment D~~ (contingency~~, *Contingency Plan*~~)~~, of the Permit includes a list of required equipment specific to each permitted unit~~.)~~.

~~13.~~12. Eyewashes/Safety Showers: Where present, eyewashes and safety showers must be inspected to ensure proper operating condition or document that scheduled routine inspections have been conducted~~ and documented as indicated~~. Documentation of routine inspections must be maintained at ~~the~~each eyewash or safety shower. Outdoor locations must be checked for freezing.

~~14.~~13. Wind ~~socks, where~~Sock: Where present at outside ~~TSDs,~~hazardous waste management units, wind socks must be inspected for damage and to ensure that they are in proper operating condition/functional~~ and checked for damage~~.

~~15.~~14. Secondary Containment: Structures or equipment (e.g., secondary containment ~~structures~~pallets) for hazardous~~ or mixed~~ waste operations must be inspected to verify proper operating condition and to ensure adequate capacity~~.~~ for the wastes stored. Structures must also be inspected for the presence of standing water or ~~hazardous/mixed waste or~~ any other indication of a spill (i.e~~.~~., discolored vegetation, soil, or concrete). For certain operations, secondary containment includes inspection of gloves, gloveboxes, hoods, and ventilation systems. For locations where inflatable “Porta Berms” are used, inspectors must ensure that they are adequately inflated. All monitoring and leak detection systems must also be checked. (Note: Dome 224 must be checked for liquids even though the liner is not considered secondary containment.)

~~16.~~15. Loading and ~~unloading~~Unloading Areas: When in use, these areas must be inspected daily ~~when in use~~ for signs of damage or deterioration that may lead to ~~an~~a release or accident or ~~spill.~~cause an environmental or human health hazard. This includes asphalt-covered areas and areas where containers or tanks are handled or the contents thereof are transferred, including doorways or entry ways (Permit Section 2.6.1).

~~17.~~16. Run-On/Runoff Control: Wherever present, run-on~~ and~~ /runoff controls ~~, wherever present,~~ must be checked. The integrity should be inspected by looking for signs of damage, erosion, ponding, or any other conditions that could lead to a ~~spill~~release or ~~an~~ accident or cause an environmental or human health hazard.

~~18.~~17. Covers/Lids of Containers: All ~~tanks and~~ containers used for storing hazardous~~ or mixed~~ waste must have the cover or lid securely in place. Containers are not considered to be closed until the lid/cover is fastened in the manner the manufacturer originally intended. However, the lid may be off ~~of~~ a~~ tank or~~ container while waste is being placed into or removed from a container.

~~19.~~18. Labels: All containers and tanks containing hazardous ~~or mixed~~ waste must be labeled with the words “HAZARDOUS WASTE,” ~~and~~ EPA Hazardous Waste Numbers~~ or~~, and an indication of the hazards of the contents (e.g., hazardous waste ~~constituents.~~characteristics, DOT requirements, OSHA standards, or NFPA label). They must also be marked with a legible accumulation start date. All containers must be dated when they arrive at the ~~facility~~unit and no hazardous~~ or mixed~~ waste may be stored for over one year, unless specifically exempted. All containers holding mixed waste shall be labeled “Radioactive” and all containers with any amount of free liquids must be labeled as such.

~~20.~~19. Compatibility: All hazardous ~~or mixed~~ waste containers holding materials that may be incompatible with any other materials at that location must be separated from those materials by dikes, berms, or other physical barriers to prevent a possible reaction (e.g., ~~when~~ ignitable or corrosive wastes ~~are~~may be segregated by distance and signage or other physical boundary or marking).

~~21.~~20. Integrity of Containers: All containers and tanks must be checked for structural integrity, leakage, corrosion, or damage that may impact integrity. This includes checking the condition of all construction materials, fixtures, seams, and auxiliary equipment. Additionally, waste containers must be protected from contact with precipitation. If precipitation (i.e., water or snow) has accumulated on the containers, it must be noted as an AR in Part II and *the accumulated water* must be removed within 24 hours from discovery. The impacted containers must all be covered (e.g., tarps). There are special inspection criteria for tank systems (see Item ~~24~~23 below).

~~22.~~21. Aisle Spacing/Stacking: Adequate aisle space must be maintained to allow for inspection and for the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of facility operation in an emergency. Containers of hazardous ~~and mixed~~ waste must be stored in a manner that ensures a minimum 2-foot aisle space and containers may not be stacked more than 3 high, unless otherwise specified for the facility (i.e~~.~~., some units ~~within the LANL Hazardous Waste Facility Permit must have an aisle space of 28 inches and~~ may only stack 55-gallon drums ~~may be stored three~~or smaller containers 3 high). ~~Please consult RCRA compliance personnel for permit related questions.~~

~~23.~~22. ~~Hazardous or mixed waste containers stored at TSDs~~Pallets and/or Raised Containers: Containers stored at hazardous waste management units that do not contain liquids or where secondary containment is engineered must be on pallets, elevated, or otherwise raised to be protected from contact with accumulated liquid. Pallets must be compatible with type of waste and in good condition.

~~**TANKS SYSTEMS**~~:

~~24.~~23. Tank Systems: For tank systems used for treatment or storage of hazardous ~~or mixed~~ waste, all aboveground portions of the tank system, including any and all ancillary plumbing, must be inspected for signs of leaking, corrosion, deterioration, or improper operation. Tanks must be operated with a minimum freeboard of 6 inches. If the tank system includes discharge controls, overtopping controls, tank level alarms, or other monitoring equipment, including leak detection equipment, all controls and relevant data must be checked to ensure they are operating properly and that operation is within design specifications for the system.

~~**SHAFTS:**~~

~~25.~~24. ~~Shafts used for retrievable storage should have their covers securely in place and the surrounding area should show no evidence of erosion.~~ Shafts/Landfill Covers: Disposal shafts and shafts used for retrievable storage should have their covers securely in place and~~,~~ ~~during waste handling operations, guard rails must be installed and in good condition.~~ the surrounding area should show no evidence of erosion. Landfill covers must be inspected at least weekly and after storms for evidence of erosion, subsidence, and water intrusion.

~~**OPEN BURNING UNITS:**~~

~~26.~~25. Open ~~burning units~~Burning Unit: This unit must be inspected for deterioration, leakage, or vegetation in the immediate vicinity that could catch fire, and to assure that the unit is covered when not in use. Inspectors must also look for explosives and debris not consumed during the burn.

~~**OPEN DETONATION UNITS:**~~

~~27.~~26. Open ~~detonation~~Detonation Units: These units must be inspected for deterioration, leakage, or vegetation in the immediate vicinity that could catch fire. Inspectors must also look for explosives and debris not consumed by the detonation.

~~**STABILIZATION UNITS:**~~

~~28.~~27. Stabilization Units: The structural integrity and condition of equipment and systems must be inspected on stabilization units. Units must also be inspected for signs of leaking, corrosion, deterioration, or improper operation.

FOR ALL INSPECTIONS:

28. Inspector Name, Date, and Time of Inspection: Legibly print the name of the inspector(s) involved in current inspection. ~~29.~~ Record ~~of~~ the date of the current inspection~~.~~ and print the inspector's name on the form. Only one date ~~is~~and time are given for each inspection, whether a team or an individual performs the inspection.

~~30. Record of the time of the current inspection. Only one time is given for each inspection, whether a team or an individual performs the inspection.~~

~~31. Legible and/or printed name of each inspector involved in the current inspection.~~

Part II

29. List any action required~~.~~

~~32.~~ : Document any action taken immediately and express any plans for future action to be taken. Also, ensure that previous ARs are closed out with completed actions described. If the AR has not been resolved, ensure that it is carried over to the current inspection. Status should be provided for both open and closed items. If necessary, attach additional sheets to inspection record form to efficiently cover the action taken or required. Printouts and ~~data base~~database or other documentation may be included as necessary. Initial any information or comments added, and if more than one action is required or conducted, assign a number to each AR.

~~PART III~~

~~***Identify any comments.***~~

~~33. Document informational comments and~~Informational comments may be also documented in this section, as well as any status associated with the current inspection that does not require specific regulatory action or remedies applicable to ~~the LANL Hazardous Waste Facility Permit specific to permit application (in the case of interim status units).~~hazardous waste requirements.

FORM E-2

Annual TA-50

~~**ATTACHMENT E**~~

~~**INSPECTION PLAN**~~

~~**WCRRF STORMWATER DRAINAGE**~~

~~**ATTACHMENT E**~~

~~**INSPECTION PLAN**~~

~~This Attachment Section presents additional inspection requirements applicable to the waste management units at Technical Area (TA) 50~~**-69**~~. The Permittees shall conduct inspection at the frequency specified in the General~~ **Storm Water Drainage** **Inspection** ~~Section to identify problems in time to correct them before they harm human health or the environment.~~**Form**

~~**E.1 WCRRF STORMWATER**~~

ANNUAL WCCRF STORM WATER DRAINAGE

~~The WCRRF storm water drainage swales located in the vicinity are utilized to divert storm water away from the TA-50-69 pad. One drainage swale is located just south of the permitted unit or, between it and the Material Disposal Area (MDA) C. A second drainage swale is located on the west side of the permitted unit between Pecos Drive and the TA-50 fence line.~~

~~E.1.1 STORAGE TANK SYSTEM~~

~~The Permittees shall inspect the WCRRF storm water drainage annually. The drainage swales must be inspected for signs of deterioration to ensure that potential run-on is directed away from the facility for the following areas:~~

- ~~South of TA-50-69 between TA50-69 and Material Disposal Area (MDA) C~~
- ~~West of TA-50-69 between Pecos Drive and the TA-50 fence line~~

MONTHLY AREA L, DOME 215 HOLDING TANK INSPECTION FORM

Month	Fluids detected in Dome 215 holding tank?	Printed Name of Inspector	Signature of Inspector	Date of Inspection
January	☐ YES ☐ NO			
February	☐ YES ☐ NO			
March	☐ YES ☐ NO			
April	☐ YES ☐ NO			
May	☐ YES ☐ NO			
June	☐ YES ☐ NO			
July	☐ YES ☐ NO			
August	☐ YES ☐ NO			
September	☐ YES ☐ NO			
October	☐ YES ☐ NO			
November	☐ YES ☐ NO			
December	☐ YES ☐ NO			

Comments: ____

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Reviewed By:

______________ / ______________ / ______ / ______

SOM/Designee (print) Signature Z# Date

ANNUAL WCRRF STORMWATER DRAINAGE INSPECTION FORM

Date: ____________________

Inspection	SAT / UNSAT	
Drainage swales south of TA-50-69 between TA-50-69 and Material Disposal Area (MDA) C show no signs of deterioration and will direct potential stormwater away from the facility.	☐ SAT	☐ UNSAT
Drainage swales west of TA-50-69, between Pecos Drive and the TA-50 fence line show no signs of deterioration and will direct potential stormwater away from the facility.	☐ SAT	☐ UNSAT

Comments: ____________________

Performed By:

Inspector Name (print) / Signature / Z# / Date

Reviewed By:

RCRA Compliance (print) / Signature / Z# / Date

Reviewed By:

SOM/Designee (print) / Signature / Z# / Date

~~January2017~~

~~TA-54~~

~~ATTACHMENT E~~

INSPECTION ~~PLAN~~FORM

~~TA-54~~

~~ATTACHMENT~~

Date: ______________________

Inspection	SATISFACTORY/UNSATISFACTORY
Drainage swales south of TA-50-69 between TA-50-69 and Material Disposal Area (MDA) C show no signs of deterioration and will direct potential storm water away from the facility.	☐ **Satisfactory** ☐ **Unsatisfactory**
Drainage swales west of TA-50-69 between Pecos Drive and the TA-50 fence line show no signs of deterioration and will direct potential storm water away from the facility.	☐ **Satisfactory** ☐ **Unsatisfactory**

Comments:

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Performed By:

____________________ ______________________ ______________ ________

Inspector Name (Print) Signature Z# Date

Reviewed By:

____________________ ______________________ ______________ ________

RCRA Compliance (Print) Signature Z# Date

Reviewed By:

____________________ ______________________ ______________ ________

SOM/Designee (Print) Signature Z# Date

FORM E-3

~~INSPECTION PLAN~~

~~This Attachment Section presents additional inspection requirements specific to the container storage units at Technical Area (TA) 54. The Permittees shall conduct inspections at the frequency specified in the general inspection Section to identify problems in time to correct them before they harm human health or the environment.~~

~~E.1 INSPECTION REQUIREMENTS FOR TRUPACT-II CONTAINERS~~

~~The Permittees shall visually inspect waste containers prior to their placement in the TRUPACT-II containers to ensure their integrity. The inspection shall include a close examination of the cover and closure devices for visible cracks, holes, gaps, or other open spaces into the interior of the waste container when the cover and closure devices are secured in the closed position. The TRUPACT-II shall be loaded with waste containers and sealed with a locking-ring closure mechanism. After the TRUPACT-II has been sealed, the Permittees shall inspect the outside of the TRUPACT-II to ensure its integrity and that there has been no human intervention.~~

~~E.2 INSPECTION REQUIREMENTS FOR TA-54~~Monthly Area L, Dome 215 Holding Tank Inspection Form

MONTHLY AREA L, DOME 215 HOLDING TANK INSPECTION FORM

~~The 10,000 gallon holding tank is located at Area L, Dome 215. The tanks is used to collect liquid that may result from fire-suppression activities and that is in excess of the capacity inside the rind wall located around the dome to prevent run-on into the dome. The Permittees shall inspect the storage tank for any detectable fluids each month. If any fluids are detected in the holding tank, the Waste Management Coordinator and the Shift Operations Manager to ensure that a chemical analysis of the fluid is performed and fluid is removed within 3 days. The following inspection requirements should be applied to the monthly inspections conducted on the 10,000 gallon holding tank and shall be documented on separate forms.~~

~~E.3 STABILIZATION UNITS~~

~~The Permittees shall inspect the stabilization units located at TA-54-0231, TA-54-0375, and TA-54-0412, according to the schedule provided below.~~

~~E.3.1 Daily (During Operation)~~

~~The Permittees shall inspect the stabilization unit each operating day (*i.e.*, when mixed waste is treated in the unit). In the daily inspection of the stabilization unit, the Permittees shall inspect the following items, as applicable:~~

1. ~~Work surfaces and floors~~
2. ~~Secondary containment structures~~
3. ~~Labels~~
4. ~~Structural integrity of stabilization unit~~
5. ~~(Un)loading area~~
6. ~~Communication equipment~~

~~E.3.2 Weekly~~

~~The Permittees shall inspect the stabilization unit weekly for the following items as applicable;~~

- ~~Warning signs~~

1. ~~Work surfaces and floors~~
2. ~~Secondary containment structure~~
3. ~~Labels~~
4. ~~Structural integrity of the stabilization unit~~
5. ~~(Un)loading area~~
6. ~~Communication equipment~~

~~TA-55~~

~~ATTACHMENT E~~

~~INSPECTION PLAN~~

~~TA-55~~

~~ATTACHMENT E~~

~~INSPECTION PLAN~~

~~This Attachment Section presents additional inspection requirements applicable to the waste management units at Technical Area (TA) 55. The Permittees shall conduct inspections at the frequency specified in the General Inspection Section to identify problems in time to correct them before they harm human health or the environment.~~

~~The Permittees shall perform daily inspections for the fences at TA-55 and document them on separate forms.~~

~~E.1 TA-55 VAULT~~

~~The Vault is a container storage unit (CSU) located in the basement at TA-55-4 and waste containers in the Vault shall only contain mixed waste. The following inspection requirements are applicable to those rooms in the Vault that store mixed waste.~~

~~E.1.1 Non-Intrusive Inspection Systems~~

~~Inspection requirements are satisfied in part by the use of continuous air monitors (CAM) located in each individual storage room within the Vault to continuously monitor airborne radioactivity levels. If a problem with a container is identified by a CAM, the Permittees shall remove that container from the Vault and inspect it in an open-front hood.~~

~~The Permittees shall ensure that information obtained during inspections and all container transfers are noted on the Vault Traffic Log Book maintained at TA-55. The Permittees shall inspect the Vault Traffic Log Book weekly to verify receipt or transfer of mixed waste from the Vault. If mixed waste is not currently being stored in the Vault and the weekly inspection indicates that no mixed waste has been received, the Permittees shall mark the Inspection Record Form (IRF) "No Use" and complete it according to the IRF instructions.~~

~~E.1.2 Intrusive Inspection Procedures~~

~~The Permittees shall ensure that the central hallway of the Vault is inspected weekly when mixed waste is in storage. The Permittees shall inspect and note the following items in weekly inspections:~~

- ~~Vault Traffic Log Book (inspected for receipt or transfer of waste)~~
- ~~Communications equipment~~
- ~~Warning signs~~
- ~~Security~~

~~1. Work surfaces and floors in central corridor~~
- ~~Spill and fire equipment~~
- ~~Secondary containment~~

~~2. (Un)loading area~~
~~3. Visual inspection of storage rooms from hallway~~
~~4. Nuclear Materials Custodian contacted to verify no alarms or problems~~

~~When containers are placed into or removed from a storage room within the Vault, the Permittees shall inspect the following items in that storage room, as appropriate:~~

- ~~Vault Traffic Log Book (inspected for receipt or transfer of waste)~~

~~1. Communication equipment~~
- ~~Warning signs~~
- ~~Security~~
- ~~Work surfaces and floors~~
- ~~Spill and fire equipment~~
- ~~Secondary containment~~

~~2. (Un)loading area~~
~~3. Nuclear Materials Custodian contacted to verify no alarms or problems~~
- ~~Emergency equipment/lighting~~
- ~~Covers/lids of containers~~

~~4. Labels~~
~~5. Accumulation start date~~
- ~~Compatibility~~
- ~~Structural integrity of containers~~
- ~~Aisle spacing/stacking~~
- ~~Pallets/raised containers~~

~~The Permittees shall record inspection results on the IRF maintained at TA-55.~~

~~E.2 STORAGE TANK SYSTEM~~

~~The Permittees shall inspect the storage tank system components located at TA-55-4, Room 401, according to the schedule provided below.~~

~~E.2.1 Daily (During Operation)~~

~~The Permittees shall inspect the storage tank system components (including ancillary equipment) at least once each operating day. An operating day includes when waste is present in the tank. In daily inspections, the Permittees shall inspect and note the following items, as applicable:~~

~~1. Work surfaces and floors~~
~~2. Secondary containment structure~~

3. ~~Structural integrity of tanks and ancillary equipment~~
4. ~~Labels~~
5. ~~(Un)loading areas~~
6. ~~All portions of tank systems to detect corrosion or releases of waste and to detect any possible malfunctions to overfill/spill control equipment, tank monitoring, and leak detection systems and data from these systems~~
7. ~~Proper operating condition of tank~~

~~E.2.2 Weekly~~

~~The Permittees shall inspect storage tank system components weekly for the following items, as applicable:~~

1. ~~Warning signs~~
2. ~~Work surfaces and floors~~
3. ~~Secondary containment structures~~
4. ~~Covers and lids of tanks~~
5. ~~Labels~~
6. ~~Structural integrity of tanks and ancillary equipment~~
7. ~~(Un)loading areas~~
8. ~~All portions of tank systems to detect corrosion or releases of waste and to detect any possible malfunctions to overfill/spill control equipment, tank monitoring, and leak detection systems and data from these systems~~
9. ~~Proper operating condition of tank~~

~~E.3 STABILIZATION UNIT~~

~~The Permittees shall inspect the stabilization unit located at TA-55-4, Room 401 according to the schedule provided below.~~

~~E.3.1 Daily (During Operation)~~

~~The Permittees shall inspect the stabilization unit each operating day (*i.e.*, when mixed waste is treated in the unit). In the daily inspection of the stabilization unit, the Permittees shall inspect the following items, as applicable:~~

1. ~~Work surfaces and floors~~
2. ~~Secondary containment structures~~
3. ~~Labels~~
4. ~~Structural integrity of cementation unit~~
5. ~~(Un)loading area~~
6. ~~Communication equipment~~

~~E.3.2 Weekly~~

~~The Permittees shall inspect the stabilization unit weekly for the following items, as applicable:~~

1. ~~Warning signs~~
2. ~~Work surfaces and floors~~

3. ~~Secondary containment structure~~
4. ~~Labels~~
5. ~~Structural integrity of cementation unit~~
6. ~~(Un)loading area~~
7. ~~Communication equipment~~

~~E.4 ADDITIONAL INSPECTION ITEMS~~

~~The Permittees shall ensure that the items listed below are inspected monthly and documented on a separate IRF:~~

1. ~~Evacuation alarms~~
2. ~~Ventilation alarms~~
3. ~~Fire alarms~~
4. ~~Fire pumps~~
5. ~~Fire extinguishers~~
6. ~~Eyewashes and safety showers~~

~~Additionally, the Permittees shall inspect the fences and TA-55 access controls daily.~~

~~E.5 INSPECTION AND MONITORING FOR UNITS SUBJECT TO SUBPARTS AA AND BB REQUIREMENTS~~

~~The TA-55 CSUs are not subject to the requirements of 40 CFR Part 264, Subparts AA and BB, because they do not operate applicable process vents or equipment.~~

Month	Fluids detected in Dome 215 holding tank	Printed Name of Inspector	Signature of Inspector	Date of Inspection
January	Yes ☐ No ☐			
February	Yes ☐ No ☐			
March	Yes ☐ No ☐			
April	Yes ☐ No ☐			
May	Yes ☐ No ☐			
June	Yes ☐ No ☐			
July	Yes ☐ No ☐			
August	Yes ☐ No ☐			
September	Yes ☐ No ☐			

October	**Yes ☐ No ☐**			
November	**Yes ☐ No ☐**			
December	**Yes ☐ No ☐**			

Comments:

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Reviewed By:

____

Designee (print) Signature Z# Date

FORM E-4

Pre- and Post- Checklist for Detonation or TA-16-388 Flash Pad Treatment Operations

Pre- and Post- Checklist for Detonation or TA-16-388 Flash Pad Treatment Operations

Pre-Treatment

Date			
Event Number			
Operation Type			
Waste Stream Profile Number		Approved through SME/ RCRA Review Process?	__YES ___NO
Type of Waste			
Temperature			
Fire Danger			
Wind Speed			
Wind Direction			
Precipitation (e.g., no precipitation)			
Comments regarding weather restrictions:			

Post Treatment

Date	
Description of Residues (if any)	

Personnel completing the checklist

Name (s)	_____

Attachment 7

Revised Supplement 1-3, Permittees' Proposed Changes to Attachment C, Waste Analysis Plan

ATTACHMENT C

WASTE ANALYSIS PLAN

TABLE OF CONTENTS

LIST OF TABLES

ATTACHMENT C

WASTE ANALYSIS PLAN

This Waste Analysis Plan (WAP) presents the characterization procedures used to determine the chemical and physical nature of ~~non-mixed~~ waste streams stored and treated at hazardous waste management units at the Los Alamos National Laboratory (LANL or the Facility) in accordance with 40 CFR § 264.13. These waste streams hazardous constituents are non-mixed (non-radioactive) hazardous waste including explosives waste streams, the hazardous component of mixed low-level waste ~~(MLLW),~~, and the hazardous component of mixed transuranic waste ~~(MTRUW) stored and treated at the Facility in accordance with 40 CFR § 264.13.~~ . The ~~waste characterization~~ requirements contained in this WAP are used for characterization of wastes stored in containers and tanks, and to support treatment processes covered by the ~~stabilization process.~~LANL Hazardous Waste Facility Permit (Permit). Waste analysis regulatory requirements are specified in 40 CFR §§ 264.13, 270.14(b) and 268.7. ~~Waste analysis~~ The general overview of permit requirements ~~are~~for waste analysis is specified in Permit Section 2.4. This WAP discusses how the waste characterization ~~data prepared by generators are~~information is obtained, reviewed, supplemented, and used by the Permittees to comply with 40 CFR Part 264 and Part 268 regulatory requirements.

This WAP is organized as follows:

Section C.1	Facility Description: Includes a general description of the Facility; general descriptions of the wastes stored and treated and the activities that generate waste.
Section C.2	Waste Analysis Parameters: Includes a discussion of the ~~proposed~~ hazardous waste analytical parameters and methods used by the Permittees and the criteria/rationale for parameter selection.
Section C.3	Characterization Procedures: Includes the characterization approach (*e.g.*, acceptable knowledge, sampling and analysis) for each waste classification stored and treated at the Facility.
Section C.4	Off-Site Waste: Includes a discussion of procedures in place for acceptance of waste from off-site facilities.
Section C.5	Special Procedural Requirements: Includes a discussion of the characterization procedures in place ~~for ignitable, reactive, and incompatible wastes; procedures~~ to ensure compliance with ~~land disposal restrictions~~ 40 CFR 268 Land Disposal Restrictions(LDR); and procedures to ensure compliance with 40 CFR Part 264 Subpart CC requirements.
Section C.6	References.

C.1 FACILITY DESCRIPTION

LANL ~~(the *Facility*)~~ is located in Los Alamos County in north-central New Mexico. It is approximately 60 miles north-northeast of Albuquerque and 25 miles northwest of Santa Fe. The Facility and the associated residential and commercial areas of Los Alamos County are situated on the Pajarito Plateau. The Facility is owned by the U.S. Department of Energy (DOE) and is operated jointly by DOE; Triad National Security, LLC, (Triad); and Newport News Nuclear BWXT-Los Alamos, LLC (N3B) (collectively the *Permittees*). The permitted units used for storage and treatment of wastes addressed in this WAP are located within various Technical Areas (TAs) at the Facility. These units are listed in Attachment J (*Hazardous Waste Management Units).* Detailed information on the permitted units is provided in Attachment A (*Technical Area Unit Descriptions*).~~A more complete Facility description is provided in Attachment A.~~

C.1.1 Facility Waste-Generating Processes and Activities

Wastes are primarily generated at the Facility ~~primarily~~ from research and development (R&D) activities, processing and recovery operations, decontamination and decommissioning (D&D) projects, and environmental restoration ~~(ER)~~ activities. Wastes generated from these types of processes and activities may also be received from off-site facilities (*see* ~~Attachment L (*Listing of Off-Site Facilities*)).~~Section C.4 and Permit Section 2.2.1). Tables C-~~2~~1 through C-~~5~~4 present descriptive information on non-mixed hazardous wastes, ~~MLLW, and MTRUW~~mixed low-level waste and mixed transuranic waste potentially generated at the Facility. ~~Wastes generated at off-site facilities that may be received at the Facility are described in Table C-8.~~ These tables include brief waste descriptions, brief descriptions of the waste-generating process or activity, the characterization basis for waste designation, potential ~~EPA~~U.S. Environmental Protection Agency (EPA) Hazardous Waste Number(s), the hazardous constituent(s) listed in Appendix VIII of 40 CFR Part 261 and/or the characteristic(s) defined at 40 CFR Part 261, Subpart C that make the waste hazardous, and the regulatory limits, as appropriate.

C.1.2 Stored Waste

Non-mixed hazardous waste, ~~MLLW~~mixed low-level waste, and ~~MTRUW~~mixed transuranic waste are stored at various ~~container storage~~hazardous waste management units throughout the Facility. The following sections contain general descriptions of these wastes and the processes that generate them.

C.1.2.1 Non-Mixed Hazardous Waste

Non-mixed hazardous wastes are generated at the Facility primarily from R&D activities, general facility operations, D&D projects, ~~and ER~~environmental restoration activities, and explosives materials programs. Non-mixed hazardous waste streams may be of uniform physical composition (*i.e.*, homogeneous) or of diverse composition (*i.e.*, heterogeneous). Homogeneous waste is defined as waste that contains only one material or substance or waste that has its components mixed so that representative samples can be drawn throughout. Homogeneous waste streams can be either solids or liquids.

Heterogeneous waste is defined as waste that contains multiple components that are separate because of density or specific gravity, are located in different places within the mixture, or are discrete and different articles. Heterogeneous wastes (*e.g.*, debris) do not lend themselves to representative sampling and analysis.

~~Routinely~~Descriptions of routinely managed non-mixed hazardous wastes and their waste-generating processes are provided below and summarized in Table C-~~2~~1.

Spent Solvents

Spent solvents and spent solvent mixtures may contain organic or inorganic compounds, heavy metals, oils, and other contaminants. Waste-generating activities include R&D, laser research, organic and inorganic chemistry research, cleaning, and degreasing.

Contaminated Solid Wastes

Contaminated solid wastes (*i.e.*, wastes of a solid physical form) include mixtures of rags, spill cleanup materials, ~~Kimwipes™~~cleaning paper, cleaning wipes, gloves, filters, plastic and other paper products, and personal protective equipment. These wastes may also consist of disposable equipment contaminated with organic or inorganic compounds, heavy metals, oils, and other contaminants. Waste-generating activities include machining operations, chemistry research, D&D projects, metal finishing operations, and general maintenance operations.

Paint and Related Wastes

Paint and paint-related wastes consist of excess paint, paint strippers and thinners, and sludges of paints and thinners. Possible contaminants include heavy metals used as paint pigments and solvents contained in thinners and lacquers. Waste-generating activities include painting and finishing operations and general facility maintenance.

Photographic and Photocopier Wastes

Photographic wastes include spent or excess film developers, fixer solutions, and bleach solutions that may be contaminated with heavy metals. Photocopier wastes include kerosene-based toners and dispersants. These wastes are generated from photographic processing and photocopier operations.

Corrosive Liquid Wastes

These wastes consist of acidic or alkaline solutions that may contain organics, inorganics, metals, oils, and other contaminants. Waste-generating activities include analytical chemistry research, electro-etching, and electro-polishing.

Solid Metals and Metallic Compounds

These wastes consist of metal chips and turnings from machining and cutting operations. They also consist of metal powders; metal salts; metal sheets; reactive metals used in synthesis reactions; solders from electronic manufacturing, repair, and brazing operations; and grinding operations. Other solid metals and metallic compounds include lead shot, bricks, plate, and shielding.

Contaminated Non-Corrosive Aqueous and Non-Aqueous Solutions and Sludges

These wastes are non-corrosive aqueous and non-aqueous solutions and sludges ~~that are~~ contaminated with non-mixed hazardous wastes or hazardous residues. Waste-generating activities include vacuum pump maintenance, analytical spectrometry, equipment cleaning and maintenance, vehicle maintenance, synthesis reactions, metal-polishing operations, and chemical research.

Mercury Wastes

Mercury wastes include free elemental mercury, mercuric compounds, articles and instruments containing mercury, fluorescent light fixtures, and gels containing mercuric compounds. Waste-generating activities include lamp replacement, chemical research, mercury spill cleanup, and equipment cleaning and maintenance.

Used Batteries and Battery Fluids

Used batteries and battery fluids contain heavy metals such as cadmium, lead, mercury, and silver. Waste-generating activities include routine equipment maintenance.

Unused and Off-Specification Commercial Chemical Products

These wastes consist of discarded solid and liquid chemical reagents that are off-specification, unused, or outdated or are spill residues.

Gas Cylinder Waste

These wastes include pressurized gas cylinders, including aerosol cans, which may contain regulated hazardous metals, or organic compounds, or exhibit the hazardous characteristics of ignitability, corrosivity, and reactivity.

Soils and Sludges

These wastes consist of environmental media and sludges generated through various activities, including site decommissioning, site characterization, ~~and~~ site remediation, and treatment. Waste-generating activities include septic tank and detention basin closure, removal actions, and other remedial actions and site closures.

Aqueous Liquids

These wastes consist of liquids generated during various activities, including decontamination of remedial action equipment, drilling fluids and well development fluids, septic tank liquids, and contaminated stormwater runoff.

Debris

These wastes consist of debris (such as concrete, vitrified clay pipe, steel baffles, and building materials) generated through various activities, including site decommissioning, site characterization, and site remediation. Waste-generating activities include septic tank and detention basin closure, removal actions, and other remedial actions and site closures.

Explosives Waste Streams

Explosives-contaminated waste and explosives waste are generated at the Facility from firing site operations, explosives processing operations, such as machining and pressing; R&D activities, including pilot-scale explosives production; D&D activities; and environmental restoration activities. The waste streams identified in Table C-5 are waste streams that may be treated by open burning and open detonation. The waste streams include homogenous and heterogeneous wastes and are described in the following paragraphs.

Explosive-contaminated waste and explosives waste may consist of off-specification explosive wastes, excess explosive waste, and other explosives-contaminated solid wastes (e.g., rags, glass, metals, and wood). These wastes are characteristic for reactivity, as defined in 40 CFR § 261.23. Explosives waste and explosives-contaminated waste meet the definition of reactive provided in 40 CFR § 261.23, because they are capable of detonation or explosive reaction if subjected to a strong initiating source or if heated under confinement.

Explosives machining waste
This waste stream consists of explosives machining chips or cuttings, water, filters, and filter solids that result primarily from the filtration of water used during the machining of explosives. Cloth filters, plastic bags, and wrapping are sometimes present in the waste.

Excess explosives
This waste stream includes large and small pieces of excess conventional explosives. Explosives may be in the form of flakes, granules, crystals, powders, pressings, plastic bonded, putties, rubberized solids, or extrudable solids. This waste stream can include waste generated from inventory reduction efforts, off-specification explosives, damaged explosives, and salvaged explosives. Other materials that may be present in this waste stream include plastic bags, wrapping, and casings; cardboard and paper; and fiberboard containers. A small fraction of the waste stream may contain metals such as aluminum, brass, barium, steel, stainless steel, and copper.

Explosives-contaminated combustible debris
This waste stream includes detonable explosives-contaminated debris generated in research laboratories, processing areas, and prep rooms. Debris may include filters removed from laboratory equipment or may contain trace amounts of solvents. Other materials that may be present in this waste stream include plastic pieces, bags, fiber cloth, wrapping, and tubing; weigh boats; latex or nitrile gloves; glass or plastic vials; cardboard and paper; fiberboard containers; paper cleaning wipes, rags, and swabs; as well as noncombustible materials such as glassware and metal as minor components. Metal constituents may include aluminum, stainless steel, steel, brass, and copper. Small quantities of solvents such as ethanol, acetone methanol, ethyl acetate, and toluene may also be present in this waste stream.

Explosives-contaminated solvent waste
This waste stream consists of dimethyl sulfoxide (DMSO) that contains dissolved explosives. It is generated primarily by dissolving of explosives and polymers in support of research and development activities.

Explosives-contaminated noncombustible debris
This waste stream consists of explosives-contaminated equipment that includes discarded, noncombustible equipment, debris from firing sites, noncombustible material from decommissioning and demolition activities, and material from explosives processing areas. Materials in this waste stream include glass, metals, and ceramics. This waste stream is typically recycled after treatment when treated by open burning. Most often this waste stream consists of metal equipment or sand/carbon from water filtration activities or maintenance and decommissioning and demolition activities.

Detonators, initiators, mild detonating fuses, and blasting caps
This waste stream includes detonators, initiators, mild detonating fuses, and blasting caps containing conventional explosives. Explosives may be in metal or plastic casings and may contain lead-based primaries or be in metal sheaths. This waste stream includes manufactured articles (detonators) removed from fire protection systems. Other materials that may be present in this waste stream include plastic bags and wrapping; cardboard and paper; and fiberboard containers. This waste stream will include metals such as aluminum, lead, brass, stainless steel, steel, nickel, and copper.

Shaped charges and test assemblies
This waste stream includes shaped charges consisting of cores of explosives with metal sheaths or metal liners, or high-explosives test assemblies consisting of explosives in plastic or metal holders. Assemblies may contain metal including lead, aluminum, copper, brass, steel, tantalum, and stainless steel. Other materials that may be present in this waste stream include plastic components, bags, or wrapping; cardboard or paper; and fiberboard containers.

Projectiles and munitions larger than 0.50 caliber
This waste stream includes military munitions such as projectiles and munitions larger than 0.50 caliber. Other materials that may be present in this waste stream include plastic bags and wrapping; cardboard and paper; fiberboard drums; and metal such as lead, brass, steel, stainless steel, copper, and aluminum.

Pressing molds
This waste stream includes urethane rubber pressing molds contaminated with detonable quantities of explosives. Other materials that may be present in this waste stream include plastic bags, plastic wrapping, cardboard, and paper.

C.1.2.2 Mixed Low-Level Waste

Low-level waste is defined in DOE ~~Order 435~~Manual M435.1, “Radioactive Waste Management Manual” (DOE, ~~1999~~2011), as “radioactive waste that is not ~~classified as~~ high-level waste, spent nuclear fuel, transuranic waste, by-product material [as defined in § 11(e)(2) of the Atomic Energy Act, as amended], or naturally occurring radioactive material”. ~~MLLW~~Mixed low-level waste is any low-level waste that has a hazardous waste component.

~~MLLW~~Mixed low-level waste is generated at the Facility primarily from R&D activities, processing and recovery operations, D&D projects, and ~~ER~~environmental restoration activities. ~~MLLW~~Mixed low-level waste streams may be homogeneous or heterogeneous, as defined in Attachment Section C.1.2.1. Descriptions of the ~~MLLW~~mixed low-level waste and ~~their~~the waste-generating processes are provided below and summarized in Table C-~~3.~~ 2. Mixed Waste Inventory Report (MWIR) Waste Identification numbers are included with each category as reference to Los Alamos Federal Facility Compliance Order (NMED, 1995) waste documentation where applicable.

Soils with Heavy Metals

Soil waste contaminated with heavy metals is generated during D&D and ~~ER~~environmental restoration activities. This waste consists of soils contaminated with varying concentrations of lead or other heavy metals.

Environmental Restoration Soils, LA-W905

This waste consists of soils contaminated with heavy metals and organic compounds. They are generated by activities such as the remediation of spill and release sites and D&D activities.

Inorganic Solid Oxidizers, LA-W923

These wastes are discarded reagent powders and crystalline materials. Most of these items are in the original manufacturer's containers, some of which may be hydrated. Many of these containers are unopened but are suspected to have radioactive surface contamination. Waste-generating activities include D&D of research laboratories and R&D.

Lead Waste, LA-W903, LA-W921, LA-W924, LA-W930, and LA-W931

Lead waste consists of contaminated and activated lead shielding used as radiation shielding, inseparable lead, lead blankets, and lead requiring sorting. It is generated primarily from radioisotope experiments and other reactor, accelerator, laser, and x-ray activities. The lead may be in the form of sheets, pigs, bricks, shot, shavings, slag, dross, and other shapes.

Noncombustible Debris, LA-W922

Noncombustible debris consists of discarded hazardous and contaminated scrap metals that are generated by maintenance, D&D of research laboratories or equipment, R&D, and ~~ER~~environmental restoration activities. Additionally, discarded bricks and glass are generated through dismantling of Facility buildings, including plating shops and machine sheds. The waste may be considered hazardous due to the metal content or by virtue of contamination during use.

Combustible Debris, LA-W912

Maintenance, D&D, R&D, and ~~ER~~environmental restoration activities generate rags and combustible debris with heavy metals and possibly organics, some of which contain residual liquids. Examples include solvents and lubricants that are used in metal-cutting operations.

Much of this waste is generated during the processing of lead and barium resulting in heavy metal contamination.

Organic-Contaminated Noncombustible Solids, LA-W919

These wastes include absorbed oils, laboratory trash, and discarded equipment. Absorbed oil waste is ~~comprised~~composed of drums containing vermiculite or other inorganic sorbents used to absorb oil from spills and routine maintenance operations. Some of the oil originates from vacuum pumps and may be contaminated by mercury, lead, or cadmium. Laboratory trash consists of noncombustible solid materials with residual solvent contamination. The laboratory debris includes reagent bottles, broken glassware, and disposable lab ware. Large quantities of chemicals are not placed in this trash; however, residual liquids or powders may have remained on some of the discarded material. Discarded equipment may have contained residual solvents.

Organic-Contaminated Combustible Solids, LA-W911

These wastes are similar to combustible debris waste and include rags, cardboard, protective clothing, and paint-stripper trash. They are potentially contaminated with methyl ethyl ketone and other solvents. Waste-generating activities include maintenance, D&D, and ~~ER~~environmental restoration activities.

Water-Reactive Wastes, LA-W916

Water-reactive wastes consist of reactive metal debris generated through the cleanup of ~~HE~~high explosives firing-site debris and from machining and disassembly of test components. They include calcium, lithium hydride, lithium metal, and magnesium.

Mercury Wastes, LA-W920 and LA-W925

Mercury-contaminated instruments and equipment consist of discarded or broken equipment containing liquid mercury such as broken thermometers, vacuum tubes, vacuum pumps with residual mercury, activated or contaminated fluorescent light bulbs, and mercury absorbed into a paper or solid matrix. Most of this waste is generated by cleanup operations.

Unused Solid Reagent Chemical Wastes

Many different types of discardable off-specification or unused solid reagent chemical wastes are generated at the Facility by R&D programs. Most of these items are in their original containers.

Spent Solvents and Contaminated Solvent Mixtures

These are spent solvents and spent solvent mixtures that contain organic or inorganic compounds, heavy metals, oils, and other contaminants. Waste-generating activities include a wide variety of maintenance, cleaning and degreasing, R&D, and processing operations, such as extraction, bench-scale experimental inorganic chemistry, environmental analysis, and radiochemistry.

Corrosive Liquid Wastes, LA-W914

These wastes are acidic or alkaline solutions that contain organics, inorganics, metals, oils, and/or other contaminants. Waste-generating activities include radiochemistry research, plutonium processing, and analytical chemistry.

Aqueous and Non-aqueous Liquids Contaminated with Heavy Metals and/or Organics, LA-W902, LA-W906, LA-W908, and LA-W913

These wastes consist of aqueous and non-aqueous solutions that contain heavy metals and possibly organics. Waste-generating activities include metal-polishing operations, radiochemistry research, and ~~ER~~environmental restoration activities.

Oil Wastes, LA-W909

Oil wastes at the Facility are generated during equipment maintenance operations. Possible contaminants include heavy metals and solvents.

Unused Liquid Reagent Chemical Wastes

Many different types of discarded off-specification unused liquid reagent chemical wastes are generated at the Facility by R&D programs. Most of these items are in their original containers.

Gas Cylinder Waste, LA-W917 and LA-W918

These wastes consist of pressurized gas cylinders, including aerosol cans, which contain regulated hazardous metals~~,~~ or organic compounds, or exhibit the hazardous characteristics of ignitability, corrosivity, and reactivity.

~~Radioactive Lead Solids~~

~~These lead solids include, but are not limited to, all forms of lead shielding and other elemental forms of lead. These lead solids do not include treatment residuals such as hydroxide sludges, other wastewater treatment residuals, or incinerator ashes that can undergo conventional pozzolanic stabilization, nor do they include organolead materials that can be incinerated and stabilized as ash.~~

C.1.2.3 Mixed Transuranic Waste

Transuranic waste is defined in DOE M435.1-1, Radioactive Waste Management Manual (DOE, 2011), as "radioactive waste containing more than 100 nanocuries (3700 becquerels) of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years, except for: (1) high-level radioactive waste; (2) waste that the Secretary of Energy has determined, with the concurrence of the Administrator of the Environmental Protection Agency, does not need the degree of isolation required by the 40 CFR Part 191 disposal regulations; or (3) waste that the Nuclear Regulatory Commission has approved for disposal on a case-by-case basis in accordance with 10 CFR Part 61."

Transuranic isotopes are those with atomic numbers greater than 92. ~~MTRUW~~Mixed transuranic waste contains both a hazardous waste component and a ~~TRU~~transuranic waste component.

~~MTRUW~~Mixed transuranic waste is generated at the Facility primarily from R&D activities, processing and recovery operations, and D&D projects. ~~Limited quantities of MTRUW from off-site facilities will be accepted at LANL for additional characterization and management. (*see* Table C-8). MTRUW~~Mixed transuranic waste at the Facility includes four broad categories that can be described by a Summary Category Group, which is further subdivided into Waste Matrix Codes.

Summary Category Groups are used to define waste characterization groupings for the Federal Facility Compliance Order (Los Alamos National Laboratory) (New Mexico Environment Department [NMED], 1995) requirements and are based on the physical and chemical forms of the waste. Complete descriptions of the Summary Category Groups are contained in DOE Waste Treatability Groups Guidance (DOE, 1995).

The Summary Category Groups applicable to the ~~MTRUW~~mixed transuranic waste stored and treated at the Facility are listed as follows:

1. *Summary Category Group S3000 (Homogeneous Solids)*: defined as solid waste materials, excluding soil and gravel, that do not meet the ~~EPA~~ LDR criteria for classification as debris~~;~~.
2. *Summary Category Group S4000 (Soil/Gravel)*: defined as solid waste materials that are at least 50 percent by volume soil and gravel~~;~~.
3. *Summary Category Group S5000 (Debris)*: defined as heterogeneous waste materials that are at least 50 percent by volume solid materials exceeding a 2.36-inch particle size that are intended for disposal and include manufactured objects, plant or animal matter, or natural geologic material. Particle sizes smaller than 2.36 inches in size may be considered debris if the debris is a manufactured object and if it is not a particle of S3000 or S4000 material~~; and~~.
4. *Summary Category Group L1000 (Aqueous Liquids/Slurries)*: defined as aqueous liquids and slurries that meet the ~~EPA~~ LDR criteria for wastewaters (*i.e.*, <1 percent total suspended solids).

Summary Category Groups are applied to ~~MTRUW~~mixed transuranic waste streams to distinguish between waste types. More specific waste identification systems (*i.e.*, Waste Matrix Codes [WMC] and Facility ~~TRU Waste Stream ID~~transuranic waste stream identification numbers) are used for supplementary purposes as part of waste management operations. The ~~WMCs that are~~general WMC series applicable to the solid ~~MTRUW~~mixed transuranic waste stored at the Facility are:

1. *WMC S3100 (Inorganic Homogeneous Solid Waste)*: includes mixed inorganic homogeneous waste (cemented inorganics, organics on vermiculite, non-cemented, salts, and cemented organics);
2. *WMC ~~S4100~~S4200 (Soil)*: consists of radioactive contaminated solid waste materials that are at least 50 percent by volume soil/gravel;

3. *WMC S5100 (Inorganic Debris Waste)*: consists of mixed non-combustible debris waste (scrap metal, concrete, brick, and glass) and up to approximately 10% of incidental organic waste forms; and

~~4. *WMC S5300 (Organic Debris Waste)*: consists of mixed combustible debris waste (plastic, cellulosics, and rubber); and~~

~~5.~~4. *WMC S5400 (Heterogeneous Debris Waste)*: includes mixed heterogeneous debris waste (varying amounts of combustible and noncombustible debris, with a small amount of homogeneous waste present).

Solid ~~MTRUW~~mixed transuranic waste is assigned a WMC and is further identified with a Facility ~~TRU Waste Stream ID~~transuranic waste stream identification number. Using the WMC, waste streams are further delineated based on the following prioritized criteria: 1) waste-generating process (to the degree to which waste has been segregated by process); 2) Summary Category Group (*i.e.*, homogeneous or debris waste); 3) waste matrix; and 4) hazardous chemical content (*i.e.*, organics and/or inorganics).

The following are general descriptions of types of ~~MTRUW~~mixed transuranic waste streams:

Homogeneous Solids, Solidified Inorganics
This waste stream consists of mixed inorganic homogeneous waste generated by plutonium recovery, R&D processes, facility and equipment operations and maintenance, and liquid waste treatment operations. ~~*Inorganic, Cemented*:~~The waste includes cemented sludge, solidified aqueous ~~or homogeneous inorganic solids~~waste, solidified inorganic process solids, leached process residues, evaporator bottoms/salts, and/or cement paste~~;~~.

~~1. *Homogeneous Inorganic, Cemented Organics*: major portion of the waste is cement (*i.e.*, inorganic) containing a minor portion of cemented solidified organic process solids;~~

~~2. *Homogeneous Inorganic, Non-cemented*: includes solid (non-cemented) inorganic waste, ash, dewatered aqueous sludge, and/or chemical treatment sludge;~~

~~3. *Homogeneous Inorganic, Salts*: includes pyrochemical, nitrate, and/or chloride salts; hydroxide cake; and/or other salt waste;~~

~~4. *Homogeneous Inorganic, Vermiculite*: includes vermiculite-absorbed hydrocarbon oil, vermiculite-absorbed silicon-based liquid, inorganic particulates, and solidified (non-cemented) organic waste.~~

~~5. *Soil*: includes all radioactive-contaminated soil;~~

~~6. *Combustible debris*: includes greater than 50% by volume combustible decontamination waste, cellulosics, plastics, rubber, laboratory trash, building debris, hot cell waste, and/or other combustibles; and~~

~~*Heterogeneous debris*:~~Homogeneous Solids Salt Waste
A portion of the waste stream that requires treatment for off-site disposition includes evaporator bottom solutions (i.e., nitrate salts concentrates) generated prior to 1992 from nitrate recovery operations at TA-55. Evaporator bottoms solution is the liquid residual that results when a volume of ion-exchange effluents, oxalate filtrates, vacuum-seal water, or negative chilled waters is processed and concentrated in evaporator processes. The procedure for stabilization of the

evaporator bottoms solution in a cement matrix was in development until 1992 when the process was successfully standardized. Prior to 1992, several alternate cementation methods were used and some of the cemented matrices may have dewatered over time.

Heterogeneous Debris
This waste stream consists of mixed heterogeneous debris waste generated from facility processes and equipment D&D, including associated sectioning, size reduction, and packaging operations. The waste is composed of noncombustible and combustible debris waste contaminated with radioactive isotopes. The waste includes greater than 50% by volume noncombustible waste, metal scrap, glass, metal waste, metal crucibles and dies, precious metals, filter media and residue, beryllium-contaminated debris, ion-exchange resins, irradiation sources, firing point sources, leaded rubber, graphite waste, high-efficiency particulate air (HEPA) filter waste, skull and oxide, slag and porcelain, and/or other noncombustible waste. The combustible portion of the waste stream consists of waste materials such as paper, rags, plastic, rubber, wood-based high-efficiency particulate air filters, or other plastic-based and cellulose-based items (e.g., personal protective equipment). Some secondary waste generated during the remediation/repackaging operations may have been added to the waste containers. Nitrate salts in the form of homogenous solids can be found in some of the containers holding this waste stream and will require further treatment for disposition.

Soils
These wastes consist of soils and environmental media generated through various activities, including site decommissioning, site characterization, and site remediation, that contains transuranic waste radioactive components and is potentially contaminated, particularly with heavy metals and organic compounds.

The WMCs correspond to other historical and current waste identification systems used at the Facility. Table C-~~4~~3 lists the ~~MTRUW~~mixed transuranic waste streams stored at the Facility by their Summary Category Group, WMC, and general matrix description and provides a cross-reference between past and present waste identification systems.

Facility TRU Waste Stream ID numbers are applied to the ~~MTRUW~~mixed transuranic waste streams described above. Facility TRU Waste Stream ID numbers are assigned the prefix “LA”, followed by a unique identifier that further specifies the waste stream. ~~MTRUW~~Mixed transuranic waste information is summarized in Table C-~~5~~4.

~~The following are some examples of MTRUW waste streams stored, and in some cases treated, at the Facility.~~

~~LA-TA-55-19: Mixed Combustible Debris Waste~~

~~This waste stream consists of mixed combustible debris waste generated by plutonium recovery, R&D processes, and facility and equipment operations and maintenance. The debris waste includes paper, rags, plastic, rubber, wood-based HEPA filters, and other plastic-based and cellulose-based items.~~

~~LA-TA-55-30: Mixed Heterogeneous Debris Waste~~

~~This waste stream consists of mixed heterogeneous debris waste generated by plutonium recovery, R&D processes, and facility and equipment operations and maintenance. The waste includes plutonium-contaminated noncombustible and combustible debris waste.~~

~~LA-MIN01-CIN: Mixed Inorganic Homogeneous Waste, Cemented Inorganics~~

~~This waste stream consists of mixed inorganic homogeneous waste generated by plutonium recovery, R&D processes, facility and equipment operations and maintenance, and liquid waste treatment operations. The waste includes cemented sludge, solidified aqueous waste, and solidified inorganic process solids.~~

~~A portion of the waste stream that requires treatment for off-site disposition includes evaporator bottom solutions (i.e., nitrate salts concentrates) generated prior to 1992 from nitrate recovery operations at TA-55. Evaporator bottoms solution is the liquid residual that results when a volume of ion-exchange effluents, oxalate filtrates, vacuum-seal water, or negative chilled waters is processed and concentrated in evaporator processes. The procedure for stabilization of the evaporator bottoms solution in a cement matrix was in development until 1992 when the process was successfully standardized. Prior to 1992, several alternate cementation methods were used and some of the cemented matrices have dewatered over time. Sampling of the liquids has shown elevated levels of nitrates and a range of corrosive pHs requiring the addition of EPA Hazardous Waste Number D001 and D002, along with other applicable EPA Hazardous Waste Numbers.~~

~~LA-MIN02-V: Mixed Inorganic Homogeneous Waste, Organics on Vermiculite~~

~~This waste stream consists of mixed inorganic homogeneous waste generated by plutonium recovery, R&D processes, and facility and equipment operations and maintenance. The waste is comprised of organic liquids (oils and solvents) adsorbed on vermiculite.~~

~~Portions of this waste stream that require treatment for off-site disposition are unremediated and remediated nitrate salts. As described for waste stream LA-MIN01-CIN, evaporator bottoms (i.e., nitrate salts) have been generated continuously from nitrate recovery operations at TA-55. In some cases, the evaporator bottoms solution was cooled, which causes a precipitation of solids (i.e., nitrate salts). The unremediated nitrate salt-bearing waste stream are nitrate salts that were double bagged and placed in containers. Reevaluation of the characterization of this waste required the addition of EPA Hazardous Waste Numbers D001, and D002, along with other applicable EPA Hazardous Waste Numbers.~~

~~The unremediated nitrate salts were mixed with various types of absorbents (e.g., WasteLok 770 [sodium polyacrylate] and Swheat Scoop [organic kitty litter]). Up to 50 percent by volume of debris including plastic packaging, lead (e.g. shielding), personal protective equipment (PPE), and metal fines may also be present in this waste stream. Some secondary waste generated during mixing/repackaging operations may also have been added to the waste containers, including but not limited to: tools, paper/plastic tags and labels, plastic/metal wire tires, leather gloves, lead-lined gloves, PPE, plastic sheeting used for contamination control, rags and wipes (e.g., Kimwipes, or Wypalls), and some packaging material (e.g., plastic bags, fiberboard liners, rigid liner lids cut into pieces).~~

~~LA-MHD01.001: Mixed Heterogeneous Debris~~

~~Waste stream LA-MHD01.001 consists of mixed heterogeneous debris waste generated in TA-55. The debris waste includes paper, rags, plastic, rubber, wood based high-efficiency particulate air (HEPA) filters, other plastic based and cellulose based items (e.g., PPE), noncombustible items (e.g., metal, glass), and lesser quantities of homogenous solids (less than 50 percent by volume) contaminated with radioactive materials. Some secondary waste generated during the remediation/repackaging operations may have been added to the waste containers. Nitrate salts in the form of homogenous solids can be found in some of the containers holding this waste stream and will require further treatment for disposition. Evaluation of the characterization of this waste required the addition of EPA Hazardous Waste Numbers D001 and D002, along with other applicable EPA Hazardous Waste Numbers.~~

~~LA-MIN03-NC: Mixed Inorganic Homogeneous Waste, Non-cemented~~

~~This waste stream consists of mixed inorganic homogeneous waste generated by plutonium recovery, R&D processes, and liquid waste treatment operations. It consists of vacuum filter cake solid waste.~~

~~LA-MIN04-S: Mixed Inorganic Homogeneous Waste, Salts~~

~~This waste stream consists of mixed inorganic homogeneous waste generated by plutonium recovery, R&D processes, and facility and equipment operations and maintenance. It is comprised of non-cemented inorganic process solids (salts).~~

~~LA-MIN05-COR: Mixed Inorganic Homogeneous Waste, Cemented Organics~~

~~This waste stream consists of mixed inorganic homogeneous solidified (cemented) organic process solids and emulsified solvents and oils generated by plutonium recovery, R&D processes, and facility and equipment operations and maintenance.~~

~~LA-MHD02-238: Mixed Heterogeneous Debris Waste, Pu-238~~

~~This waste stream consists of mixed heterogeneous debris waste generated by Pu-238 processing operations (primarily heat-source fabrication) and facility and equipment operations and maintenance. The waste includes Pu-238 contaminated noncombustible and combustible debris waste.~~

~~LA-MIN06-C238: Mixed Inorganic Homogeneous Waste, Cemented Inorganics, Pu-238~~

~~This waste stream consists of mixed inorganic homogeneous waste comprised of solidified (cemented) inorganic process solids. This waste stream is generated by Pu-238 processing operations (primarily heat-source fabrication) and facility and equipment operations and maintenance.~~

~~LA-MHD03-DD: Mixed Heterogeneous Debris Waste, D&D~~

~~This waste stream consists of mixed heterogeneous debris waste generated from facility and equipment D&D, including associated sectioning, size reduction, and packaging operations. The waste is comprised of plutonium-contaminated noncombustible and combustible debris waste.~~

~~LA-MHD05-ITRI: Mixed Heterogeneous Debris Waste, ITRI~~

~~This waste stream consists of mixed heterogeneous debris generated between 1975 and 1984 by the Inhalation Toxicology Research Institute, which is currently operated by Lovelace at the Kirtland Air Force Base, New Mexico. The waste is comprised of laboratory waste that may contain rags, tools, and biological waste contaminated with Pu-239.~~

~~LA-MHD04-RH: Mixed Heterogeneous Debris Waste, Remote-Handled~~

~~This waste stream consists of mixed remote-handled heterogeneous debris waste generated by hot cell operations. This waste is comprised of combustible and noncombustible waste.~~

~~LA-MIN06-NS.001: Mixed Inorganic Homogenous Waste, Solids Mixed with Zeolite~~

~~This waste stream consists primarily of inorganic homogenous solids generated from the evaporator process at TA-55 and treated at TA-50. This waste is comprised of transuranic waste solids (evaporator bottoms consisting primarily of nitrate salts, which may be mixed with organic-based kitty litter or Waste Lock 770 ®) mixed with zeolite (aluminosilicate mineral).~~

C.1.3 Treated Wastes

~~MTRUW is~~ Hazardous, mixed low-level, and mixed transuranic wastes are treated at ~~a permitted unit~~hazardous waste management units at the Facility. ~~MTRUW is treated~~ These treatment processes include explosives waste treatment by open burning/open detonation processes for hazardous waste, macroencapsulation for hazardous and mixed low-level waste, and stabilization in containers and cementation ~~to stabilize the~~for mixed transuranic waste ~~for storage and~~ to meet the Waste Isolation Pilot Plant (WIPP) waste acceptance criteria.

C.1.3.1 ~~Treated Mixed TRU Wastes~~Open Burning/Open Detonation

~~MTRUW~~Hazardous wastes that require treatment ~~is~~are generated primarily from R&D and processing explosive operations. Treatment of explosive hazardous wastes at the Facility consists of open burning or open detonation to consume waste materials or form a non-reactive solid matrix. Additional specific information on the open burning/open detonation processes is provided in Section C.3.1.4 of this WAP.

C.1.3.2 Macroencapsulation Wastes

Hazardous or mixed low-level wastes that require treatment by macroencapsulation may be generated by many of the operations described in Sections C.1.2.1 and C.1.2.2 of this WAP. The wastes will be treated primarily to meet LDR requirements for final disposition and the determination of applicable waste types will be controlled by the conditions for treatment identified in Permit Section 8.0, *Treatment by Macroencapsulation*. Additional specific information on the macroencapsulation treatment process is provided in Section C.3.1.3 of this WAP.

C.1.3.3 Treatment in Containers

Mixed transuranic wastes that require treatment are generated primarily from R&D and processing and recovery operations. ~~Treatment of MTRUW~~Treatment of mixed transuranic waste at the Facility may consist of stabilization and neutralization in containers to form a nonignitable, non-corrosive solid matrix. The determination of applicable waste types for this type of waste will be controlled by the conditions for treatment identified in Permit Part 7.0, Stabilization in Containers. Additional specific information on the stabilization in containers treatment process is provided in Section C.3.2.6 of this WAP.

C.1.3.4 Cementation Wastes

Mixed transuranic waste that require treatment are generated primarily from R&D and processing and recovery operations. Treatment of mixed transuranic waste at the Facility may consist of stabilization by cementation to form a noncorrosive solid matrix. Additional specific information on the stabilization treatment process is provided in Section C.3.2.~~4~~5 of this WAP.

~~C.1.4 Description of Permitted Units~~

~~**THE PERMITTED UNITS USED FOR STORAGE AND TREATMENT OF WASTES ADDRESSED IN THIS WAP ARE LOCATED WITHIN VARIOUS TAS AT THE FACILITY. THESE UNITS ARE LISTED IN ATTACHMENT J (*HAZARDOUS WASTE MANAGEMENT UNITS*). DETAILED INFORMATION ON THE PERMITTED UNITS IS PROVIDED IN ATTACHMENT A (*TECHNICAL AREA UNIT DESCRIPTIONS*).**~~

C.2 WASTE ANALYSIS PARAMETERS

The Permittees shall conduct detailed chemical and physical characterization ~~on~~for non-mixed hazardous wastes, the hazardous component of ~~MLLW~~mixed low-level waste, and the hazardous component of ~~MTRUW~~mixed transuranic waste as required by 40 CFR § 264.13 and Permit Section 2.4. The Permittees shall select waste analysis parameters to ensure that the waste characterization documentation will contain the information necessary to manage the waste in accordance with Resource Conservation and Recovery Act (RCRA) general facility standards in 40 CFR Part 264 and the LDR requirements in 40 CFR Part 268.

C.2.1 Analytical Parameters and Methods

The Permittees shall use the characterization methods for non-mixed hazardous wastes, ~~MLLW~~mixed low-level waste, and ~~MTRUW~~mixed transuranic waste summarized in Tables C-~~9~~6 through C-~~11~~8 to quantify the waste characterization parameters in those tables. The Permittees shall comply with the sampling and analysis requirements of Permit Sections 2.4.1 through 2.4.9. The Permittees shall use the methods listed below, as necessary, for the wastes listed in ~~Attachment~~ Section C.1.

1. Acceptable Knowledge (AK);

2. Sampling and laboratory analysis to determine the presence and concentrations of:
   - RCRA-regulated metals
   - RCRA-regulated volatile organic compounds (VOC~~)~~), and
   - RCRA-regulated semivolatile organic compounds (SVOC~~)~~);
3. Additional ~~MTRUW~~mixed transuranic waste characterization sampling methods~~;~~:
   - Headspace gas sampling to determine the presence of VOCs in container headspace, and
   - Physical waste form characterization through real-time radiography (RTR) and/or visual examination
4. Flash point characterization;
5. pH characterization;
6. Reactivity characterization; and
7. Free liquid determination via the paint filter test.

C.2.2 Criteria and Rationale for Characterization Methodology Selection

The Permittees shall select methods for waste characterization based on the physical form of the waste (*e.g.*, debris) and on knowledge of the process generating the waste. To determine whether a solid waste is hazardous, the Permittees shall use AK as described in Section C.3.1.1. When deemed necessary, the Permittees shall use sampling and laboratory analysis as described in Section C.3.1.2 and other characterization methodologies to evaluate the analytical parameters to confirm knowledge-based waste characterization for non-mixed hazardous waste, ~~MLLW~~mixed low-level waste, and ~~MTRUW~~mixed transuranic waste based upon the rationales identified in Tables C-~~9~~6, C-~~10~~7, and C-~~11~~8, respectively.

~~40 CFR § 260.11 lists approved~~Approved analytical methods to determine the concentrations of hazardous constituents in the liquid and solid fractions and extracts of waste samples~~.~~ are listed in 40 CFR § 260.11. All the methods are described in the most recent version of the U.S. EPA's *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)*. The Permittees shall use these and other ~~approved~~ methods approved by the Department, as necessary, to determine whether a waste stream is hazardous and to identify underlying hazardous constituents. The Permittees shall analyze samples for all hazardous constituents likely to be present based on the source of the waste stream and AK. ~~The Permittees shall require the analytical laboratory to report all constituents the laboratory analytical method is capable of measuring as specified in the most recent version of the U.S. EPA's *Test Methods for Evaluating Solid Wastes* (*SW-846*). Any hazardous constituents identified during analysis shall be included on the waste profile form. Detailed instructions for conducting Toxicity Characteristic Leaching Procedure (TCLP) waste analysis are found in the most recent version of *SW-846* and are incorporated by reference in 40 CFR § 260.11.~~ Also listed in *SW-846* is the appropriate analytical method for each hazardous constituent required to determine whether or not the waste contains a contaminant in excess of the maximum contaminant concentration regulated under 40 CFR Part 261. The Facility requires the analytical laboratory to report all constituents the laboratory analytical method selected is capable of measuring as specified in *SW-846*. Any hazardous constituents identified during analysis at levels higher than the regulatory thresholds for hazardous waste will be included within the waste characterization documentation.

~~TCLP is a method for leaching hazardous constituents from the solid portion of the waste and is used only if the solids constitute more than 0.5% of the waste by weight. The laboratory can also forego analysis by extraction if: 1) total analysis of the waste shows the concentrations of the analytes are so low that an extract of the waste could not contain analytes at concentrations above the regulatory limits (*see* Section C.3.1.2.1); or 2) analysis of any liquid portion of the waste contains such high concentrations of hazardous constituents that, even accounting for dilution, the entire sample would be hazardous.~~

Many hazardous wastes are restricted from land disposal under the Hazardous and Solid Waste Amendments unless they are treated to diminish their toxicity and reduce the likelihood that hazardous constituents will migrate from the disposal site. As required by 40 CFR Part 268, each waste shipment must be accompanied by a notification stating whether the restricted waste meets specific LDR treatment standards promulgated for hazardous constituents or is otherwise exempt. In most cases, the notification can be completed after laboratory analysis of the waste. If an LDR notification is based solely on knowledge of the waste, the Permittees shall keep the supporting documentation on record, in accordance with 40 CFR § 268.7.

C.3 CHARACTERIZATION METHODS

Non-mixed hazardous wastes, mixed low-level waste, and mixed transuranic waste will be characterized based on the chemical, physical, and radiological nature of the waste stream. Characterization will be performed by using AK or sampling and analysis or both, as described below. The Permittees' operating procedures consider characterization of wastes before a waste-generating process will begin. The preliminary characterization of waste begins prior to actual generation (at the point of concept and design of a process or system) so that the generator can determine whether AK, sampling and analysis, or a combination of the two will be required for waste characterization.

~~The Permittees shall characterize non-mixed hazardous wastes, MLLW, and MTRUW based on the chemical, physical, and radiological nature of the waste stream. The Permittees shall perform characterization by using AK or sampling and analysis or both, as described below.~~

~~The~~Once generated, the Permittees shall record information for each waste stream on a waste characterization profile ~~form accompanied by~~that includes sampling and analysis data and/or AK documentation. ~~These documents are~~This information is collectively referred to as the waste characterization documentation. Such documentation may include items referred to by a traceable identifier and separately located within the Facility. The Permittees shall ensure that waste characterization documentation is reviewed and approved prior to waste acceptance at a ~~permitted unit.~~hazardous waste management unit for treatment or storage. If the documentation is incomplete or does not contain sufficient information to characterize the waste, the Permittees shall return the documentation to the generator and shall not accept the waste for storage or treatment.

Before accepting waste for storage or treatment, the Permittees shall determine that waste characterization documentation satisfies the information requirements of Permit Section 2.4, including but not limited to the assignment of all applicable EPA Hazardous Waste Numbers and the LDR status of the waste. Once the waste characterization documentation is reviewed and approved, the Permittees may notify the generator and authorize the transfer of the waste to a permitted unit. Before the waste is transferred, the Permittees' waste management personnel shall review any transfer documentation to ensure that it accurately pertains to the waste being transferred and that it corresponds with the waste characterization documentation. If the transfer documentation does not correspond with the characterization documentation, the Permittees shall not transfer the waste. The Permittees shall maintain the waste characterization documentation and the transfer documentation shall be part of the Facility Operating Record. After approval of waste characterization of a waste stream by waste management personnel, the Permittees shall approve subsequent transfer of waste from that waste stream based upon the generator's statement that the waste stream is accurately represented by the previously approved waste characterization information.

Training for use of waste characterization documentation is included in a facility waste documentation course. This training provides step-by-step instructions on how to complete and review ~~forms~~documentation for characterizing wastes.

The Permittees shall perform reevaluation of initial characterization information and annual verification in accordance with Permit Section 2.4.7.

The Permittees shall deem a waste container to contain free liquids if any of the following characterization methods so demonstrate:

- generator waste-characterization knowledge;
- visual examination;
- radiography; or
- the Paint Filter Test (*SW-846*, Method 9095).

C.3.1 Hazardous and Mixed Low-Level Waste Characterization

The Permittees shall select characterization methods for non-mixed hazardous waste and ~~MLLW~~mixed low-level waste based on the physical nature of the waste stream (*i.e.*, homogeneous or heterogeneous). The Permittees shall characterize homogeneous solid and liquid waste for the presence of hazardous constituents (*e.g.*, VOCs, SVOCs, metals) on the basis of AK and, if necessary, sampling and analysis.

The Permittees shall characterize heterogeneous solid waste solely on the basis of AK for the following reasons:

- the physical, chemical, and/or radiological nature of the waste makes it difficult to obtain representative samples;
- the lack of appropriate sampling methodology; and
- for ~~MLLW~~mixed low-level waste, safety concerns associated with unnecessary exposure to the radioactive component of the waste.

In using AK to characterize waste, the Permittees shall review characterization documents with the help of subject matter experts, when necessary.

The Permittees shall characterize chemicals of an unknown nature by assembling all knowledge of the operations and activities that were performed at the site of generation relevant to waste generation and management. The Permittees shall test unknown wastes in volumes greater than one gallon for ignitability, corrosivity, reactivity, toxicity characteristics, and any other parameters indicated by the initial data gathered on the material. Based on that determination, the Permittees shall assign the waste the proper EPA Hazardous Waste Number(s) and LDR status. The Permittees shall use the characterization methods provided in Tables C-~~9~~6 and C-~~10~~7.

The Permittees shall analyze small volumes of unknown wastes for pH, flash point, and reactivity. For purposes of managing unknown wastes, a small volume is defined as one liquid gallon or less. The rationale for this basis is that one gallon is the minimum quantity of sample needed for these three tests to determine whether or not the waste is hazardous.~~The Permittees shall analyze small volumes of unknown wastes for pH, flash point, and reactivity.~~

C.3.1.1. Acceptable Knowledge

Acceptable knowledge (AK) includes process knowledge, additional characterization data, and facility records of analysis~~ (EPA, 1994A).~~.

Process knowledge~~ (PK)~~ includes information about the process used to generate the waste, material inputs to the process, and the time period during which the waste was generated. ~~PK~~Process knowledge is described in 40 CFR § 264.13(a)(2) as data developed under 40 CFR Part 261 and existing published or documented data on a specific hazardous waste or hazardous waste generated from similar processes. ~~PK~~Process knowledge may include off-site facility waste characterization data pertaining to a specific waste and laboratory analysis data performed prior to the effective date of applicable RCRA regulations.

Additional characterization data includes data obtained after the advent of RCRA and from chemical or physical analysis that is not subject to the most recent version of *SW-846* and other approved methods, or through testing of similar or surrogate waste streams. This includes previous analytical data relevant to the waste stream including results from fingerprint analyses, spot checks, or routine waste verification sampling.

Facility records of analysis consist of waste analysis and physical characterization performed prior to the effective date of RCRA regulations.

The Permittees may use AK alone or in conjunction with sampling and analysis in the following instances (EPA, ~~1994A~~2015):

~~1.~~ hazardous constituents in wastes from specific processes ~~that~~ are well documented~~;~~

- ~~F and~~ , such as with K-listed wastes, presuming that the wastes are not highly variable, and accurate and precise concentrations are not necessary for documenting compliance;

- wastes are discarded~~,~~ unused~~,~~ commercial chemical products, reagents, or chemicals of known physical and chemical ~~properties (~~constituents, presuming that the wastes are not highly variable, and accurate and precise concentrations are not necessary for documenting compliance. See the P~~-~~ and U-listed ~~wastes);~~waste categories in 40 CFR §261.33;
- it has been determined that no acceptable test method exists to satisfy an analytical requirement (e.g., hazardous waste determinations under §261.23 for D003 reactivity);
- health and safety risks to personnel would not justify sampling and analysis ~~; and~~(e.g., if opening a container exposes technician to radionuclides from radioactive mixed waste); or
- the physical nature of the waste ~~does not lend itself to taking~~makes it technically impracticable to obtain a laboratory sample~~ (*e.g.*, heterogeneous waste streams).~~.

The Permittees shall document the basis for using AK on a waste profile form. The Permittees shall maintain AK information in accordance with Permit Section 2.12.2 in a format that allows waste management personnel and subject matter experts to either obtain copies or, in the case of classified or sensitive AK documentation that cannot be ~~sent to TA-54~~kept in the standard recordkeeping systems due to security requirements, review the documentation at the point of waste generation. The Permittees shall assign a traceable identifier (*i.e.*, process or AK document number or alphanumeric designation) in accordance with Permit Section 2.4.1 to the waste characterization documentation so that the Permittees can obtain the information for as long as required by RCRA regulation and this Permit.

C.3.1.1.1 Process Knowledge

The Permittees shall obtain, assemble, and prepare the process knowledge documentation for each waste stream. The Permittees may substantiate process knowledge for a specific waste stream using documentation such as:

- laboratory notebooks that detail the research processes and raw materials used in an experiment;
- process or experiment design documents;
- safety analysis reports;
- standard operating procedures and detailed operating procedures, which can include a list of the raw materials or reagents, a description of the process or experiment that uses the materials, and a description of the wastes generated and how the wastes are handled;
- waste packaging logs;
- test plans or research project reports that describe the reagents and other raw materials used in an experiment;
- chemical inventory database for particular processes or experiments;
- information from site personnel (*e.g.*, documented interviews);
- industry reports on a similar process when there is a clear connection between the Facility process/experiment and the industry's similar process or experiment;

- ~~Material~~ Safety Data Sheets, product labels, and other product package information; and
- ~~ER~~Environmental restoration site and waste characterization data.

C.3.1.2 Sampling and Analysis

For waste streams that can be representatively sampled (*i.e.*, homogeneous), the Permittees shall conduct sampling and analysis when there is insufficient AK. The Permittees shall collect a representative sample of the waste and handle it by a means that preserves its original physical form and composition and prevents contamination or changes in concentration of the constituents to be analyzed. The Permittees shall, when it is necessary to conduct sampling and analysis to fully characterize a waste, utilize the analytical methods specified in Tables C-~~9~~11 through C-~~18~~13 for the identification of any hazardous constituents likely to be present based on the source of the waste stream and AK. Personnel involved in sampling and analysis shall comply with the most recent version of *SW-846* and other Department approved methods. The Permittees shall obtain samples representative of the waste stream in accordance with Permit Section 2.4.2.

C.3.1.2.1 ~~Solid Waste~~Toxicity Characteristic Analysis

The Permittees shall, if necessary for waste characterization purposes, sample and analyze homogeneous waste streams for the toxicity characteristic (TC) contaminants listed in 40 CFR § 261.24~~, which is incorporated herein by reference. The Permittees may conduct~~. Detailed instructions for conducting Toxicity Characteristic Leaching Procedure (TCLP) waste analysis ~~for total concentration of TC contaminants on samples in a screening step,~~are as described in Section 1.2 of SW-846 Method 1311~~, the toxicity characteristic~~. TCLP is a method for leaching ~~procedure (TCLP).~~hazardous constituents from the solid portion of the waste and is used only if the solids constitute more than 0.5% of the waste by weight. The Permittees may forego analysis by extraction if: (1) total analysis of the waste shows the concentrations of the analytes are so low that an extract of the waste could not contain hazardous constituents at concentrations above the regulatory limits; or (2) analysis of any liquid portion of the waste contains such high concentrations of hazardous constituents that, even accounting for dilution, the entire sample would be hazardous. If total concentrations are used in the waste characterization process, the Permittees shall compare analytical data to the TC regulatory levels expressed as total values. These total values will be considered the regulatory threshold limit ~~(RTL)~~ values for the determination of whether a particular waste exhibits a TC. The Permittees shall obtain ~~RTL~~Regulatory threshold limit values by calculating the weight/weight concentration (in the solid) of a TC contaminant that would give the regulatory weight/volume concentration in the TCLP extract. If the total concentrations are less than the ~~RTL~~regulatory threshold limit value, then it may be assumed that the waste does not exhibit the toxicity characteristic and the TCLP does not need to be completed for the screened TC contaminants.

~~C.3.1.2.2 Liquid Waste Analysis~~

Liquid wastes generated at the Facility consist of aqueous solutions, slurries, and organic liquids. The Permittees shall sample and analyze these wastes, if necessary for waste characterization purposes, for total metal content, VOCs, and SVOCs. In accordance with SW-846 Method 1311 ~~(TCLP),~~, liquid wastes (~~*i.e.*, those wastes~~ that contain less than 0.5 percent dry solids) do not require extraction. The liquid waste, after filtration, is defined as the TCLP extract. Liquid waste, therefore, is characterized by filtering the waste, measuring total contaminant concentrations in the resulting filtrate, and comparing these concentrations to the TC regulatory levels in 40 CFR § 261.24.

The Permittees shall characterize wastes that contain both a liquid and a solid phase using total analytical data for the solid phase to determine toxicity characteristics. The Permittees shall compare with the TC regulatory levels for each phase in a manner consistent with the discussion in ~~Section C.3.1.2.1.~~this section. The following formula (EPA, ~~1994b~~1994) will be used to calculate the maximum theoretical leachate concentrations for the combined phases:

$$\frac{[A \times B] + [C \times D]}{B + [20 \text{ liters/kilogram} \times D]} = M$$

Where:

A = concentration of the analyte in the liquid portion of the sample (milligrams/liter);

B = volume of the liquid portion of the sample (liter);

C = concentration of the analyte in the solid portion of the sample (milligrams/kilogram);

D = weight of the solid portion of the sample (kilogram); and

M = maximum theoretical leachate concentration (milligrams/liter).

C.3.1.2.~~3~~2 Sample Handling, Preservation, and Storage

Table C-~~15~~10 presents ~~requirements specified in~~ the most recent ~~version of~~ *SW-846* ~~regarding~~requirements for sample containers, preservation techniques, and holding times associated with sample collection. The Permittees shall adhere to these requirements to ensure that sampling and analysis meet quality objectives for data. In the event the specified criteria are not met, the Permittees shall collect another sample and submit it for analysis.

C.3.1.2.~~4~~3 Analytical Laboratory Selection and Analytical Methods

The Permittees shall ensure that analytical laboratories at the Facility and approved contractor laboratories conduct the detailed qualitative and quantitative chemical analyses specified in Tables C-~~16~~11 and C-~~17~~12. These laboratories must have:

1. a documented and comprehensive QA/QC program;
2. technical analytical expertise;
3. a document control and records management plan; and
4. the capability to perform data reduction, validation, and reporting.

C.3.1.~~2.5~~3 Characterization of Waste to be ~~treated~~Treated by Macroencapsulation

~~The~~The treatment objective of macroencapsulation is to utilize an EPA-approved treatment technology to meet the LDR treatment standard for hazardous debris waste and radioactive lead solids as specified in 40 CFR § 268.42 and 40 CFR § 268.45. The macroencapsulation technology is at least a two-component system formulated to resist contaminants and leachate. The closure system ensures a permanent and impermeable barrier between the waste debris and the outside environment. Permittees shall conduct chemical and physical characterization of hazardous or mixed low-level waste prior to treatment by macroencapsulation~~. The Permittees shall use documented AK,~~ as described in ~~Attachment C,~~ Section C.3.1.1, which will be used to determine whether or not the waste stream is regulated as a hazardous waste. ~~The Permittees shall use~~ After treatment, the waste will meet LDR treatment standards for toxicity characteristic hazardous waste debris. The EPA hazardous waste numbers D004-D011 and D018-D043 will no longer apply to the waste. The Permittees shall confirm this condition with process knowledge~~,~~ and conformance with the applicable treatment conditions.

C.3.1.4 Characterization of Waste to be Treated by Open Burning and Open Detonation

Explosives waste streams at the Facility are treated to remove the characteristic of reactivity as defined in 40 CFR § 261.23. Open burning treatment of these wastes involves a propane-fueled burn that removes the high-explosives component of the waste and renders the waste non-reactive and any residue amenable to handling and dispositioning. Regulations do not specify a particular test method for reactivity of explosives waste or explosives-contaminated waste, therefore, the determination of whether a waste is reactive is made based on the properties of the chemicals known or suspected to be in the waste. Wastes that contain concentrated explosives are characterized by process knowledge, as described in Section C.3.1.1.1. Explosives-contaminated waste streams are characterized by both process knowledge and/or other acceptable knowledge (Section C.3.1.1). Information to determine whether explosives content within the waste stream is detonable follows.

- If it is unknown whether explosives are present, a screening method or field test, such as the High Explosives Spot Test, may be used.
- If the waste contains visible explosives, it is considered reactive.
- If the waste came into direct contact with explosives, and all of the surfaces cannot be tested or visually examined (e.g., debris or equipment), it is assumed that there is a reactive amount of explosives associated with it.
- All open burning treatment residues will be sampled and analyzed in accordance with the requirements of Section C.3.1.2 to ensure that treatment residuals are not hazardous waste. This is usually conducted using the appropriate analytical method from the most recent version of Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) listed in Table C-9. All sampling of waste streams is conducted to be representative of the waste.

Additionally, analysis of the treatment residue will be used to verify the characterization of the treated explosives waste stream that generated the residue. If analysis of the residue identifies constituents not identified in the waste characterization documentation, those constituents will be included on the waste profile form for the waste stream prior to ~~macroencapsulation~~acceptance at the unit in the future. Most treatment residues generated by the open burning treatment process are characterized as nonhazardous wastes; however, all treatment residues (both nonhazardous and hazardous) are shipped off-site for disposal.

- ~~C.3.1.3~~ Because the TA-16-388 Flash Pad may be used to treat hazardous debris that exhibits a reactive characteristic potentially mixed with "toxicity characteristic debris" or a "debris contaminated with listed waste" (see 40 CFR § 268.45(b)), the alternative treatment standards outlined in Table 1 at 40 CFR § 268.45 must be met prior to land disposal of the waste. Any hazardous debris treated at the TA-16-388 Flash Pad that will be land disposed will be separated from treatment residues using simple physical or mechanical means as necessary. If further treatment of the hazardous debris waste is required to meet the waste-specific treatment standards for organic compounds, the additional treatment will be conducted at an off-site treatment facility prior to land disposal.

Open detonation treatment of these wastes involves an explosion that chemically transforms the high-explosives component of the waste faster than the speed of sound. Regulations do not specify a particular test method for reactivity of explosives waste and explosives-contaminated waste; therefore, the determination of whether a waste is explosives waste is made based on the properties of the chemicals known or suspected to be in the waste and/or field screening or laboratory analysis. Wastes that contain concentrated explosives are characterized by process knowledge, as described in Section C.3.1.1.1. Wastes that may contain explosives in lower concentrations are characterized by both process knowledge and/or the following techniques to determine whether explosives in lower concentrations are detonable/explosive.

- If it is unknown whether explosives are present, a screening method, such as the High Explosives Spot Test, may be used.
- If heterogeneous waste contains visible high explosives, it is considered reactive.
- If heterogeneous waste came into direct contact with high explosives and all of the surfaces cannot be tested or visually examined (e.g., debris or equipment), it is assumed that there is a reactive amount of explosives associated with it.
- High explosives concentrations may be directly measured in homogeneous materials (e.g., soil or water). This is usually completed using the appropriate analytical method from the most recent version of SW 846 Method 8300 series. Parameters such as the concentration of the high explosive, its sensitivity, and the media in which it occurs are used to determine whether the waste is likely to be reactive or not.

Characterization methods for explosives-contaminated waste and explosives waste are summarized in Table C-9. Treatment by open burning and open detonation completely removes the reactive characteristic from explosives waste streams.

C.3.1.5 Verification Frequencies

The Permittees shall comply with the waste characterization verification procedures identified in Permit Section 2.4.7(3). The Permittees shall place a non-conformance report in the Facility Operating Record if the characterization for the waste stream is found to be inconsistent with the documentation. The Permittees shall decline to accept any waste from the waste stream in issue until the characterization deficiency is remedied.

C.3.2 Mixed Transuranic Waste Characterization

The Permittees characterize ~~MTRUW~~mixed transuranic waste for the information specified in Tables C-8 and C-13 and described in Permit Section 2.4.1 ~~in accordance with the parameters and methods shown in Tables C-11 and C-18~~ for management, storage, and treatment at the Facility. Characterization of the hazardous component of ~~MTRUW~~mixed transuranic waste to be stored and treated at the Facility shall be conducted in accordance with the procedures discussed in the following sections.

Initial characterization of ~~MTRUW~~mixed transuranic waste for the purpose of storage at the Facility is based primarily on AK (*see* ~~Attachment~~ Section C.3.1.1) with additional procedures applied to confirm the AK. The Permittees shall begin the AK process by reviewing the available generator documentation for the waste stream. This includes process knowledge, any extant analytical data, and the information included with the waste documentation forms associated with the individual waste containers.

Most mixed transuranic waste managed at the Facility is destined for disposal at the WIPP in Carlsbad, New Mexico. WIPP certification procedures require additional characterization to meet the requirements of the WIPP permit and waste acceptance criteria prior to shipment there. Information regarding the waste derived from the WIPP certification procedures will be used as additional information for AK.

The Permittees shall categorize ~~MTRUW~~mixed transuranic waste streams by Summary Category Groups based on the physical and chemical form of the waste as established by AK. The Permittees shall assign individual waste containers to waste streams based upon AK.

The Permittees shall utilize AK to determine the EPA Hazardous Waste Numbers applicable to the waste stream or container under consideration. The Permittees shall utilize AK to determine whether the container requires additional waste management procedures such as secondary containment for liquid waste or segregation of incompatible, ignitable, or reactive wastes. If AK is insufficient to determine needed information (*e.g.*, ignitability), the Permittees shall use headspace gas sampling to provide the needed information.

~~Until it is determined that a container does not contain free liquids, the~~The Permittees shall manage ~~MTRUW container storage~~mixed transuranic waste in accordance with regulations and Permit requirements applicable to containers holding free liquids (*i.e.*, with secondary containment and appropriate labeling~~).~~) if the hazardous waste determination made pursuant to Permit Section 2.4.1 indicates that the container holds any free liquids.

If AK is inadequate to characterize a homogeneous ~~MTRUW~~mixed transuranic waste stream or container (*e.g.*, homogeneous solids, soil and gravel, aqueous liquids and slurries) the Permittees shall collect a representative sample of the waste and submit the waste for ~~laboratory~~on-site laboratory analysis. Mixed transuranic waste is not shipped off-site for analysis.

C.3.2.1~~.1~~ Real-Time Radiography

~~MTRUW~~Mixed transuranic waste containers generated after the effective date of the Permit and that are not wastes taken from retrievable storage after that date are not required to undergo RTR if associated AK documentation contains the information necessary to fully characterize the waste in accordance with Permit Section 2.4~~/.~~.1~~.~~ and the WIPP waste acceptance criteria. Otherwise, all ~~MTRUW~~mixed transuranic waste containers require RTR prior to storage at the Facility.

RTR is a nondestructive, qualitative, and semi-quantitative characterization technique that involves x-ray scanning of waste containers to identify and verify the physical form(s) of waste container contents using appropriate equipment and qualified operators. The Permittees shall use RTR to verify the absence of free liquids, to confirm the physical form of containerized waste, and to document the materials present.

The Permittees shall ensure that during RTR the waste container is scanned while the operator views and permanently records the image from the television screen on audio and videotape. The radiography image is examined for evidence of liquids by repetitively moving the container-handling system and searching for evidence of wave motion. The Permittees shall utilize a radiography data form to document the materials present and all other relevant characterization information about the containerized waste.

The Permittees shall allow only properly trained personnel to operate radiography equipment. Standardized training requirements for radiography operators are based upon existing industry standard training requirements. Operators must requalify ~~at least every two years.~~ periodically, as required.

The Permittees shall examine the radiography image produced for evidence of liquids by repetitively moving the container-handling system and searching for evidence of wave motion.

C.3.2.~~1.~~2 Visual Examination

~~The Permittees may use visual~~ Visual examination (VE) or visual inspection (VI) is used to verify the contents of ~~MTRUW~~mixed transuranic waste containers as a substitute to RTR or during packaging of the waste. VE/VI is performed by physically examining the contents of a waste container to verify that the container is properly included in the appropriate waste stream, to verify the absence of free liquids, to confirm the physical form of containerized waste, and to document the materials present. The Permittees shall ensure that waste characterization determined through VE/VI is recorded in the associated waste's AK documentation.

~~Standardized training for VE shall be developed.~~ Visual examination operators shall be trained in the specific waste generating processes, typical packaging configurations, and waste material parameters expected to be found in each waste stream at the generator site. The training shall be site specific to include the various waste configurations generated at the site. Operators must requalify ~~at least every two years~~periodically, as required.

C.3.2.3 Headspace Gas Analysis

Headspace gas analysis is used to confirm the presence and concentration of flammable gas/VOCs, hydrogen, and methane in a mixed transuranic waste container intended for shipment to WIPP. A sample of headspace gas is taken through the vent assembly of a waste container at controlled temperatures and analyzed by gas chromatography and thermal conductivity. Waste characterization information collected through headspace gas analysis is recorded in the associated waste's AK documentation.

C.3.2.4 Characterization to Meet LDR Requirements

~~The Permittees shall characterize MTRUW~~Mixed transuranic waste is characterized to determine its land disposal restriction status in accordance with Attachment Section C.5.2.

C.3.2.~~3 WIPP Characterization~~

~~Most MTRUW waste at the Facility is destined for disposal at the Waste Isolation Pilot Project (WIPP) in Carlsbad, New Mexico. Therefore, prior to shipment to WIPP, additional characterization to meet WIPP certification procedures will be implemented to meet requirements of the WIPP permit for these wastes. Waste information that is derived from the WIPP waste characterization will be used for Facility MTRUW characterization as additional information for AK.~~

~~C.3.2.4~~ 5 Characterization Procedures ~~Prior to and After~~ for Treatment of Mixed ~~TRU~~Transuranic Wastes by Stabilization (Cementation)

The Permittees shall adhere to the waste characterization procedures specific to waste treatment in the stabilization unit at TA-55, Building 4, Room 401. The stabilization unit at TA-55 is a miscellaneous unit pursuant to 40 CFR Part 264, Subpart X, and is used to treat liquid and solid mixed wastes by stabilization in cement to form a noncorrosive solid matrix.

The stabilization (cementation) unit at TA-55 treats homogeneous liquid and solid mixed waste generated primarily from R&D and processing and recovery operations at TA-55 and at the Chemistry and Metallurgy Research Building at TA-3. The liquid wastes (Summary Category Group L1000) generally consist of evaporator bottoms solutions and laboratory solutions that may exhibit the hazardous characteristics of corrosivity and toxicity for metals (e.g., arsenic, barium, cadmium, chromium, lead, mercury, and silver) as defined in 40 CFR §§ 261.22 and 261.24, which are incorporated herein by reference. The homogeneous solid process wastes (Summary Category Group S3000) consist of process residue from the evaporator, process leached solids, filter cake, and other miscellaneous solids. This waste stream typically exhibits the hazardous characteristic of toxicity (for metals) and corrosivity. These waste streams are mixed with cement in 55-gallon drums and allowed to cure into a noncorrosive solid matrix. Table C-14 provides a description of the waste streams associated with the stabilization unit and identifies their potentially applicable EPA Hazardous Waste Numbers. The resulting cemented waste is identified by Summary Category Group S3000 and typically carries the Waste Matrix Code S3100. ~~;~~Based on documented AK, the wastes treated by stabilization at TA-50 do not contain VOCs or SVOCs.

C.3.2.6 Characterization Procedures for Treatment of Mixed Transuranic Waste by Treatment in Containers

The Permittees shall adhere to the waste characterization procedures specific to waste treatment for the stabilization process of blending with zeolite at the TA-50, Building 69 (TA-50-0069) Indoor Permitted Unit; and the stabilization/neutralization treatment processes at TA-54, Area G, Pad 9, Dome 231 (TA-54-0231), TA 54, Area G, Pad 11, Dome 375 (TA-54-0375), and TA-54, Area G, Pad 1, Building 412 (TA-54-0412). ~~The stabilization unit at TA-55 is a miscellaneous unit pursuant to 40 CFR Part 264, Subpart X and is used to treat liquid and solid mixed wastes by stabilization in cement to form a noncorrosive solid matrix.~~ The stabilization treatment process at TA-50 occurs within a glovebox at a permitted storage unit and is used to treat liquid and solid mixed waste by blending with water and zeolite to form a noncorrosive and non-ignitable solid matrix. The stabilization treatment process at TA-54-0231 occurs within a glove bag at a permitted storage unit and is used to treat liquid and solid waste by neutralizing pourable liquids and adding zeolite or another Waste Isolation Pilot Plan (WIPP)-approved absorbent to form a noncorrosive and non-ignitable solid matrix. The stabilization treatment process at TA-54-0412 occurs within the pre-engineered containment tent within TA-54-0412 at permitted storage unit and is used two treat liquid and solid waste by neutralizing pourable liquids and adding zeolite or another Waste Isolation Pilot Plan (WIPP)-approved absorbent to form a noncorrosive and non-ignitable solid matrix. Treatment will occur under fume hoods for 55-gallon and 85-gallon drums. The fume hoods are attached to the ventilation system when in use. The stabilization treatment process at TA-54-0375 occurs within the PermaCon® within TA-54-0375 at a permitted storage unit and is used to treat liquid and solid waste by neutralizing pourable liquids and adding zeolite or another WIPP-approved absorbent to form a noncorrosive and nonignitable solid matrix. Treatment occurs inside the PermaCon®, which is equipped with a HEPA filtration system and is under negative pressure during waste processing activities.

~~The stabilization unit at TA-55 treats homogeneous liquid and solid mixed waste generated primarily from R&D and processing and recovery operations at TA-55 and at the Chemistry and Metallurgy Research Building at TA-3. The liquid wastes (Summary Category Group L1000) generally consist of evaporator bottoms solutions and laboratory solutions that may exhibit the hazardous characteristics of corrosivity and toxicity for metals (including arsenic, barium, cadmium, chromium, lead, mercury, and silver) as defined in 40 CFR §§ 261.22 and 261.24, which are incorporated herein by reference. The homogeneous solid process wastes (Summary Category Group S3000) consist of process residue from the evaporator, process leached solids, filter cake, and other miscellaneous solids. This waste stream typically exhibits the hazardous characteristic of toxicity (for metals) and corrosivity. These waste streams are mixed with cement in 55-gallon drums and allowed to cure into a noncorrosive solid matrix. Table C-19 provides a description of the waste streams associated with the stabilization unit and identifies their potentially applicable EPA Hazardous Waste Numbers. The resulting cemented waste is identified by Summary Category Group S3000 and typically carries the Waste Matrix Code S3100.~~

The glovebox at the TA-50-0069 Indoor Permitted Unit is used to treat nitrate salt-bearing waste by stabilization in containers. Liquids and solid waste that exhibit the hazardous characteristics of ignitability, corrosivity (for liquids only), and toxicity for metals (including arsenic, barium, cadmium, chromium, lead, mercury, and silver) as defined in 40 CFR §§261.22 and 261.24, which are incorporated herein by reference, are treated at the unit to remove only the ignitability and corrosivity characteristics. Table C-~~20~~15 provides a description of the waste streams associated with the stabilization within a bowl in a glovebox located within in TA-50-0069 and the stabilization (including absorption) and neutralization inside a Perma-Con in building TA-54-0231, and identifies their potentially applicable EPA Hazardous Waste Numbers prior to treatment. After treatment, only the EPA Hazardous Waste Numbers for ignitability and corrosivity (D001 and D002) will be removed from the treated waste. All other Hazardous Waste Numbers will still apply to the treated waste.

The Permitted Units at TA-54-0231, TA-54-0375, and TA-54-0412 are used to treat mixed transuranic waste from the S3000 waste matrix (homogenous solids) to remove the Resource Conservation and Recovery Act (RCRA) hazardous waste characteristics of ignitability (D001), corrosivity (D002) and reactivity (D003). Treatment of cemented sludge waste will occur within glove bags located inside the Permitted Unit, a Perma-Con in TA-54-0231. At TA-54-0375, treatment of waste occurs within the PermaCon® within Dome 375. At TA-54-412,treatment of waste occurs within the pre-engineered containment tent within Building 412. Treatment activities include neutralization of liquids, and stabilization of liquids using zeolite or another WIPP-approved absorbent. Table C-~~20~~15 provides a description of the waste streams associated with the stabilization (including absorption) and neutralization inside a glove bag located within a PermaCon in TA-54-0231, within a PermaCon® in TA-54-0375, and within the pre-engineered containment tent in TA-54-0412; and identifies their potentially applicable EPA Hazardous Waste Numbers (HWNs) prior to treatment. After treatment, only the EPA HWNs D001 and D002 will be removed from the treated waste. To remove the D003 HWN, aerosol cans will be removed/segregated from the waste stream and sent off-site for treatment and disposal. All other HWNs that have not been removed by treatment or segregation will still apply to the treated waste.

~~C.3.2.4.1 Characterization Procedures for Waste to Be Treated by Stabilization~~

The Permittees shall conduct chemical and physical characterization prior to treatment of ~~MTRUW.~~mixed transuranic waste by stabilization. The Permittees shall use documented AK, as described in ~~Attachment~~ Section C.3.1.1, to determine whether or not the waste stream is regulated as a hazardous waste. The Permittees shall use process knowledge, chemical analytical data, or both to adequately characterize the ~~MTRUW~~mixed transuranic waste prior to stabilization and neutralization, if necessary (at TA-54-0231, TA-54-0375, and TA-54-0412 only). If process information is not sufficient, the Permittees shall periodically sample and analyze the wastes to be treated by stabilization for pH and for TC metals listed in 40 CFR § 261.24 to establish a baseline, as appropriate. ~~Based on documented AK, the wastes treated by stabilization at TA-55 do not contain VOCs or SVOCs.~~ Parameters and analytical methods for specific hazardous constituents are presented in Table C-~~18~~13.

The neutralization process will consist of verifying the pH and adding hydrochloric acid (HCl) or sodium hydroxide (NaOH) incrementally and iteratively to aqueous waste to bring the pH within a 3 -10 range. Pourable liquids in the waste drums will have their pH measured with a calibrated pH meter prior to the neutralization process and will generally follow EPA Method 9040C (as updated), pH Electrometric Measurement for pH testing. However, because of the need for "real-time" pH screening results at the time of waste processing, strict adherence to all aspects of

EPA method 9040C may not be possible. The Permittees may use an equivalent method, if approved in advance by NMED. The liquids will be neutralized, if necessary, and stabilized with zeolite in a minimum ratio of 3:1 (three parts zeolite to one part liquid waste). The treated waste will be repackaged into a new certified 55-gal. daughter drum and characterized and certified by Central Characterization Program (CCP) personnel in accordance with the WIPP WAC. All measuring tools used in the stabilization process (*i.e.*, glass/plastic pipettes, graduated cylinders, beakers, etc.) must be resistant to a wide variety of reagents.

~~C.3.2.4.2 Characterization Procedures for Waste Treated by Stabilization~~

~~The Permittees shall characterize waste treated by stabilization (*i.e.*, MTRUW) in accordance with Attachment Section C.3.2. For treatment at the TA-50-0069 Indoor Permitted Unit, samples will be collected from a minimum of 1% of treated waste containers from each waste stream and analyzed at an onsite laboratory to confirm chemical composition when compared to that of the surrogates tested.~~

NMED may require additional sampling of waste from the TA-54-0231, TA-54-0375, and TA-54-0412 treatment processes.

C.3.2.~~5~~7 Sample Handling, Preservation, and Storage

Table C-15 presents the most recent *SW-846* requirements regarding sample containers, preservation techniques, and holding times associated with sample collection. The Permittees shall adhere to these requirements to ensure that sampling and analysis meet quality objectives for data.

C.4 OFF-SITE WASTE ACCEPTANCE PROCEDURES

For off-site waste, the Permittees shall require the generator to provide waste characterization documentation equivalent to that prepared by the Permittees for waste generated on site. The Permittees shall review such documentation for completeness and accuracy prior to approving the waste for shipment to the Facility.

The Permittees shall verify that off-site waste documentation, including Uniform Hazardous Waste Manifests and LDR Notification Forms, corresponds to the waste received and its associated characterization documentation.

The Permittees shall physically examine waste shipments upon receipt for correct documentation, correctness and completeness of waste container identification and labeling, and conformance with permitted container types and waste compatibility for storage and segregation, as appropriate. If the Permittees find discrepancies between the wastes received and the manifest or during further characterization find such discrepancies, the Permittees shall notify the Department in accordance with Permit Section 2.4.4. If the Permittees cannot resolve the discrepancies, the waste shall be returned to the generator in accordance with Permit Section 2.4.4.

C.5 SPECIAL PROCEDURAL REQUIREMENTS

Waste management requirements specific to ignitable, reactive, and incompatible waste as well as requirements for compliance with LDR and 40 CFR Part 264 Subparts BB and CC are described below.

C.5.1 Procedures for Ignitable, Reactive, and Incompatible Wastes to be Stored or Treated

The Permittees shall characterize all waste to be stored or treated under this Permit to identify applicable and appropriate classes and divisions contained in 49 CFR § 177.848, which is incorporated herein by reference, and shall label the container or tank to reflect that classification.

C.5.2 Procedures to Ensure Compliance with LDR Requirements

The Permittees shall evaluate all waste streams to identify all applicable underlying hazardous constituents (UHCs) exceeding treatment standards in accordance with 40 CFR § 268.7(a)(1), which is incorporated herein by reference. Waste designated to be disposed of at the ~~Waste Isolation Pilot Plant (~~WIPP~~)~~ must undergo characterization to determine whether it is subject to the land disposal prohibitions, but it is not required to be characterized to determine all applicable underlying hazardous constituents listed in 40 CFR § 268.48.

If waste is to be treated on site to meet the LDR requirements, the Permittees shall comply with the testing and reporting requirements of 40 CFR § 268.7(b), which is incorporated herein by reference. The Permittees shall identify and document before treatment all waste whose treatment goal is to meet the LDR requirements. After treating such waste, the Permittees shall characterize the treated waste or residue to determine whether all treatment standards have been met. The Permittees shall analyze residues from wastes with concentration-based treatment standards by the appropriate methods described in Attachment Section C.3.1.2 to assure that the waste meets applicable treatment standards.

The Permittees shall prepare certifications required by the 40 CFR § 268.7(b), which is incorporated herein by reference, appropriate to formerly characteristic wastes for which all characteristics have been deactivated and all Universal Treatment Standards have been met, formerly characteristic wastes for which all characteristics have been deactivated but not all treatment standards are achieved, and other special certifications as required. The Permittees shall prepare new waste characterization documentation for the treated waste or residue, as appropriate, incorporating the treatment facility paperwork requirements of 40 CFR § 268.7(b) or the generator paperwork requirements of 40 CFR § 268.7(a), which is incorporated herein by reference, if the residue is considered a newly-generated waste.

C.5.3 Procedures to Ensure Compliance with Subpart BB Requirements

The Permittees shall comply with 40 CFR Part 264, Subpart BB, as described below, as to equipment at the facility that is subject to specific requirements for test methods and procedures at 40 CFR Part 264 Subpart BB, which is incorporated herein by reference.

C.5.3.1 Requirements for Leak Detection and Monitoring

The Permittees shall ensure that monitoring complies with Reference Method 21 at 40 CFR Part 60.

The detection instrument shall meet the performance criteria of Reference Method 21. The Permittees shall use Reference Method 21 procedures to calibrate the detection instrument prior to each day it is used. The calibration gases shall be:

1. less than 10 parts per million (ppm) of hydrocarbon in air; and
2. methane or n-hexane mixed with air at approximately, but less than, 10,000 ppm methane or n-hexane.

The Permittees shall measure all potential leak interfaces as close to the interface as possible. For determining compliance with “no detectable emissions” requirements (40 CFR § 264.1054, which is incorporated herein by reference), the Permittees shall meet all of the above requirements as well as the following:

1. background shall be determined pursuant to Reference Method 21; and
2. the arithmetic difference between background and the maximum concentration detected shall be compared with 500 ppm.

C.5.3.2 Determination of Hazardous Waste Concentration

The Permittees shall determine whether hazardous waste contained in, or in contact with, the equipment is greater than or equal to 10% by weight organics using one of the following (*see* 40 CFR § 264.1063(d)):

1. ASTM Methods D 2267-88, E 169-87, E 168-88, E 260-85 (*see* 40 CFR § 260.11);
2. *SW-846* Method 9060 or 8260 (*see* 40 CFR § 260.11); or
3. acceptable knowledge with documentation (*e.g.*, production process information, measurements from an identical process at another facility).

If concentration of the hazardous waste changes such that it is believed to be greater than 10% by weight organics, the Permittees shall revise the determination only after chemical analyses is performed in accordance with the methods listed above (*see* 40 CFR § 264.1063(e)). If the Department does not agree with the determination, chemical analyses using the methods listed above can be used to resolve the dispute (*see* 40 CFR § 264.1063(f)). Samples used to make this determination shall be representative of the highest total organic concentration expected (*see* 40 CFR § 264.1063(g)).

C.5.4 Procedures to Ensure Compliance with Subpart CC Requirements

The Permittees’ waste streams described in this document may be subject to 40 CFR Part 264, Subpart CC~~,~~ “Air Emission Standards for Tanks, Surface Impoundments, and Containers~~”~~,” based on applicability criteria specified in 40 CFR § 264.1080, incorporated herein by reference. For waste units that are not exempt from this Subpart under 40 CFR §264.1080(b), the

Permittees shall address the applicable Subpart CC requirements. In addition, exemption from the standards specified in 40 CFR §§ 264.1084 through 264.1087, incorporated herein by reference, can be demonstrated if the average VOC concentration is less than 500 parts per million by weight (ppmw) at the point of waste origination, as described at 40 CFR § 264.1082(c)(1), incorporated herein by reference. The Permittees shall make this determination in accordance with 40 CFR § 264.1083(a) and shall review and update it as necessary at least every twelve months.

If the Permittees claim a 40 CFR § 264.1082(c) exemption for any hazardous waste management units, the Permittees shall document the determination for each waste stream. Permittees may use AK or process knowledge to make the determination. However, if sampling and analysis is needed, the Permittees shall conduct it in accordance with the approved methods identified at 40 CFR §§ 265.1084(a)(3)(iii)(A) through 265.1084(a)(3)(iii)(I), and listed in Tables C-~~16~~11, C-~~17~~12, and C-~~18~~13. The Permittees shall review the characterization documentation before acceptance of the waste at ~~TA-54~~any permitted storage unit as required in Permit Section 2.4.7.

Characterization requirements for waste that has been treated to meet the exemptions allowed at 40 CFR §§ 264.1082(c)(2) and (4) are summarized below:

1. ~~in~~In accordance with 40 CFR § 264.1082(c)(2)(i), waste is treated to reduce the volatile organic (VO) concentration to less than 500 ppmw that is measured in either a waste from a single point of origination or individual wastes from multiple points of origination commingled before treatment. The Permittees shall analyze the waste prior to and after treatment pursuant to provisions at 40 CFR § 264.1083(a) and (b~~);~~).
2. ~~in~~In accordance with 40 CFR § 264.1082(c)(2)(ii), waste is treated to reduce the VO concentrations by at least 95% and the treated waste VO concentration is ensured to be less than 100 ppmw. The Permittees shall analyze the waste prior to and after treatment pursuant to provisions at 40 CFR § 264.1083(a) and (b~~);~~).
3. ~~in~~In accordance with 40 CFR § 264.1082(c)(2)(iii), waste is treated to remove VO mass greater than or equal to the VO mass that exceeded the 500 ppmw. The Permittees shall analyze the waste prior to and after treatment pursuant to provisions at 40 CFR § 264.1083(a) and (b~~);~~).
4. ~~in~~In accordance with 40 CFR § 264.1082(c)(2)(v), waste is treated to reduce the VO concentration to less than the lowest VO concentration for all individual waste streams mixed together at the point of origin and less than 500 ppmw. The Permittees shall analyze the waste prior to and after treatment pursuant to provisions at 40 CFR § 264.1083(a) and (b~~);~~).
5. ~~in~~In accordance with 40 CFR § 264.1082(c)(2)(vi), waste is treated to reduce the VO concentration by 95% and each individual waste stream entering the treatment process is certified to be less than 10,000 ppmw. The Permittees shall analyze the waste prior to and after treatment pursuant to provisions at 40 CFR § 264.1083(a) and (b~~); and~~).
6. ~~in~~In accordance with 40 CFR § 264.1082(c)(4), waste is treated to meet LDR standards, either concentration-based or technology-based. LDR compliance is determined for concentration-based using either analysis or AK.

Details for specific treatment criteria and analytical requirements associated with each exemption can be found at the regulations cited.

C.6 REFERENCES

ASTM, 1991, “Standard Practice for Sampling Waste and Soils for Volatile Organic Compounds,” ASTM D4547-91, *Annual Book of ASTM Standards*, Philadelphia, Pennsylvania, American Society for Testing and Materials.

DOE, ~~1999~~2011, “Radioactive Waste Management Manual,” *DOE ~~Order~~ Manual 435.1*, U.S. Department of Energy, Washington, D.C.

DOE, 1995, “DOE Waste Treatability Groups Guidance,” Revision 0.0, U.S. Department of Energy, Idaho Operations Office.

EPA, ~~1994a~~2015, “Waste Analysis at Facilities that Generate Treat, Store, and Dispose of Hazardous Wastes, A Guidance Manual,” *~~OSWER 9938.4-03~~*EPA 530-R-12-001, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

EPA, ~~1994b~~1994, “Use of Total Waste Analysis in Toxicity Characteristic Determinations,” FAXBACK 13647, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

EPA, 1986 and all approved updates, “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” *SW-846*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.

NMED, 1995, “Federal Facility Compliance Order (Los Alamos National Laboratory),” New Mexico Environment Department, Santa Fe, New Mexico.

Table C-1

~~(This table is reserved)~~

~~Table C-2~~
Descriptions of Non-Mixed Hazardous Waste Stored at the Facility

~~(This table is for informational purposes only)~~

Waste Description[a]	Waste-Generating Process[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Spent Solvents	Research and development (R&D) activities; laser research; organic and inorganic chemistry research (*e.g.*, solvent extractions, liquid chromatography solvents, polymer synthesis, and distillations); cleaning; and degreasing operations	Acceptable Knowledge Sampling and Analysis	D001 D002 D003 D004 D005 D006 D007 D008 D009 D010 D011 D018 D019 D021 D022 D027 D028 D029 D030 D032 D034 D035 D036 D037 D038 D040 D041 D042 D043 F001 F002 F003 F004 F005 U213	Ignitability Corrosivity Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Benzene Carbon tetrachloride Chlorobenzene Chloroform 1,4-Dichlorobenzene 1,2-Dichloroethane 1,1-Dichloroethylene 2,4-Dinitrotoluene Hexachlorobenzene Hexachloroethane Methyl ethyl ketone Nitrobenzene Pentachlorophenol Pyridine Trichloroethylene 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol Vinyl chloride Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents Tetrahydrofuran	NA[c] NA[c] NA[c] 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 0.5 100.0 6.0 7.5 0.5 0.7 0.13 0.13 3.0 200.0 2.0 100.0 5.0 0.5 400.0 2.0 0.2 NA[c] NA[c] NA[c] NA[c] NA[c] NA[c]	Antimony, Arsenic, Barium, Cadmium, Cyanides (Total), Chromium (Total), Lead, Mercury-all others, Selenium, Silver, Acetone, Acetonitrile, Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, 1,4-Dichlorobenzene, 1,2-Dichloroethane, 1,1-Dichloroethylene, 2,4-Dinitrotoluene, 1,4-Dioxane, Ethyl ether, Hexachlorobenzene, Hexachloroethane, Methanol, Methylene chloride, Methyl ethyl ketone, Nitrobenzene, Pentachlorophenol, Pyridine, Toluene, Triethylamine, Trichloroethylene, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol, Vinyl chloride, and all applicable constituents identified above the UHC regulatory limit.

Table C-~~2~~1 (continued)

~~**Waste Description[a]**~~	~~**Waste-Generating Process[a]**~~	~~**Basis for Hazardous Waste Designation[a]**~~	~~**Potential EPA Hazardous Waste Numbers**~~	~~**Potential Hazardous Waste Constituents and/or Characteristics**~~	~~**Regulatory Limits[b] (milligrams per liter)**~~	~~**Potential Underlying Hazardous Constituents**~~
~~Contaminated Solid Wastes~~	~~Machining operations, chemistry research, decontamination and decommissioning projects, metal finishing operations, HE wastewater filtration, and general maintenance operations~~	~~Acceptable Knowledge~~ ~~Sampling and Analysis~~	~~D001~~ ~~D003~~ ~~D004~~ ~~D005~~ ~~D006~~ ~~D007~~ ~~D008~~ ~~D009~~ ~~D010~~ ~~D011~~ ~~D018~~ ~~D019~~ ~~D021~~ ~~D022~~ ~~D023~~ ~~D024~~ ~~D025~~ ~~D027~~ ~~D028~~ ~~D029~~ ~~D030~~ ~~D031~~ ~~D032~~ ~~D033~~ ~~D034~~ ~~D035~~ ~~D036~~ ~~D037~~ ~~D038~~ ~~D039~~ ~~D040~~ ~~D041~~ ~~D042~~ ~~D043~~ ~~F001~~ ~~F002~~ ~~F003~~ ~~F004~~ ~~F005~~ ~~K045~~	~~Ignitability~~ ~~Reactivity~~ ~~Arsenic~~ ~~Barium~~ ~~Cadmium~~ ~~Chromium~~ ~~Lead~~ ~~Mercury~~ ~~Selenium~~ ~~Silver~~ ~~Benzene~~ ~~Carbon tetrachloride~~ ~~Chlorobenzene~~ ~~Chloroform~~ ~~o-Cresol~~ ~~m-Cresol~~ ~~p-Cresol~~ ~~1,4-Dichlorobenzene~~ ~~1,2-Dichloroethane~~ ~~1,1-Dichloroethylene~~ ~~2,4-Dinitrotoluene~~ ~~Heptachlor (and its epoxide)~~ ~~Hexachlorobenzene~~ ~~Hexachlorobutadiene~~ ~~Hexachloroethane~~ ~~Methyl ethyl ketone~~ ~~Nitrobenzene~~ ~~Pentachlorophenol~~ ~~Pyridine~~ ~~Tetrachloroethylene~~ ~~Trichloroethylene~~ ~~2,4,5-Trichlorophenol~~ ~~2,4,6-Trichlorophenol~~ ~~Vinyl chloride~~ ~~Spent halogented solvents~~ ~~Spent halogenated solvents~~ ~~Spent non-halogenated solvents~~ ~~Spent non-halogenated solvents~~ ~~Spent non-halogenated solvents~~ ~~Spent non-halogenated solvents~~ ~~Spent carbon~~	~~NA[c]~~ ~~NA[c]~~ ~~5.0~~ ~~100.0~~ ~~1.0~~ ~~5.0~~ ~~5.0~~ ~~0.2~~ ~~1.0~~ ~~5.0~~ ~~0.5~~ ~~0.5~~ ~~100.0~~ ~~6.0~~ ~~200.0[d]~~ ~~200.0[d]~~ ~~200.0[d]~~ ~~7.5~~ ~~0.5~~ ~~0.7~~ ~~0.13~~ ~~0.008~~ ~~0.13~~ ~~0.5~~ ~~3.0~~ ~~200.0~~ ~~2.0~~ ~~100.0~~ ~~5.0[e]~~ ~~0.7~~ ~~0.5~~ ~~400.0~~ ~~2.0~~ ~~0.2~~ ~~NA[c]~~ ~~NA[c]~~ ~~NA[c]~~ ~~NA[c]~~ ~~NA[c]~~ ~~NA[c]~~ ~~NA[c]~~	~~Arsenic, Barium, Beryllium, Cadmium, Chromium, Lead, Mercury-all others, Selenium, Silver, Thallium, Benzene, Carbon Disulfide, Carbon Tetrachloride, Chlorobenzene, Chloroform, o-Cresol, m-Cresol, p-Cresol~~ ~~Cresol,1,4-Dichlorobenzene~~ ~~1,1-Dichloroethylene,2,4-Dinitrotoluene, Ethyl Ether, Heptachlor (and its epoxide), Hexachlorobenzene~~ ~~Hexachlorobutadiene,~~ ~~Hexachloroethane, Methanol, Methyl ethyl ketone, Methylene Chloride, Nitrobenzene,~~ ~~Pentachlorophenol, Phenol, p,p'-DDT, Pyridine, Tetrachloroethylene, Trichloroethylene,~~ ~~2,4,5-Trichlorophenol,~~ ~~2,4,6-Trichlorophenol,~~ ~~Vinyl chloride, and all applicable constituents identified above the UHC regulatory limit~~

~~**Table C-2 (continued)**~~

Description of Non-Mixed Hazardous Waste Stored at the Facility

Waste Description[a]	Waste-Generating Process[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
~~Paint and Related Wastes~~	~~Painting and finishing operations, and general facility maintenance~~	~~Acceptable Knowledge~~ ~~Sampling and Analysis~~	~~D001~~ ~~D005~~ ~~D006~~ ~~D007~~ ~~D008~~ ~~D009~~ ~~D011~~ ~~D036~~ ~~F003~~ ~~F005~~	~~Ignitability~~ ~~Barium~~ ~~Cadmium~~ ~~Chromium~~ ~~Lead~~ ~~Mercury~~ ~~Silver~~ ~~Nitrobenzene~~ ~~Spent non-halogenated solvents~~ ~~Spent non-halogenated solvents~~	~~NA[e]~~ ~~100.0~~ ~~1.0~~ ~~5.0~~ ~~5.0~~ ~~0.2~~ ~~5.0~~ ~~2.0~~ ~~NA[e]~~ ~~NA[e]~~	~~Barium, Cadmium, Chromium (Total), Lead, Mercury - all others, Silver, Methyl ethyl ketone, Nitrobenzene and all applicable constituents above the UHC regulatory limit~~
~~Photographic and Photocopier Wastes~~	~~Photographic film processing and photocopier operations~~	~~Acceptable Knowledge~~ ~~Sampling and Analysis~~	~~D001~~ ~~D002~~ ~~D006~~ ~~D007~~ ~~D008~~ ~~D011~~	~~Ignitability~~ ~~Corrosivity~~ ~~Cadmium~~ ~~Chromium~~ ~~Lead~~ ~~Silver~~	~~NA[e]~~ ~~NA[e]~~ ~~1.0~~ ~~5.0~~ ~~5.0~~ ~~5.0~~	~~Cadmium, Chromium, Lead, Silver and all applicable constituents above the UHC regulatory limit~~
~~Corrosive Liquid~~Contaminated Solid Wastes	~~Analytical~~Machining operations, chemistry research, ~~electro-etching,~~decontamination and ~~electro-polishing~~decommissioning projects, metal finishing operations, HE wastewater filtration, and general maintenance operations	Acceptable Knowledge Sampling and Analysis	D001 ~~D002~~ D003 D004 D005 D006 D007 D008 D009 D010 D011 D018 D019 D021 D022 D023 D024 D025 D027 D028 D029 D030 D031 D032	Ignitability ~~Corrosivity~~ Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Benzene Carbon tetrachloride Chlorobenzene Chloroform o-Cresol m-Cresol p-Cresol 1,4-Dichlorobenzene 1,2-Dichloroethane 1,1-Dichloroethylene 2,4-Dinitrotoluene Heptachlor (and its epoxide) Hexachlorobenzene	~~NA[e]~~ NA[c] NA[c] 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 0.5 100.0 6.0 200.0[d] 200.0[d] 200.0[d] 7.5 ~~.~~0.5 0.7 0.13 0.008 0.13	~~Acetone,~~ Arsenic, Barium, ~~Benzene,~~ Beryllium, Cadmium, Chromium ~~(Total), Chloroform, Cyanides (Total), 2,4-Dinitrophenol, Fluoride, Isobutyl alcohol~~, Lead, Mercury-all others, ~~Methanol, Nickel, o-Nitrophenol, Pyridine~~ Selenium, Silver, ~~Sulfide,~~ Thallium, ~~Triethylamine, Zinc~~Benzene, Carbon Disulfide, Carbon tetrachloride, Chlorobenzene, Chloroform, o-Cresol, m-Cresol, p-Cresol Cresol,1,4-Dichlorobenzene 1,1-Dichloroethylene,2,4-Dinitrotoluene, Ethyl Ether, Heptachlor (and its epoxide), Hexachlorobenzene Hexachlorobutadiene,

			D033 D034 D035 D036 D037 D038 D039 D040 D041 D042 D043 F001 F002 F003 F004 F005 ~~P023~~K045	Hexachlorobutadiene Hexachloroethane Methyl ethyl ketone Nitrobenzene Pentachlorophenol Pyridine Tetrachloroethylene Trichloroethylene 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol Vinyl chloride Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents ~~Chloroacetaldehyde~~ Spent non-halogenated solvents Spent non-halogenated solvents Spent carbon	0.5 3.0 200.0 2.0 100.0 5.0[e] 0.7 0.5 400.0 2.0 0.2 NA[c] NA[c] NA[c] NA[c] NA[c] NA[c] NA[c]	Hexachloroethane, Methanol, Methyl ethyl ketone, Methylene Chloride, Nitrobenzene, Pentachlorophenol, Phenol, p,p'-DDT, Pyridine, Tetrachloroethylene, Trichloroethylene, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol, Vinyl chloride, and all applicable constituents identified above the UHC regulatory limit

Table C-~~2~~1 (continued)
Descriptions of Non-Mixed Hazardous Waste Stored at the Facility

Waste Description[a]	Waste-Generating Process[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Paint and Related Wastes	Painting and finishing operations, and general facility maintenance	Acceptable Knowledge Sampling and Analysis	D001 D005 D006 D007 D008 D009 D011 D036 F003 F005	Ignitability Barium Cadmium Chromium Lead Mercury Silver Nitrobenzene Spent non-halogenated solvents Spent non-halogenated solvents	NA[c] 100.0 1.0 5.0 5.0 0.2 5.0 2.0 NA[c] NA[c]	Barium, Cadmium, Chromium (Total), Lead, Mercury–all others, Silver, Methyl ethyl ketone, Nitrobenzene, and all applicable constituents above the UHC regulatory limit
Photographic and Photocopier Wastes	Photographic film processing and photocopier operations	Acceptable Knowledge Sampling and Analysis	D001 D002 D006 D007 D008 D011	Ignitability Corrosivity Cadmium Chromium Lead Silver	NA[c] NA[c] 1.0 5.0 5.0 5.0	Cadmium, Chromium, Lead, Silver, and all applicable constituents above the UHC regulatory limit

Corrosive Liquid Wastes	Analytical chemistry research, electro-etching, and electro-polishing	Acceptable Knowledge Sampling and Analysis	D001 D002 D003 D004 D005 D006 D007 D008 D009 D010 D011 D018 D022 D038 F002 F003 F005 P023	Ignitability Corrosivity Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Benzene Chloroform Pyridine Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents Chloroacetaldehyde	NA[c] NA[c] NA[c] 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 6.0 5.0 NA[c] NA[c] NA[c] NA[c]	Acetone, Arsenic, Barium, Benzene, Cadmium, Chromium (Total), Chloroform, Cyanides (Total), 2,4-Dinitrophenol, Fluoride, Isobutyl alcohol, Lead, Mercury-all others, Methanol, Nickel, o-Nitrophenol, Pyridine Selenium, Silver, Sulfide, Thallium, Triethylamine, Zinc, and all applicable constituents above the UHC regulatory limit

Table C-1 (continued)
Descriptions of Non-Mixed Hazardous Waste Stored at the Facility

Waste Description [a]	Waste-Generating Process[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Solid Metals and Metallic Compounds	Machining and cutting operations; synthesis reactions; solder from electronic manufacturing, repair, and brazing operations; and grinding operations	Acceptable Knowledge Sampling and Analysis	D001 D003 D004 D005 D006 D007 D008 D009 D010 D011	Ignitability Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	NA[c] NA[c] 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury-all others, Nickel, Silver, and all applicable constituents above the UHC regulatory limit
Mercury Wastes	Lamp replacement, chemical research, mercury spill cleanup, and equipment cleaning and maintenance	Acceptable Knowledge Sampling and Analysis	D003 D008 D009 D011 U151	Reactivity Lead Mercury Silver Mercury	NA[c] 5.0 0.2 5.0 NA[c]	Barium, Chromium (Total), Lead, Mercury-all others, Silver, Thallium, Zinc, and all applicable constituents above the UHC regulatory limit
Unused/Off-specification Commercial Chemical Products	R&D, spill residues, and general facility operations	Acceptable Knowledge Sampling and Analysis	D001 D002 D003 D004 through D043 All P- and U-listed EPA Hazardous Waste Numbers[g]	Ignitability Corrosivity Reactivity Toxicity characteristic wastes Discarded commercial chemical products and off-specification species	NA[c] NA[c] NA[c] -[b] NA[c]	Arsenic, Barium, Cadmium, Chromium (Total), Lead, Mercury-all others, Nickel, Selenium, Silver, Acetonitrile, Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, o-Cresol, m-Cresol, p- Cresol, 2, 4-D, 1,4 Dichlorobenzene, 1,1-Dichloroethylene, 1,2-Dichloroethane 2,4 Dinitrotoluene, Endrin, Heptachlor (and its epoxide), Hexachlorobenzene, Hexachlorobutadiene, Hexachloroethane, Lindane, Methoxychlor, Methyl ethyl ketone, Nitrobenzene, Pentachlorophenol~~;~~, Pyridine, Tetrachloroethylene, Toluene, Toxaphene, Trichloroethylene, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol, 2,4,5-TP (Silvex), Vinyl chloride, and all applicable constituents identified above the UHC regulatory limit

Table C-~~2~~1 (continued)

~~Waste Description[a]~~	~~Waste-Generating Process[a]~~	~~Basis for Hazardous Waste Designation[a]~~	~~Potential EPA Hazardous Waste Numbers~~	~~Potential Hazardous Waste Constituents and/or Characteristics~~	~~Regulatory Limits[b] (milligrams per liter)~~	~~Potential Underlying Hazardous Constituents~~
~~Contaminated Non-corrosive Aqueous and Non-aqueous Solutions and Sludges~~	~~Vacuum pump maintenance, analytical spectrometry, equipment cleaning and maintenance, vehicle maintenance, synthesis reactions, metal-polishing operations, and chemical research~~	~~Acceptable Knowledge~~ ~~Sampling and Analysis~~	~~D001~~ ~~D002~~ ~~D003~~ ~~D004~~ ~~D005~~ ~~D006~~ ~~D007~~ ~~D008~~ ~~D009~~ ~~D010~~ ~~D011~~ ~~D018~~ ~~D019~~ ~~D021~~ ~~D022~~ ~~D023~~ ~~D024~~ ~~D025~~ ~~D027~~ ~~D028~~ ~~D029~~ ~~D030~~ ~~D032~~ ~~D033~~ ~~D034~~ ~~D035~~ ~~D036~~ ~~D037~~ ~~D038~~ ~~D039~~ ~~D040~~ ~~D041~~ ~~D042~~ ~~D043~~ ~~F001~~ ~~F002~~ ~~F003~~ ~~F004~~ ~~F005~~	~~Ignitability~~ ~~Corrosivity~~ ~~Reactivity~~ ~~Arsenic~~ ~~Barium~~ ~~Cadmium~~ ~~Chromium~~ ~~Lead~~ ~~Mercury~~ ~~Selenium~~ ~~Silver~~ ~~Benzene~~ ~~Carbon tetrachloride~~ ~~Chlorobenzene~~ ~~Chloroform~~ ~~o-Cresol~~ ~~m-Cresol~~ ~~p-Cresol~~ ~~1,4-Dichlorobenzene~~ ~~1,2-Dichloroethane~~ ~~1,1-Dichloroethylene~~ ~~2,4-Dinitrotoluene~~ ~~Hexachlorobenzene~~ ~~Hexachlorobutadiene~~ ~~Hexachloroethane~~ ~~Methyl ethyl ketone~~ ~~Nitrobenzene~~ ~~Pentachlorophenol~~ ~~Pyridine~~ ~~Tetrachloroethylene~~ ~~Trichloroethylene~~ ~~2,4,5-Trichlorophenol~~ ~~2,4,6-Trichlorophenol~~ ~~Vinyl chloride~~ ~~Spent halogenated solvents~~ ~~Spent halogenated solvents~~ ~~Spent non-halogenated solvents~~ ~~Spent non-halogenated solvents~~ ~~Spent non-halogenated solvents~~	~~NA[c]~~ ~~NA[c]~~ ~~NA[c]~~ ~~5.0~~ ~~100.0~~ ~~1.0~~ ~~5.0~~ ~~5.0~~ ~~0.2~~ ~~1.0~~ ~~5.0~~ ~~0.5~~ ~~0.5~~ ~~100.0~~ ~~6.0~~ ~~200.0[d]~~ ~~200.0[d]~~ ~~200.0[d]~~ ~~7.5~~ ~~0.5~~ ~~0.7~~ ~~0.13[e]~~ ~~0.13[e]~~ ~~0.5~~ ~~3.0~~ ~~200.0~~ ~~2.0~~ ~~100.0~~ ~~5.0~~ ~~0.7~~ ~~0.5~~ ~~400.0~~ ~~2.0~~ ~~0.2~~ ~~NA[c]~~ ~~NA[c]~~ ~~NA[c]~~ ~~NA[c]~~ ~~NA[c]~~	~~Acetone, Acetonitrile, Antimony, Arsenic, Barium, Benzene, Cadmium, Carbon tetrachloride, Chlorobenzene, Chloroform~~ ~~Chromium (Total), Chrysene, o-Cresol, m-Cresol p-Cresol~~ ~~m-Dichlorobenzene, 1,4-Dichlorobenzene~~ ~~1,2-Dichloroethane, 1,1-Dichloroethylene, 2,4-Dinitrotoluene,~~ ~~4,6-Dinitro-o-cresol, 1,4-Dioxane, Fluorine, Indeno(1,2,3-c,d) pyrene, Hexachlorobenzene,~~ ~~Hexachlorobutadiene,~~ ~~Hexachloroethane,~~ ~~Lead, Mercury-all others, Methanol, Methyl ethyl ketone, Methylene chloride, Naphthalene, Nitrobenzene,~~ ~~p-Nitrophenol, Pentachlorophenol,~~ ~~Pyridine, Selenium, Silver, Tetrachloroethylene, Toluene, Trichloroethylene, 2,4,5-Trichlorophenol~~ ~~2,4,6-Trichlorophenol, Zinc~~ ~~Vinyl chloride and all applicable constituents above the UHC regulatory limit~~

Descriptions of Non-Mixed Hazardous Waste Stored at the Facility

~~Table C-2 (continued)~~

Waste Description[a]	Waste-Generating Process[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
~~Gas Cylinder Waste~~Contaminated Non-corrosive Aqueous and Non-aqueous Solutions and Sludges	~~R&D and general facility operations~~Vacuum pump maintenance, analytical spectrometry, equipment cleaning and maintenance, vehicle maintenance, synthesis reactions, metal-polishing operations, and chemical research	Acceptable Knowledge Sampling and Analysis	D001 D002 D003 ~~Potential D-coded EPA Hazardous Waste Numbers~~ ~~Potential P-and U-listed EPA Hazardous Waste Numbers~~D004 D005 D006 D007 D008 D009 D010 D011 D018 D019 D021 D022 D023 D024 D025 D027 D028 D029 D030 D032 D033 D034 D035 D036 D037 D038 D039 D040 D041 D042 D043	Ignitability Corrosivity Reactivity Arsenic Barium Cadmium Chromium Lead ~~Toxicity characteristic wastes~~ ~~Discarded commercial chemical products and off-specification species~~ Mercury Selenium Silver Benzene Carbon tetrachloride Chlorobenzene Chloroform o-Cresol m-Cresol p-Cresol 1,4-Dichlorobenzene 1,2-Dichloroethane 1,1-Dichloroethylene 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Methyl ethyl ketone Nitrobenzene Pentachlorophenol Pyridine Tetrachloroethylene Trichloroethylene 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol Vinyl chloride Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	NA[c] NA[c] NA[c] __[b] 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 0.5 100.0 6.0 200.0[d] 200.0[d] 200.0[d] 7.5 0.5 0.7 0.13[e] 0.13[e] 0.5 3.0 200.0 2.0 100.0 5.0 0.7 0.5 400.0 2.0 0.2 NA[c] NA[c] NA[c] NA[c] NA[c]	Acetone, Acetonitrile, Antimony, Arsenic, Barium, Benzene, Cadmium, ~~Chromium (Total), Lead, Mercury-all others, Selenium, Silver, Benzene,~~ Carbon tetrachloride, Chlorobenzene, Chloroform Chromium (Total), Chrysene, o-Cresol, m-Cresol~~,~~ p-Cresol~~, 2,4-D~~ m-Dichlorobenzene, 1,4-Dichlorobenzene 1,2-Dichloroethane, 1,1-Dichloroethylene, 2,4-Dinitrotoluene, ~~Endrin, Heptachlor (and its epoxide),~~ 4,6-Dinitro-o-cresol, 1,4-Dioxane, Fluorine, Indeno(1,2,3-c,d) pyrene, Hexachlorobenzene, Hexachlorobutadiene, Hexachloroethane~~, Lindane, Methoxychlor~~ Lead, Mercury-all others, Methanol, Methyl ethyl ketone, Methylene chloride, Naphthalene, Nitrobenzene, p-Nitrophenol, Pentachlorophenol, Pyridine, Selenium, Silver, Tetrachloroethylene, ~~Toxaphene~~Toluene, Trichloroethylene, 2,4,5-Trichlorophenol ~~,~~ 2,4,6-Trichlorophenol, ~~2,4,5-TP (Silvex)~~Zinc Vinyl chloride~~,~~ and all applicable constituents ~~identified~~ above the UHC regulatory limit

			F001 F002 F003 F004 F005	Spent non-halogenated solvents		
~~Used Batteries and Battery Fluids~~	~~Equipment maintenance~~	~~Acceptable Knowledge~~	~~D002~~ ~~D003~~ ~~D006~~ ~~D007~~ ~~D008~~ ~~D009~~ ~~D011~~ ~~D038~~	~~Corrosivity~~ ~~Reactivity~~ ~~Cadmium~~ ~~Chromium~~ ~~Lead~~ ~~Mercury~~ ~~Silver~~ ~~Pyridine~~	~~NA[e]~~ ~~NA[e]~~ ~~1.0~~ ~~5.0~~ ~~5.0~~ ~~0.2~~ ~~5.0~~ ~~5.0[e]~~	~~Cadmium, Chromium, Lead, Mercury-all others, Pyridine, Silver and all applicable constituents above the UHC regulatory limit~~

Table C-~~2~~1 (continued)
Descriptions of Non-Mixed Hazardous Waste Stored at the Facility

Waste Description[a]	Waste-Generating Process[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Gas Cylinder Waste	R&D and general facility operations	Acceptable Knowledge	D001 D002 D003 Potential D-coded EPA Hazardous Waste Numbers Potential P- and U-listed EPA Hazardous Waste Numbers	Ignitability Corrosivity Reactivity Toxicity characteristic wastes Discarded commercial chemical products and off-specification species	NA[c] NA[c] NA[c] -[b] NA[c]	Arsenic, Barium, Cadmium, Chromium (Total), Lead, Mercury-all others, Selenium, Silver, Benzene, Carbon tetrachloride Chlorobenzene, Chloroform o-Cresol, m-Cresol, p-Cresol, 2,4-D, 1,4-Dichlorobenzene 1,1-Dichloroethylene,2,4-Dinitrotoluene, Endrin, Heptachlor (and its epoxide), Hexachlorobenzene Hexachlorobutadiene, Hexachloroethane, Lindane, Methoxychlor, Methyl ethyl ketone, Nitrobenzene, Pentachlorophenol Pyridine, Tetrachloroethylene, Toxaphene, Trichloroethylene, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol, 2,4,5-TP (Silvex) Vinyl chloride, and all applicable constituents identified above the UHC regulatory limit
Used Batteries and Battery Fluids	Equipment maintenance	Acceptable Knowledge	D002 D003 D006 D007 D008 D009 D011 D038	Corrosivity Reactivity Cadmium Chromium Lead Mercury Silver Pyridine	NA[c] NA[c] 1.0 5.0 5.0 0.2 5.0 5.0[e]	Cadmium, Chromium, Lead, Mercury-all others, Pyridine, Silver, and all applicable constituents above the UHC regulatory limit

Table C-1 (continued)
Descriptions of Non-Mixed Hazardous Waste Stored at the Facility

Waste Description[a]	Waste-Generating Process[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Environmental Restoration ~~(ER)~~ Soils and Sludges	Site decommissioning, site characterization, and site remediation; includes septic tank and detention basin closure, removal actions, and other remedial actions and site closures	Acceptable Knowledge Sampling and Analysis	D001 D003 D004 D005 D006 D007 D008 D009 D010 D011 D018 D022 D030 D032 D033 D034 D036 D039 D040 D042 F001 F002 F003 F005	Ignitability Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Benzene Chloroform 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Nitrobenzene Tetrachloroethylene Trichloroethylene 2,4,6-Trichlorophenol Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	NA[c] NA[c] 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 6.0 0.13[c] 0.13[c] 0.5 3.0 2.0 0.7 0.5 2.0 NA[c] NA[c] NA[c] NA[c]	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury-all others, Selenium, Silver, Benzene, Chloroform, 2,4-Dinitrotoluene, Hexachlorobenzene, Hexachlorobutadiene, Hexachloroethane, Nitrobenzene, Tetrachloroethylene, Trichloroethylene, 2,4,6-Trichlorophenol, and all applicable constituents identified above the UHC regulatory limit

~~a Denotes information from the Los Alamos National Laboratory waste characterization documentation database~~
~~b A solid waste exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, Test Method 1311 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1986), the extract from a representative sample of the waste contains any of the contaminants listed (D004-D043) at a concentration equal to or greater than the respective value given in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20.4.1 NMAC), Subpart II, Part 261, Subpart C [6-14-00]~~

a Denotes information from the Los Alamos National Laboratory waste characterization documentation database
b A solid waste exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, Test Method 1311 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1986), the extract from a representative sample of the waste contains any of the contaminants listed (D004-D043) at a concentration equal to or greater than the respective value given in 40 CFR Part 261, Subpart C
c Not applicable: Refers to the absence of regulatory limits for ignitable, corrosive, and reactive characteristic wastes and F-, P-, and U-listed wastes
d If o-, m-, and p-Cresol concentrations cannot be differentiated, the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 milligrams per liter
e The quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory ~~level (20.4.1 NMAC, Subpart II,~~level40 CFR § 261.24, Table 1 ~~[6-14-00]~~).

Table C-~~3~~2
Descriptions of Mixed Low-Level Waste Stored at the Facility
~~(This table is for informational purposes only)~~

Waste Description[a]	Waste Generating Activity[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Solid Wastes						
Soils with Heavy Metals	Decontamination and decommissioning (D&D) and Environmental ~~Restoration (ER)~~restoration activities	Acceptable Knowledge and Preliminary Analysis	D004 D005 D006 D007 D008 D009 D010 D011	Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0	Arsenic, Barium, Cadmium, Chromium (Total), Mercury-all others, Lead, Selenium, Silver, Vanadium, Zinc and those constituents identified above the UHC regulatory limit
Environmental Restoration Soils	Remediation of release sites and D&D activities	Acceptable Knowledge Sampling and Analysis	D005 D006 D007 D008 D009 D028 D029 F001 F002 F004 F005	Barium Cadmium Chromium Lead Mercury 1,2-Dichloroethane 1,1-Dichloroethylene Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	100.0 1.0 5.0 5.0 0.2 0.5 0.7 NA[c] NA[c] NA[c] NA[c]	Barium, Cadmium, Chromium (Total), Lead, Mercury 1,2-Dichloroethane 1,1-Dichloroethylene, and all applicable constituents identified above the UHC regulatory limit.
Inorganic Solid Oxidizers	D&D of research laboratories and research and development (R&D)	Acceptable Knowledge	D001 D003 D005	Ignitability Reactivity Barium	NA[c] NA[c] 100.0	Barium and all applicable constituents identified above the UHC limit
Lead Waste	Radioisotope experiments and other reactor, accelerator, laser, and x-ray activities	Acceptable Knowledge	D002 D003 D007 D008 D009	Corrosivity Reactivity Chromium Lead Mercury	NA[c] NA[c] 5.0 5.0 0.2	Chromium, Lead, Mercury-all others, and all applicable constituents identified above the UHC regulatory limit
Noncombustible Debris	Maintenance, D&D, R&D, and ~~ER~~environmental restoration activities	Acceptable Knowledge	D001 D003 D004 D005 D006 D007 D008 D009 D010 D011 F002 F005	Ignitability Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Spent halogenated solvents Spent non-halogenated solvents	NA[c] NA[c] 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 NA[c] NA[c]	Arsenic, Barium, Cadmium, Chromium (Total), Lead, Mercury-all others, Selenium, Silver, and all applicable constituents identified above the UHC regulatory limit

Table C-~~3~~2 (continued)
Descriptions of Mixed Low-Level Waste Stored at the Facility

Waste Description[a]	Waste Generating Activity[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Solid Wastes						
Combustible Debris	Maintenance, R&D, D&D, and ~~ER~~environmental restoration activities	Acceptable Knowledge	D001 D003 D004 D005 D006 D007 D008 D009 D010 D011 F001 F002 F003 F005	Ignitability Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	NA[c] NA[c] 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 NA[c] NA[c] NA[c] NA[c]	Arsenic, Barium, Chromium, Lead, Mercury-all others, Selenium, Silver, Nickel, Zinc, and all applicable constituents identified above the UHC regulatory limit
Organic-Contaminated Noncombustible Solids	Vacuum pump maintenance, R&D, D&D, and ~~ER~~environmental restoration activities	Acceptable Knowledge	D001 D004 D005 D006 D007 D008 D009 D010 D011 D018 D027 D030 D032 D033 D034 D035 D037 D038 D041 D042 F001 F002 F004 F005	Ignitability Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Benzene 1,4-Dichlorobenzene 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Methyl ethyl ketone Pentachlorophenol Pyridine 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	NA[c] 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 7.5 0.13[d] 0.13[d] 0.5 3.0 200.0 100.0 5.0[d] 400.0 2.0 NA[c] NA[c] NA[c] NA[c]	Arsenic, Barium Cadmium, Chromium Lead, Mercury Selenium, Silver Benzene, 1,4-Dichlorobenzene 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene Hexachloroethane, Methoxychlor, Methyl ethyl ketone, Pentachlorophenol, Pyridine, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol, and all applicable constituents identified above the UHC regulatory limit

Table C-~~3~~2 (continued)
Descriptions of Mixed Low-Level Waste Stored at the Facility

Waste Description[a]	Waste Generating Activity[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Solid Wastes						
Organic-Contaminated Combustible Solids	Maintenance, D&D, and ~~ER~~environmental restoration activities	Acceptable Knowledge	D001 D003 D007 D008 D009 D030 D035 F001 F002 F003 F005	Ignitability Reactivity Chromium Lead Mercury 2,4-Dinitrotoluene Methyl ethyl ketone Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	NA[c] NA[c] 5.0 5.0 0.2 0.13[d] 200.0 NA[c] NA[c] NA[c] NA[c]	Chromium, Lead, Mercury-all other, 2,4-Dinitrotoluene, Methyl ethyl ketone, and all applicable constituents identified above the UHC regulatory limit
Water-Reactive Wastes	Cleanup of HE firing-site debris, machining and disassembly of test components	Acceptable Knowledge	D001 D003 D005 F002	Ignitability Reactivity Barium Spent halogenated solvents	NA[c] NA[c] 100.0 NA[c]	Barium~~,~~ and all applicable constituents identified above the UHC regulatory limit
Mercury Wastes	Cleanup operations	Acceptable Knowledge	D005 D007 D008 D009 F001	Barium Chromium Lead Mercury Spent halogenated solvents	100.0 5.0 5.0 0.2 NA[c]	Barium, Chromium, Lead, Mercury-all others and all applicable constituents identified above the UHC regulatory limit
Unused Solid Reagent Chemical Wastes	R&D activities	Acceptable Knowledge	D001 D002 D003 All P- and U-listed EPA Hazardous Waste Numbers[e]	Ignitability Corrosivity Reactivity Discarded commercial chemical products and off-specification species	NA[c] NA[c] NA[c] NA[c]	All applicable constituents above the UHC regulatory limit

Table C-~~3~~2 (continued)

Descriptions of Mixed Low-Level Waste Stored at the Facility

Waste Description[a]	Waste Generating Activity[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Liquid Wastes						
Spent Solvents and Contaminated Solvent Mixtures	Maintenance, cleaning, and degreasing activities: R&D; processing operations, such as extraction, bench-scale experimental inorganic chemistry, environmental analysis, radiochemistry	Acceptable Knowledge	D001 D002 D004 D005 D007 D008 D009 D010 D011 D018 D019 D021 D022 D027 D028 D030 D032 D033 D034 D036 D042 D043 F001 F002 F003 F005	Ignitability Corrosivity Arsenic Barium Chromium Lead Mercury Selenium Silver Benzene Carbon tetrachloride Chlorobenzene Chloroform 1,4-Dichlorobenzene 1,2-Dichloroethane 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Nitrobenzene 2,4,6-Trichlorophenol Vinyl chloride Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	NA[c] NA[c] 5.0 100.0 5.0 5.0 0.2 1.0 5.0 0.5 0.5 100.0 6.0 7.5 0.5 0.13[d] 0.13[d] 0.5 3.0 2.0 2.0 0.2 NA[c] NA[c] NA[c] NA[c]	Arsenic, Barium, Chromium, Lead, Mercury-all others, Selenium, Silver, Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, 1,4-Dichlorobenzene, 1,2-Dichloroethane, 2,4-Dinitrotoluene, Hexachlorobenzene, Hexachlorobutadiene, Hexachloroethane, Nitrobenzene, Tribromomethane (Bromoform) 2,4,6-Trichlorophenol, Vinyl chloride, and all applicable constituents identified above the UHC regulatory limit
Corrosive Liquid Wastes	Radiochemistry research, plutonium-processing operations, and analytical chemistry	Acceptable Knowledge	D001 D002 D004 D006 D007 D008 D009 D010 D011 D036 D043 F001 F002 F005	Ignitability Corrosivity Arsenic Cadmium Chromium Lead Mercury Selenium Silver Nitrobenzene Vinyl chloride Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents	NA[c] NA[c] 5.0 1.0 5.0 5.0 0.2 1.0 5.0 2.0 0.2 NA[c] NA[c] NA[c]	Arsenic, Barium, Cadmium, Bromodichloromethane, Chromium (Total), Lead, Mercury-all others, Nitrobenzene, Nickel, Selenium, Silver, Vinyl ~~Chloride~~chloride and all applicable constituents identified above the UHC regulatory limit

Table C-~~3~~2 (continued)
Descriptions of Mixed Low-Level Waste Stored at the Facility

Waste Description[a]	Waste Generating Activity[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Liquid Wastes						
Oil Wastes	Equipment maintenance operations	Acceptable Knowledge	D004 D005 D006 D007 D008 D009 D010 D018 D019 D027 D028 D030 D032 D033 D034 D036 D037 D038 D041 D042 D043 F001 F002 F003 F005	Arsenic Barium Cadmium Chromium Lead Mercury Selenium Benzene Carbon tetrachloride 1,4-Dichlorobenzene 1,2-Dichloroethane 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Nitrobenzene Pentrachlorophenol Pyridine 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol Vinyl chloride Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	5.0 100.0 1.0 5.0 5.0 0.2 1.0 0.5 0.5 7.5 0.5 0.13[d] 0.13[d] 0.5 3.0 2.0 100.0 5.0[d] 400.0 2.0 0.2 NA[c] NA[c] NA[c] NA[c]	Arsenic, Barium, Cadmium, Chromium Lead, Mercury-all others, Selenium, Silver, Thallium, Benzene, Carbon tetrachloride, 1,4-Dichlorobenzene, 1,2-Dichloroethane, 2,4-Dinitrotoluene, Diethylphthalate, Di-n-butyl phthalate, Hexachlorobutadiene, Hexachlorobenzene, Hexachloroethane, Hexachlorocyclopentadiene, Nitrobenzene, Pentachlorophenol, Pyridine, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol, Vinyl chloride, and all applicable constituents identified above the UHC regulatory limit
Unused Liquid Reagent Chemical Wastes	R&D activities	Acceptable Knowledge	D001 D002 D035 All P- and U-listed EPA Hazardous Waste Numbers[e]	Ignitability Corrosivity Methyl ethyl ketone Discarded commercial chemical products and off-specification species	NA[c] NA[c] 200.0 NA[c]	Methyl ethyl ketone and all applicable constituents identified above the UHC regulatory limit

Table C-~~3~~2 (continued)
Descriptions of Mixed Low-Level Waste Stored at the Facility

Waste Description[a]	Waste Generating Activity[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Liquid Wastes						
Aqueous and Nonaqueous Liquids Contaminated with Heavy Metals and/or Organics	~~ER~~Environmental restoration activities, metal-polishing operations, and radiochemistry research	Acceptable Knowledge Sampling and Analysis	D001 D003 D004 D005 D006 D007 D008 D009 D010 D011 D018 D019 D021 D022 D023 D024 F002 F005	Ignitability Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Benzene Carbon tetrachloride Chlorobenzene Chloroform o-Cresol m-Cresol Spent halogenated solvents Spent non-halogenated solvents	NA[c] NA[c] 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 0.5 100.0 6.0 200.0[f] 200.0[f] NA[c] NA[c]	Arsenic, Barium, Cadmium, Chromium (Total), Lead, Mercury-all others, Selenium, Silver, Benzene, Carbon ~~Tetrachloride~~tetrachloride, Chlorobenzene, Chloroform, o-cresol, m-cresol, 1,2-Dichloroethane, and all applicable constituents identified above the UHC regulatory limit
Gas Cylinder Waste						
Gas Cylinder Waste	R&D and general facility operations	Acceptable Knowledge	D001 D002 D003 Potential D-coded EPA Hazardous Waste Numbers Potential P- and U-listed EPA Hazardous Waste Numbers[e]	Ignitability Corrosivity Reactivity Toxicity characteristic wastes Discarded commercial chemical products and off-specification species	NA[c] NA[c] NA[c] -[b] NA[c]	All applicable constituents above the UHC regulatory limit

[a] Denotes information from the Los Alamos National Laboratory waste characterization documentation database.
[b] A solid waste exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, Test Method 1311 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1986), the extract from a representative sample of the waste contains any of the contaminants listed (D004-D043) at a concentration equal to or greater than the respective value given in ~~the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20.4.1 NMAC), Subpart II,~~40 CFR Part 261, Subpart C ~~[6-14-00].~~.
[c] Not applicable: Refers to the absence of regulatory limits for ignitable, corrosive, and reactive characteristic wastes and F-, P-, and U-listed wastes.
[d] The quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level (~~20.4.1 NMAC, Subpart II,~~40 CFR 261.24, Table 1 ~~[6-14-00]).~~).
[e] Refers to the P- and U-listed wastes found in the most recent "Los Alamos National Laboratory General Part A Permit Application," ~~Revision 3.0, 2002,~~ Los Alamos National Laboratory, Los Alamos, New Mexico.
[f] If o-, m-, and p-Cresol concentrations cannot be differentiated, the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 milligrams per liter.

Note: Fluoride, sulfide, vanadium, and zinc are not "underlying hazardous constituents" in characteristic wastes, according to the definition in 40 CFR § 268.2(i). Selenium is not an underlying hazardous constituent as defined at 40 CFR § 268.2(i) because its Universal Treatment Standard level is greater than its Toxicity Characteristic level, thus a treated selenium waste would always be characteristically hazardous, unless it is treated to below its characteristic level.

Table C-~~4~~3
Facility ~~MTRUW~~Mixed Transuranic Waste Stream Waste Matrix Codes Correlated with Facility Waste Identification Systems

~~(This table is for informational purposes only)~~

Summary Category Group	Waste Matrix Code	Waste Stream Description	RSWD Code[a]		IDC[b]		TRUCON Code[c]	
S3000 - Homogeneous	S3100	Homogeneous Inorganic, Cemented	A-25	Leached Process Residues	002	Cemented Aqueous Waste	LA111	Solidified Aqueous or Homogeneous Inorganic Solids
			A-26	Evaporator Bottoms/Salts	006	Solidified Inorganic and Organic Process Solids	LA114	Solidified Inorganic Process Solids
			A-76	Cement Paste				
	S3100	Homogeneous Inorganic, Cemented Organics					LA126	Solidified Organic Process Solids
	S3100	Homogeneous Inorganic, Non-cemented	A-75	Chemical Treatment Sludge	003	Stabilized Aqueous Waste (dewatered sludge)	LA122	Solid Inorganic Waste
							LA130	Ash
	S3100	Homogeneous Inorganic, Salts	A-27	Nitrate Salts		Salt Waste	LA124	Pyrochemical Salt Waste
			A-28	Chloride Salts				
			A-29	Hydroxide Cake				
	S3100	Homogeneous Inorganic, Vermiculite	A-20	Hydrocarbon Oil – Liquid (Absorbed)			LA112	Solidified Organic Waste
			A-21	Silicon-Based - Liquid (Absorbed)				
S4000 – Soil/Gravel	S4100	Soil	A-90	Radioactively-Contaminated Soil				

Table C-4~~4~~3 (continued)

Facility Mixed Transuranic Waste Stream Waste Matrix Codes Correlated with Facility Waste Identification Systems

Summary Category Group	Waste Matrix Code	Waste Stream Description	RSWD Code[a]		IDC[b]		TRUCON Code[c]	
S5000 - Debris	S5100	~~Non-Combustible~~ Noncombustible Debris	NA[d]	NA[d]	NA[d]	NA[d]	LA117	Metal Wastes
	S5300	Combustible Debris	A-14	Combustible Decon Waste	004	Combustible Waste	LA116	Combustible Debris
			A-15~~.~~	Cellulosics				
			A-16	Plastics				
			A-17	Rubber Materials				
			A-18	Combustible Lab Trash				
			A-35	Combustible Building Debris				
			A-40	Combustible Hot-Cell Waste				
			A-60	Other Combustibles				
	S5400	Heterogeneous Debris	A-10	Graphite Solids	001	Metal Scrap and Incidental Combustibles	LA115	Graphite Waste
			A-19	Combined Combustible/~~Non-Combustible~~Noncombustible Lab Trash	005	Combined Noncombustible / Combustible Waste	LA117	Metal Waste
			A-30	PN Equipment	005LG	Glass Waste	LA118	Glass Waste
			A-31	Non-PN Equipment	005LM	Metal Waste	LA119	HEPA Filter Waste
			A-36	Noncombustible Building Debris	005P1	Leaded Rubber and Metal Waste	LA123	Leaded Rubber and Metal Waste

Table C-43 (continued)
Facility Mixed Transuranic Waste Stream Waste Matrix Codes Correlated with Facility Waste Identification Systems

Summary Category Group	Waste Matrix Code	Waste Stream Description	RSWD Code[a]	IDC[b]	TRUCON Code[c]
			A-41 Noncombustible Hot-Cell Waste	005P2G Graphite Waste	LA125 Mixed Combustible ~~/~~ /Noncombustible Waste
			A-46 Skull and Oxide		
			A-47 Slag and Porcelain		
			A-50 Metal Crucibles, Scrap, Dies		
			A-51 Precious Metals		
			A-52 Scrap Metal		
			A-55 Filter Media		
			A-56 Filter Media Residue		
			A-61 Other Noncombustibles		
			A-72 Beryllium Contaminated Debris		
			A-74 Ion Exchange Resin		
			A-80 Irradiation Sources		
			A-85 Firing Point Residues		
			A-95 Glass		

[a] RSWD = Radioactive Solid Waste Disposal [codes]
[b] IDC = Item Description Code
[c] TRUCON = TRUPACT-II Content [codes]
[d] NA = Not Applicable~~,~~; RSWD code and IDC usage was discontinued in 2010

Table C-~~5~~4
Descriptions of Mixed Transuranic Waste Stored at the Facility

~~(This table is for informational purposes only)~~

Summary Category Group	Waste Matrix Code	Waste Description[a]	TRUCON Code	Waste-Generating Area	Waste-Generating Activity	Basis for Hazardous Waste Designation	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and /or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents[c]
S3000 ~~-~~– Homogeneous Solids	~~S3100~~ S3120	LA-MIN03-NC.001, Homogeneous ~~Inorganic, Cemented~~Solids – Solidified Inorganics	LA111/211	TA-50	Plutonium processing operations	Acceptable Knowledge	D001 D002 D003 D004 D005 D006 D007 D008 D009 D010 D011 D018 D019 D021 D022 D035 D038 D039 D040 F001 F002 F003 F005	Ignitable Corrosive Reactive Arsenic Barium hydroxide Cadmium Chromium Lead Mercury Selenium Silver Benzene Carbon tetrachloride Chlorobenzene Chloroform Methyl ethyl ketone Pyridine Tetrachloroethylene Trichloroethylene Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	NA[d] NA[d] NA[d] 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 0.5 100.0 6.0 200.0 5.0[e] 0.7 0.5 NA[d] NA[d] NA[d] NA[d]	Arsenic Barium hydroxide Cadmium Chromium Lead Mercury Selenium Silver Benzene Carbon tetrachloride Chlorobenzene Chloroform Methyl ethyl ketone Pyridine Tetrachloroethylene Trichloroethylene and all applicable constituents identified above the UHC regulatory limit
	S3150	LA-CIN02.001, Homogeneous ~~Inorganic, Cemented Organics~~Solids, Solidified Inorganics	LA111/211	TA-50	Plutonium processing operations	Acceptable Knowledge				
	S3150	LA-CIN01.001, Homogeneous ~~Inorganic, Non-cemented~~Solids, Solidified Inorganics	LA126/226 LA114/214	TA-55	Plutonium processing operations	Acceptable Knowledge				
	S3110	LA-MIN02-V.001, Homogeneous ~~Inorganic, Salts~~Solids – Solidified Inorganics	LA112/212 LA126/226 SQ112/212 SQ113/213 SQ129/229 SQ113/113 SQ126/216	TA-55	Plutonium processing operations	Acceptable Knowledge				
	S3140	LA-MIN-04-S.001, Homogeneous Solids – Salt Waste	LA124/224	TA-55	Plutonium processing operations	Acceptable Knowledge				
	S3150	LA-CIN03-001, Homogeneous Solids – Solidified Inorganics	LA126/226 LA114/214	TA-03	Plutonium processing operations	Acceptable Knowledge				
	S3900	LA-MIN05-V.001, Homogeneous Solids – Solidified Inorganics	SQ111/211 LA112/212 LA126/226 SQ113/213 SQ/126/226 SQ129/229	TA-03	Plutonium processing operations	Acceptable Knowledge				

Table C-4 (continued)
Descriptions of Mixed Transuranic Waste Stored at the Facility

Summary Category Group	Waste Matrix Code	Waste Description[a]	TRUCON Code	Waste-Generating Area	Waste-Generating Activity	Basis for Hazardous Waste Designation	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and /or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents[c]
S4000 – Soil/ Gravel	S4200	LA-MSG04.001, Soils	LA111/211 SQ111/211	TA-21	D&D	Acceptable Knowledge	D004 D005 D006 D007 D008 D009 D010 D011 D018 D019 D021 D022 D035 D038 D039 D040 F001 F002 F003 F005	Arsenic Barium hydroxide Cadmium Chromium Lead Mercury Selenium Silver Benzene Carbon tetrachloride Chlorobenzene Chloroform Methyl ethyl ketone Pyridine Tetrachloroethylene Trichloroethylene Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 0.5 100.0 6.0 200.0 5.0[e] 0.7 0.5 NA[d] NA[d] NA[d] NA[d]	Arsenic Barium hydroxide Cadmium Chromium Lead Mercury Selenium Silver Benzene Carbon tetrachloride Chlorobenzene Chloroform Methyl ethyl ketone Pyridine Tetrachloroethylene Trichloroethylene and all applicable constituents identified above the UHC regulatory limit
S5000 – Heterogeneous Debris	S5400	LA-MHD09.001, Heterogeneous Debris	LA125/225 LA116/216 LA117/217 LA120/220 LA123/223	TA-50	Plutonium processing operations; D&D	Acceptable Knowledge				
	S5400	LA-MHD01.001, Heterogeneous Debris	LA125/225 LA116/216 LA115/215 LA118/218 LA119/219 LA117/217 LA122/222 LA123/223 SQ133/233	TA-55	Plutonium processing operations	Acceptable Knowledge				
	S5100	LA-OS-00-01.001, Uncategorized Metal – Defense Sealed Sources	LA120A/ 220A	TA-03, TA-54, TA-55	Plutonium processing operations; D&D	Acceptable Knowledge				

Table C-4 (continued)
Descriptions of Mixed Transuranic Waste Stored at the Facility

Summary Category Group	Waste Matrix Code	Waste Description[a]	TRUCON Code	Waste-Generating Area	Waste-Generating Activity	Basis for Hazardous Waste Designation	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and /or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents[c]
	S5100	LA-OS-00.03, Uncategorized Metal – Defense Sealed Sources (not in POC)	LA120B/ 220B	TA-03, TA-54, TA-55		Acceptable Knowledge				
	S5100	LA-OS-00-0.4, Uncategorized Metal – Mixed Sealed Sources	LA120A/ 220A	TA-03, TA-54, TA-55		Acceptable Knowledge				
	S5400	LA-MHD03.001, Heterogeneous Debris	LA125/225 LA116/216 LA117/217 LA120/220 LA123/223	TA-03		Acceptable Knowledge	D001 D002 D003 D004 D005 D006 D007 D008 D009 D010 D011 D018 D019 D021 D022 D035 D038 D039 D040 D043 F001 F002 F003 F004 F005 U080	Ignitable Corrosive Reactive Arsenic Barium hydroxide Cadmium Chromium Lead Mercury Selenium Silver Benzene Carbon tetrachloride Chlorobenzene Chloroform Methyl ethyl ketone Pyridine Tetrachloroethylene Trichloroethylene Vinyl Chloride Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents Methylene chloride	NA[d] NA[d] NA[d] 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 0.5 100.0 6.0 200.0 5.0[e] 0.7 0.5 0.2 NA[d] NA[d] NA[d] NA[d] NA[d] NA[d]	Arsenic Barium hydroxide Cadmium Chromium Lead Mercury Selenium Silver Benzene Carbon tetrachloride Chlorobenzene Chloroform Methyl ethyl ketone Pyridine Tetrachloroethylene Trichloroethylene Vinyl chloride Methylene chloride and all applicable constituents identified above the UHC regulatory limit
	S5400	LA-MHD04.001, Heterogeneous Debris	LA125/225 LA116/216 LA117/217 LA123/223	TA-21		Acceptable Knowledge				
	S5400	LA-MHD08.001, Heterogeneous Debris	LA125/225 LA116/216 LA117/217 LA120/220 LA123/223	TA-48		Acceptable Knowledge				

Table C-4 (continued)
Descriptions of Mixed Transuranic Waste Stored at the Facility

Summary Category Group	Waste Matrix Code	Waste Description[a]	TRUCON Code	Waste-Generating Area	Waste-Generating Activity	Basis for Hazardous Waste Designation	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and /or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents[c]
	S5400	LA-MHD05-ITRI.001, Heterogeneous Debris	LA125/225	TA-54		Acceptable Knowledge				

Table C-4 (continued)
Descriptions of Mixed Transuranic Waste Stored at the Facility
~~Table C-5 (continued)~~

~~Summary Category Group~~	~~Waste Matrix Code~~	~~Waste Description~~[a]	~~Waste-Generating Activity~~	~~Basis for Hazardous Waste Designation~~	~~Potential EPA Hazardous Waste Numbers~~	~~Potential Hazardous Waste Constituents and/or Characteristics~~	~~Regulatory Limits~~[b] ~~(milligrams per liter)~~	~~Potential Underlying Hazardous Constituents~~[c]
~~S3000 – Homogeneous~~	~~S3100~~	~~Homogeneous Inorganic, Vermiculite~~	~~Plutonium processing operations~~	~~Acceptable Knowledge~~	~~D001~~	~~Ignitable~~	~~NA~~[d]	
					~~D002~~	~~Corrosive~~	~~NA~~[d]	
					~~D004~~	~~Arsenic~~	~~5.0~~	
					~~D005~~	~~Barium hydroxide~~	~~100.0~~	
					~~D006~~	~~Cadmium~~	~~1.0~~	
					~~D007~~	~~Chromium~~	~~5.0~~	
					~~D008~~	~~Lead~~	~~5.0~~	
					~~D009~~	~~Mercury~~	~~0.2~~	
					~~D010~~	~~Selenium~~	~~1.0~~	
					~~D011~~	~~Silver~~	~~5.0~~	
					~~D018~~	~~Benzene~~	~~0.5~~	
					~~D019~~	~~Carbon tetrachloride~~	~~0.5~~	
					~~D021~~	~~Chlorobenzene~~	~~100.0~~	
					~~D022~~	~~Chloroform~~	~~6.0~~	
					~~D027~~	~~1,4-Dichlorobenzene~~	~~7.5~~	
					~~D028~~	~~1,2-Dichloroethane~~	~~0.5~~	
					~~D030~~	~~2,4-Dinitrotoluene~~	~~0.13~~[e]	
					~~D032~~	~~Hexachlorobenzene~~	~~0.13~~[e]	
					~~D033~~	~~Hexachlorobutadiene~~	~~0.5~~	
					~~D034~~	~~Hexachloroethane~~	~~3.0~~	
					~~D035~~	~~Methyl ethyl ketone~~	~~200.0~~	
					~~D036~~	~~Nitrobenzene~~	~~2.0~~	
					~~D037~~	~~Pentachlorophenol~~	~~100.0~~	
					~~D038~~	~~Pyridine~~	~~5.0~~[e]	
					~~D039~~	~~Tetrachloroethylene~~	~~0.7~~	
					~~D040~~	~~Trichloroethylene~~	~~0.5~~	
					~~D042~~	~~2,4,6-Trichlorophenol~~	~~2.0~~	
					~~D043~~	~~Vinyl Chloride~~	~~0.2~~	
					~~F001~~	~~Spent halogenated solvents~~	~~NA~~[d]	
					~~F002~~	~~Spent halogenated solvents~~	~~NA~~[d]	
					~~F003~~	~~Spent non-halogenated solvents~~	~~NA~~[d]	
					~~F005~~	~~Spent non-halogenated solvents~~	~~NA~~[d]	

Table C-4 (continued)
Descriptions of Mixed Transuranic Waste Stored at the Facility
~~Table C-5 (continued)~~

~~Summary Category Group~~	~~Waste Matrix Code~~	~~Waste Description[a]~~	~~Waste-Generating Activity~~	~~Basis for Hazardous Waste Designation~~	~~Potential EPA Hazardous Waste Numbers~~	~~Potential Hazardous Waste Constituents and/or Characteristics~~	~~Regulatory Limits[b] (milligrams per liter)~~	~~Potential Underlying Hazardous Constituents[c]~~
~~S4000 – Soil/ Gravel~~	~~S4100~~	~~Soil~~	~~D&D~~	~~Acceptable Knowledge~~	~~D004~~ ~~D005~~ ~~D006~~ ~~D007~~ ~~D008~~ ~~D009~~ ~~D010~~ ~~D011~~ ~~D018~~ ~~D019~~ ~~D021~~ ~~D022~~ ~~D035~~ ~~D038~~ ~~D039~~ ~~D040~~ ~~F001~~ ~~F002~~ ~~F003~~ ~~F005~~	~~Arsenic~~ ~~Barium hydroxide~~ ~~Cadmium~~ ~~Chromium~~ ~~Lead~~ ~~Mercury~~ ~~Selenium~~ ~~Silver~~ ~~Benzene~~ ~~Carbon tetrachloride~~ ~~Chlorobenzene~~ ~~Chloroform~~ ~~Methyl ethyl ketone~~ ~~Pyridine~~ ~~Tetrachloroethylene~~ ~~Trichloroethylene~~ ~~Spent halogenated solvents~~ ~~Spent halogenated solvents~~ ~~Spent non-halogenated solvents~~ ~~Spent non-halogenated solvents~~	~~5.0~~ ~~100.0~~ ~~1.0~~ ~~5.0~~ ~~5.0~~ ~~0.2~~ ~~1.0~~ ~~5.0~~ ~~0.5~~ ~~0.5~~ ~~100.0~~ ~~6.0~~ ~~200.0~~ ~~5.0[e]~~ ~~0.7~~ ~~0.5~~ ~~NA[d]~~ ~~NA[d]~~ ~~NA[d]~~ ~~NA[d]~~	~~D004~~ ~~D005~~ ~~D006~~ ~~D007~~ ~~D008~~ ~~D009~~ ~~D010~~ ~~D011~~ ~~D018~~ ~~D019~~ ~~D021~~ ~~D022~~ ~~D035~~ ~~D038~~ ~~D039~~ ~~D040~~ ~~F001~~ ~~F002~~ ~~F003~~ ~~F005~~

Table C-4 (continued)
Descriptions of Mixed Transuranic Waste Stored at the Facility
~~Table C-5 (continued)~~

~~Summary Category Group~~	~~Waste Matrix Code~~	~~Waste Description[a]~~	~~Waste-Generating Activity~~	~~Basis for Hazardous Waste Designation~~	~~Potential EPA Hazardous Waste Numbers~~	~~Potential Hazardous Waste Constituents and/or Characteristics~~	~~Regulatory Limits[b] (milligrams per liter)~~	~~Potential Underlying Hazardous Constituents[c]~~
~~S5000 – Debris~~	~~S5100~~	~~Non-Combustible Debris~~	~~Plutonium processing operations; D&D~~	~~Acceptable Knowledge~~	~~D001~~	~~Ignitable~~	~~NA[d]~~	
					~~D002~~	~~Corrosive~~	~~NA[d]~~	
					~~D003~~	~~Reactive~~	~~NA[d]~~	
					~~D004~~	~~Arsenic~~	~~5.0~~	
					~~D005~~	~~Barium hydroxide~~	~~100.0~~	
					~~D006~~	~~Cadmium~~	~~1.0~~	
	~~S5300~~	~~Combustible Debris~~	~~Plutonium processing operations~~	~~Acceptable Knowledge~~	~~D007~~	~~Chromium~~	~~5.0~~	
					~~D008~~	~~Lead~~	~~5.0~~	
					~~D009~~	~~Mercury~~	~~0.2~~	
					~~D010~~	~~Selenium~~	~~1.0~~	
					~~D011~~	~~Silver~~	~~5.0~~	
	~~S5400~~	~~Heterogeneous Debris~~	~~Plutonium processing operations; D&D~~	~~Acceptable Knowledge~~	~~D018~~	~~Benzene~~	~~0.5~~	
					~~D019~~	~~Carbon tetrachloride~~	~~0.5~~	
					~~D021~~	~~Chlorobenzene~~	~~100.0~~	
					~~D022~~	~~Chloroform~~	~~6.0~~	
					~~D035~~	~~Methyl ethyl ketone~~	~~200.0~~	
					~~D038~~	~~Pyridine~~	~~5.0[e]~~	
					~~D039~~	~~Tetrachloroethylene~~	~~0.7~~	
					~~D040~~	~~Trichloroethylene~~	~~0.5~~	
					~~D043~~	~~Vinyl Chloride~~	~~0.2~~	
					~~F001~~	~~Spent halogenated solvents~~	~~NA[d]~~	
					~~F002~~	~~Spent halogenated solvents~~	~~NA[d]~~	
					~~F003~~	~~Spent non-halogenated solvents~~	~~NA[d]~~	
					~~F004~~	~~Spent non-halogenated solvents~~	~~NA[d]~~	
					~~F005~~	~~Spent non-halogenated solvents~~	~~NA[d]~~	
					~~U080~~	~~Methylene Chloride~~	~~NA[d]~~	

a This table is based on information from the *Acceptable Knowledge Information Summary for Los Alamos National Laboratory Transuranic Waste Streams* (AKIS), (TWCP-AK-2.1-019, R.0) (LA-UR-03-4870); and from waste characterization documentation information maintained by the Facility and Waste Operations Division. Waste with EPA Hazardous Waste Numbers that are not included in the Waste Isolation Pilot Plant (WIPP) Hazardous Waste Facility Permit will not be transported to WIPP. Additionally, recharacterization efforts for nitrate salt-bearing waste have been conducted and documented in several documents as outlined in Enclosure 3 of *Response to Ordered Action 2/3; Attachment A to Settlement Agreement and Stipulated Final Order HWB-14-20; Los Alamos National Laboratory.*

Table C-4 (continued)
Descriptions of Mixed Transuranic Waste Stored at the Facility

[b] A solid waste exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, Test Method 1311 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1986), the extract from a representative sample of the waste contains any of the contaminants listed at a concentration equal to or greater than the respective value given in ~~the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart II~~40 CFR, Part 261, Subpart C ~~[6-14-00].~~.

[c] Potential underlying hazardous constituents (UHC) have been included, where the information is available. UHC characterization for the purpose of Land Disposal Restrictions will apply for mixed transuranic waste to be disposed of at WIPP.

[d] Not Applicable: Refers to the absence of regulatory limits for ignitable, corrosive, and reactive characteristic wastes and F-, P-, and U-listed wastes.

[e] Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level.

Note: Fluoride, sulfide, vanadium, and zinc are not "underlying hazardous constituents" in characteristic wastes, according to the definition in 40 CFR § 268.2(i). Selenium is not an underlying hazardous constituent as defined at 40 CFR § 268.2(i) because its Universal Treatment Standard level is greater than its Toxicity Characteristic level, thus a treated selenium waste would always be characteristically hazardous, unless it is treated to below its characteristic level.

Table C-~~6~~5

~~(This table is reserved)~~

Table C-5 (continued)
Waste Streams Treated Through Open Burning (OB) and/or Open Detonation (OD) at the Facility
~~TABLE C-7~~

~~(This table is reserved)~~

Table C-5 (continued)
Waste Streams Treated Through Open Burning (OB) and/or Open Detonation (OD) at the Facility
Waste Streams Treated through Open Burning (OB) and/or Open Detonation (OD) at the Facility

Waste Stream	Waste Stream Description	Percentage of Total Waste Treated[1]	Potential Explosives[2]	Other Potential Materials	Potential EPA Hazardous Waste Numbers[3]	Potential Hazardous Constituents and/or Characteristics	Regulatory Limits[4] (mg/L)
Explosives machining waste	Explosives machining chips, filters, filter solids, and water	80-95% OB	Pentaerythritol tetranitrate (PETN), Cyclo-1,3,5-trimethylene-2,4,6-trinitramine (RDX), Octahydro, 1,3,5,7-tetranitro, 1,3,5,7-tetrazocine (HMX), plastic-bonded explosives (PBXs or LXs), 4,4-diamino-3,3- azoxyfurazan (DAAF), 2,4,6-trinitrotoluene (TNT), Comp B, and triamino trinitrobenzene (TATB), Baratol, Cyclotol	Plastic bags	D003 D005 D008 D030	Reactivity Barium Lead 2,4-Dinitrotoluene	NA[5] 100.0 5.0 0.13
Excess explosives	Large, laboratory-sized, or small amounts of excess standard explosives. Explosives may be in the form of flakes, granules, crystals, powders, pressings, plastic bonded, putties, rubberized solids, or extrudable solids. Explosives infrequently contain barium or ammonium nitrate mixed with more than 0.2% combustible substances.	5-15% OB 50-90%OD	HMX, RDX, PETN, TATB, DAAF, (2,6-Bis[picrylamino]-3,5-dinitropyridine (PYX), Nitroguanidine (NQ), Nitrocellulose, PBXs and LXs, Comp B, TNT, Boracitol, Cyclotol, HBX-1, Octol, Pentolite, Tritonal, Baratol	Plastic bags, plastic wrapping, plastic casings, cardboard, paper, paper bags, and/or fiberboard containers. Small potential for aluminum, stainless steel, steel, and/or copper.	D001 D003 D005 D030	Ignitability Reactivity Barium 2,4-Dinitrotoluene	NA[5] NA[5] 100.0 0.13

Table C-5 (continued)
Waste Streams Treated Through Open Burning (OB) and/or Open Detonation (OD) at the Facility

Waste Stream	Waste Stream Description	Percentage of Total Waste Treated[1]	Potential Explosives[2]	Other Potential Materials	Potential EPA Hazardous Waste Numbers[3]	Potential Hazardous Constituents and/or Characteristics	Regulatory Limits[4] (mg/L)
Explosives-contaminated combustible debris	Explosives-contaminated debris generated in research laboratories and processing operations. Debris can involve filters removed from laboratories or processing bays, or may contain very small amounts of solvent. The most common solvents used are ethanol and acetone.	<1%OB <1%OD	HMX, RDX, PETN, Cyclotol, Octol, TATB, DAAF, PYX, TNT, PBXs, and LXs	Plastic bags, plastic wrapping, weigh boats, gloves, vials, cardboard, paper, paper bags, fiberboard containers, kimwipes, rags, swabs, flasks, watch glasses, tubing, and/or rods. Possible aluminum, stainless steel, steel, and/or copper. When solvents are present, may contain trace amounts of ethanol, acetone, methanol, ethyl acetate, toluene, cyclohexanone, benzene, chloroform, 1,2-dichloroethane, 1,2-dichloroethylene, methyl ethyl ketone, or trichloroethylene. Noncombustible portions of waste are minimized as much as possible.	D001 D003 D018 D022 D028 D029 D030 D035 D040 F001 F002 F003 F004 F005	Ignitability Reactivity Benzene Chloroform 1,2-Dichloroethane 1,1-Dichloroethylene 2,4- Dinitrotoluene Methyl ethyl ketone Trichloroethylene Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	NA[5] NA[5] 0.5 6.0 0.5 0.7 0.13 200.0 0.5 NA[5] NA[5] NA[5] NA[5] NA[5]
Explosives-contaminated solvent waste	Dimethyl sulfoxide (DMSO) containing dissolved explosives	<1%OB	HMX, RDX, PETN, TATB, DAAF, PBXs, and LXs		D003 D030	Reactivity 2,4-Dinitrotoluene	NA[5] 0.13

Table C-5 (continued)
Waste Streams Treated Through Open Burning (OB) and/or Open Detonation (OD) at the Facility

Waste Stream	Waste Stream Description	Percentage of Total Waste Treated[1]	Potential Explosives[2]	Other Potential Materials	Potential EPA Hazardous Waste Numbers[3]	Potential Hazardous Constituents and/or Characteristics	Regulatory Limits[4] (mg/L)
Explosives-contaminated noncombustible debris	Explosives-contaminated equipment including discarded, noncombustible equipment; debris from firing sites; noncombustible material from decommissioning and demolition activities; and material from explosives processing areas such as carbon or sand from filtering processes	1-3%OB <1%OD[6]	HMX, RDX, PETN, TATB, DAAF, PYX, NQ, Nitrocellulose, PBXs, LXs, Comp B, TNT, Boracitol, Cyclotol, HBX-1, Octol, Pentolite, Tritonal, Baratol	Noncombustible material may include glass, ceramic, or metal piping or equipment. Rarely when solvents are present, they may include trace amounts of ethanol, acetone, methanol, ethyl acetate, toluene, cyclohexanone, benzene, chloroform, 1,2- dichloroethane, 1,2-dichloroethylene, methyl ethyl ketone, or trichloroethylene.	D003 D005 D008 D011 D018 D022 D028 D029 D030 D035 D040 F001 F002 F003 F004 F005	Reactivity Barium Lead Silver Benzene Chloroform 1,2-Dichloroethane 1,1-Dichloroethylene 2,4-Dinitrotoluene Methyl ethyl ketone Trichloroethylene Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	NA[5] 100.0 5.0 5.0 0.5 6.0 0.5 0.7 0.13 200.0 0.5 NA[5] NA[5] NA[5] NA[5] NA[5]
Detonators, initiators, and mild detonating fuses	Detonators, initiators, and/or mild detonating fuses containing standard explosives. Explosives may be in metal or plastic casings and may contain lead-based primaries or be in a lead sheath. Typically nitromethane is used as fuel for treatment activities. This waste stream may include manufactured articles removed from fire protection systems.	1-2%OD	PETN, HMX, RDX, TATB, lead azide, lead styphnate, PBXs	Plastic bags, plastic wrapping, cardboard, paper, paper bags, and/or fiberboard containers. Possible aluminum, lead, stainless steel, steel, or copper present as well.	D003 D008	Reactivity Lead	NA[5] 5.0

Table C-5 (continued)
Waste Streams Treated Through Open Burning (OB) and/or Open Detonation (OD) at the Facility

Waste Stream	Waste Stream Description	Percentage of Total Waste Treated[1]	Potential Explosives[2]	Other Potential Materials	Potential EPA Hazardous Waste Numbers[3]	Potential Hazardous Constituents and/or Characteristics	Regulatory Limits[4] (mg/L)
Shaped charges and test assemblies	Shaped charges consisting of cores of explosives with metal sheaths or metal liners or high-explosives test assemblies consisting of standard explosives in plastic or metal holders. Assemblies may contain lead or silver metal.	1-2%OD	PETN, RDX, HMX, PBXs, and LXs	Plastic components, plastic bags, plastic wrapping, cardboard, paper, paper bags, and/or fiberboard containers. Aluminum, copper, lead, stainless steel, brass, and/or copper may be present.	D003 D008 D011 D030	Reactivity Lead Silver 2,4-Dinitrotoluene	NA[5] 5.0 5.0 0.13
Projectiles and munitions larger than 0.50 caliber	Projectiles and munitions larger than 0.50 caliber	1-2%OD	Munitions/ projectiles	Plastic bags, plastic wrapping, fiberglass, cardboard, paper, fiberboard drums, lead, brass, steel, stainless steel, copper, and/or aluminum	D003 D008	Reactivity Lead	NA[5] 5.0
Pressing molds	Adiprene (urethane) pressing molds contaminated with explosives	1-2%OD	TNT	Adiprene, plastic bags, plastic wrapping, cardboard, paper, and/or paper bags	D003 D030	Reactivity 2,4-Dinotrotoluene	NA[5] 0.13

1 Estimated percentage of the waste stream's representation of all waste that will be treated at the open burning and open detonation units.

2 Potential explosives do not include all of the possible explosives that may be treated at the unit, only those currently expected to be treated as part of the waste stream.

3 Potential EPA Hazardous Waste Numbers do not include all of the possible waste numbers that may be treated at the unit, only those currently expected to be treated. A full list of EPA Hazardous Waste Numbers that may be treated at the unit is included with the most recent version of the LANL Part A Permit Application.

4 A solid waste exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, Test Method 1311 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1986), the extract from a representative sample of the waste contains any of the contaminants listed (D004-D043) at a concentration equal to or greater than the respective value given in 40 CFR Part 261, Subpart C. These are represented in milligrams per liter (mg/L).

5 Not Applicable

Table C-5 (continued)
Waste Streams Treated Through Open Burning (OB) and/or Open Detonation (OD) at the Facility

Table C-~~8~~6

~~(This table is reserved)~~

~~Table C-9~~

Parameters, Characterization Methods, and Rationale for Parameter Selection for Hazardous Waste

Waste Description[a]	Parameters[b]	Characterization Methods	Rationale
Spent Solvents	Flash point (for liquid waste) pH (for liquid waste) RCRA[c]-regulated metals Volatile organic compounds (VOC) Semivolatile organic compounds (SVOC) Free liquids	Acceptable Knowledge Sampling and Analysis	Determine characteristic for ignitability, corrosivity, reactivity, and toxicity Determine concentration of F-listed solvents Determine underlying hazardous constituents
Contaminated Solid Wastes	RCRA[c]-regulated metals VOCs SVOCs	Acceptable Knowledge Sampling and Analysis	Determine characteristic for ignitability, reactivity, and toxicity Determine concentration of F-listed solvents
Paint and Related Wastes	Flash point (for liquid waste) RCRA[c]-regulated metals VOCs	Acceptable Knowledge Sampling and Analysis	Determine characteristic for ignitability and toxicity Determine concentration of F-listed solvents
Photographic and Photocopier Wastes	Flash point (for liquid waste) pH (for liquid waste) RCRA[c]-regulated metals	Acceptable Knowledge Sampling and Analysis	Determine characteristic for ignitability, corrosivity, and toxicity
Corrosive Liquid Wastes	Flash point (for liquid waste) pH (for liquid waste) RCRA[c]-regulated metals VOCs SVOCs	Acceptable Knowledge Sampling and Analysis	Determine characteristic for ignitability, corrosivity, and toxicity Determine concentration of F-listed solvents
Solid Metals and Metallic Compounds	RCRA[c]-regulated metals	Acceptable Knowledge Sampling and Analysis	Determine characteristic for ignitability, reactivity, and toxicity
Contaminated Noncorrosive Aqueous and Nonaqueous Solutions and Sludges	Flash point RCRA[c]-regulated metals VOCs SVOCs	Acceptable Knowledge Sampling and Analysis	Determine characteristic for ignitability, reactivity, and toxicity Determine concentration of F-listed solvents
Mercury Wastes	RCRA[c]-regulated metal	Acceptable Knowledge Sampling and Analysis	Determine ~~characterisitc~~characteristic for toxicity Determine the presence of a U-listed unused commercial chemical product
Used Batteries and Battery Fluids	pH (for liquid waste) RCRA[c]-regulated metals	Acceptable Knowledge	Determine characteristic for corrosivity and toxicity
Unused/Off-specification Commercial Chemical Products	Flash point (for liquid waste) pH (for liquid waste) RCRA[c]-regulated metals VOCs SVOCs	Acceptable Knowledge Sampling and Analysis	Determine characteristic for ignitability, corrosivity, reactivity, and toxicity Determine presence of P-listed or U-listed unused commercial chemical products
Gas Cylinder Waste	RCRA[c]-regulated metals VOCs SVOCs	Acceptable Knowledge	Determine ~~characterisitic~~characteristic for ignitability, corrosivity, and reactivity Determine presence of D-coded and U- and P-listed wastes
Environmental Restoration ~~(ER)~~ Soils and Sludges	RCRA[c]-regulated metals VOCs SVOCs	Acceptable Knowledge	Determine characteristic for ignitability, reactivity, and toxicity Determine concentration of F-listed solvents
Environmental Restoration ER Aqueous Liquids	pH RCRA[c]-regulated metals VOCs SVOCs	Acceptable Knowledge	Determine characteristic for ignitability, corrosivity, reactivity, and toxicity Determine concentration of F-listed solvents
~~ER~~Environmental Restoration Debris	RCRA[c]-regulated metals VOCs SVOCs	Acceptable Knowledge	Determine characteristic for ignitability, reactivity, and toxicity Determine concentration of F-listed solvents

[a] Information contained in this column is from the Los Alamos National Laboratory waste characterization documentation database

[b] Parameter selection is based on acceptable knowledge for each waste stream. Additional parameters may be selected for each waste stream as necessary

[c] Resource Conservation and Recovery Act. Use of the term "RCRA-regulated metals" refers to hazardous waste as defined in ~~the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart II, 261.24 [6-14-00]~~40 CFR 261.24

Table C-7

~~Table C-10~~

Parameters, Characterization Methods, and Rationale for Parameter Selection for Mixed Low-Level Waste

Waste Description[a]	Parameter[b]	Characterization Method	Rationale
Soils with Heavy Metals	RCRA-regulated metals[c]	Acceptable Knowledge Sample and analyze randomly selected drums in waste stream	Determine toxicity characteristic
Environmental Restoration Soils	RCRA-regulated metals[c] VOCs	Acceptable Knowledge Sample and analyze randomly selected drums in waste stream	Determine presence of F-listed solvents Determine toxicity characteristic
Inorganic Solid Oxidizers	RCRA-regulated metals[c]	Acceptable Knowledge Sample and analyze randomly selected drums in waste stream	Determine toxicity characteristic Determine characteristic for ignitability and reactivity
Lead Waste	RCRA-regulated metals[c]	Acceptable Knowledge	Determine characteristic for reactivity Determine toxicity characteristic
Noncombustible Debris	RCRA-regulated metals[c]	Acceptable Knowledge	Determine toxicity characteristic Determine characteristic for ignitability and reactivity
Combustible Debris	RCRA-regulated metals[c] VOCs	Acceptable Knowledge	Determine toxicity characteristic Determine presence of F-listed solvents Determine characteristic for ignitability and reactivity
Organic-Contaminated Noncombustible Solids	RCRA-regulated metals[c] VOCs	Acceptable Knowledge	Determine toxicity characteristic Determine presence of F-listed solvents
Organic-Contaminated Combustible Solids	RCRA-regulated metals[c] VOCs	Acceptable Knowledge	Determine characteristic for ignitability and reactivity Determine toxicity characteristic Determine presence
Solid Wastes			
Mercury Wastes	RCRA-regulated metals[c] VOCs	Acceptable Knowledge Sample and analyze randomly selected drums in waste stream	Determine toxicity characteristic Determine presence of F-listed solvents
Unused Solid Reagent Chemical Wastes	RCRA-regulated metals[c]	Acceptable Knowledge	Determine characteristic for ignitability and corrosivity Determine the presence of P- and U-listed unused commercial chemical product

Table C-~~10~~7 (continued)

Waste Description[a]	Parameter[b]	Characterization Method	Rationale
Solid Wastes			
Unused Solid Reagent Chemical Wastes	RCRA-regulated metals[c]	Acceptable Knowledge	Determine characteristic for ignitability and corrosivity Determine the presence of P- and U-listed unused commercial chemical product
Liquid Wastes			
Spent Solvents and Contaminated Solvent Mixtures	Flash point pH RCRA-regulated metals[c] VOCs Semivolatile organic compounds (SVOCs)	Acceptable Knowledge Sampling and Analysis	Determine characteristic for ignitability, corrosivity, and toxicity Determine concentration of F-listed solvents
Corrosive Liquid Wastes	Flash point pH RCRA-regulated metals[c] SVOCs	Acceptable Knowledge Sampling and Analysis	Determine characteristic for ignitability, corrosivity, and toxicity Determine concentration of F-listed solvents
Aqueous and Nonaqueous Liquids Contaminated with Heavy Metals and/or Organics	Flash point RCRA-regulated metals[c] VOCs SVOCs	Acceptable Knowledge Sampling and Analysis	Determine characteristic for ignitability and toxicity Determine concentration of F-listed solvents
Oil Wastes	RCRA-regulated metals[c] VOCs SVOCs	Acceptable Knowledge Sampling and analysis	Determine characteristic for toxicity Determine concentration of F-listed solvents
Unused Liquid Reagent Chemical Wastes	Flash point pH	Acceptable Knowledge	Determine characteristic for ignitability and corrosivity Determine the presence of P- and U-listed unused commercial chemical product
Gaseous Wastes			
Gas Cylinder Waste	RCRA[c]-regulated metals VOCs SVOCs	Acceptable Knowledge	Determine characteristic for ignitability, corrosivity, and reactivity Determine presence of D-coded and P- and U-listed waste

[a] Information contained in this column is extracted primarily from Los Alamos National Laboratory, 1995, "LANL's Federal Facility Compliance Order Site Treatment Plan Background Volume," Los Alamos National Laboratory, Los Alamos, New Mexico.

[b] Parameter selection is based on acceptable knowledge for each waste stream. Additional parameters may be selected for each waste stream as necessary

[c] Resource Conservation and Recovery Act. Use of the term "RCRA-regulated metals" refers to hazardous waste as defined in ~~the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart II, 261.24 [6-14-00]~~40 CFR 261.24

Table C-~~11~~8
Parameters, Characterization Methods, and Rationale for Parameter Selection for Mixed Transuranic Waste

Summary Category Group/ Description[a]	Waste Description	Parameters	Characterization Methods	Rationale
Storage				
S3000-Homogeneous Solids	Solidified aqueous waste (*e.g.*, concreted/cemented aqueous waste)	Free liquids in waste matrix Physical form of the waste	Visual examination Real-time radiography (RTR) Acceptable Knowledge	Verify physical waste form No free liquids allowed
	Solidified aqueous waste (*e.g.*, dewatered sludge and chemical treatment sludge) Solidified inorganic/organic process solids and liquids	Resource Conservation and Recovery Act (RCRA)-regulated metals	Sample and analyze statistically selected number of drums in waste stream Acceptable Knowledge	Determine toxicity characteristic Determine concentration of metals
	Homogeneous inorganic solids Glass/noncombustible waste Non-cemented inorganics Absorbed organics on vermiculite	Volatile organic compounds in container headspace gas	Gas chromatography / mass spectrometry (GC/MS) Fourier transform infrared spectrometry Gas chromatography / Flame ionization detector Acceptable Knowledge	Qualitative screening to confirm the presence of VOCs
S4000-Soils/Gravels	Contaminated soil	Free liquids in waste matrix Physical form of the waste	Visual examination RTR Acceptable Knowledge	Verify physical waste form No free liquids allowed
		RCRA-regulated metals	Sample and analyze statistically selected number of drums in waste stream Acceptable Knowledge	Determine toxicity characteristic Determine concentration of metals
		VOCs in container headspace gas	GC/MS Fourier transform infrared spectrometry Gas chromatography / Flame ionization detector	Qualitative screening to confirm the presence of VOCs
S5000-Debris Waste	Mixed metal scrap and incidental combustibles Combustible waste Graphite waste Metal waste Glass waste	Free liquids Physical form of the waste VOCs in container headspace gas VOCs and semivolatile organic compounds	Visual examination RTR Acceptable Knowledge	Verify physical waste form No free liquids allowed Determine compliance with land disposal restrictions (LDR) treatment standards, if applicable
	Leaded-rubber and metal waste High-efficiency particulate air filters Noncombustible waste Mixed combustible / noncombustible waste	RCRA-regulated metals	Gas chromatography / mass spectrometry Fourier transform infrared spectrometry Gas chromatography / Flame ionization detector Acceptable Knowledge	Qualitative screening to confirm the presence of VOC Determine compliance with LDR treatment standards, if applicable

Table C-~~11~~8 (continued)
Parameters, Characterization Methods, and Rationale for Parameter Selection for Mixed Transuranic Waste

Treatment				
L1000 Aqueous Liquids/Slurries	Evaporator bottoms solutions, aqueous waste, and laboratory solutions	RCRA-regulated metals and corrosivity	Acceptable Knowledge Sampling and Analysis	Determine toxicity characteristics Determine concentration of metals
S3000 Homogeneous Solids	Inorganic process solids and cemented inorganic process solids	RCRA-regulated metals	Acceptable Knowledge Sampling and Analysis	Determine concentration of metals

[a] Information in this column is based on information from the *Acceptable Knowledge Information Summary for Los Alamos National Laboratory Transuranic Waste Streams* (AKIS), TWCP-AK-2.1-019, R.0, LA-UR-03-4870, Los Alamos National Laboratory, Los Alamos, New Mexico.

Table C-~~12~~9

Summary of Characterization Methods[a] for Explosives Waste Treatment Residue

WASTE DESCRIPTION	PARAMETER[a]	CHARACTERIZATION METHOD	RATIONALE
Explosives machining waste	Reactivity Resource Conservation and Recovery Act (RCRA)-regulated metals SVOCs	Acceptable Knowledge[b] Field Screening[c]	Determine characteristic for reactivity, the total concentration of metals, and the presence of SVOCs
Excess explosives	Ignitability Reactivity RCRA-regulated metals SVOCs	Acceptable Knowledge[b] Field Screening[c]	Determine characteristic for ignitability and reactivity, the total concentration of metals, and the presence of SVOCs
Explosives-contaminated combustible debris	Ignitability Reactivity RCRA-regulated metals SVOCs Spent halogenated solvents Spent nonhalogenated solvents	Acceptable Knowledge[b] Field Screening[c]	Determine characteristic for ignitability and reactivity, the total concentration of metals, and the presence of SVOCs or solvents
Explosives-contaminated solvent waste	Reactivity 2,4-Dinitrotoluene	Acceptable Knowledge[b] Field Screening[c]	Determine characteristic for reactivity and the presence of SVOCs
Explosives-contaminated noncombustible debris	Reactivity RCRA-regulated metals SVOCs Spent halogenated solvents Spent non-halogenated solvents	Acceptable Knowledge[b] Field Screening[c]	Determine characteristic for reactivity and the presence of SVOCs
Residue (ash) generated from treatment	Ignitability Reactivity RCRA-regulated metals SVOCs	Acceptable Knowledge[b] Sampling and analysis[d]	Determine characteristic for ignitability, reactivity, toxicity characteristic for metals, and the presence of SVOCs.
Excess explosives	Ignitability Reactivity	Acceptable Knowledge[a] Field Screening	Determine characteristic for ignitability and reactivity
Detonators, initiators, and mild detonating fuses	Reactivity Lead	Acceptable Knowledge[a] Field Screening Sampling and analysis[b]	Determine characteristic for reactivity Determine toxicity characteristic for lead
Shaped charges and test assemblies	Reactivity Lead 2,4-Dinitrotoluene	Acceptable Knowledge[a] Field Screening Sampling and analysis[b]	Determine characteristic for reactivity Determine toxicity characteristic for lead and 2,4-Dinitrotoluene
Projectiles and munitions larger than 0.50 caliber	Reactivity Lead	Acceptable Knowledge[a] Field Screening Sampling and analysis[b]	Determine characteristic for reactivity Determine toxicity characteristic for lead
Pressing molds	Reactivity 2,4-Dintirotoluene	Acceptable Knowledge [a] Field Screening	Determine characteristic for reactivity Determine toxicity characteristic 2,4-Dinitrotoluene

[a] Regulations do not specify a particular characterization method for reactivity of explosives waste streams; characterization of explosives waste is based mainly on the properties of the chemicals known or suspected to be in the waste (e.g., process knowledge or acceptable knowledge).

[b] Acceptable knowledge is defined in Section C.3.1.1 of this Waste Analysis Plan.

[c] Field screening such as High Explosives Spot Test can be used to determine the presence of explosives.

[d] Sampling and analysis is conducted in accordance with Section C.3.1.2 of this Waste Analysis Plan.

Table C-10

~~(This table is reserved)~~

~~Table C-13~~

~~(This table is reserved)~~

~~Table C-14~~

~~(This table is reserved)~~

~~Table C-15~~

Recommended Sample Containers[a], Preservation Techniques, and Holding Times[b]

Analyte Class and Sample Type	Container	Preservative	Holding Time
	Volatile Organics		
Concentrated Waste Samples:	Method 5035: 40-milliliter (mL) vials with stirring bar. Method 5021: See method. Methods 5031 & 5032: 125-mL WM[c]-G[d]. Use Teflon-lined lids for all procedures.	Cool to ~~4º~~0-6º degrees Celsius (ºC)[e]	14 days
Aqueous Samples:			
No Residual Chlorine Present	Methods 5030, 5031, & 5032: ~~2~~3 x 40-mL vials with Teflon-lined septum caps.	Cool to ~~4ºC~~0-6ºC and adjust pH[f] to less than 2 with H_2SO_4, HCl, or solid $NaHSO_4$	14 days
Residual Chlorine Present	Methods 5030, 5031, & 5032: ~~2~~3 x 40-mL vials with Teflon-lined septum caps.	Collect sample in a 125-mL container which has been pre-preserved with 4 drops of 10% sodium thiosulfate solution. Gently swirl to mix sample and transfer to a 40-mL volatile organic analysis (VOA) vial. Cool to ~~4ºC~~0-6ºC and adjust pH to less than 2 with H_2SO_4, HCl, or solid $NaHSO_4$	14 days
Acrolein and Acrylonitrile	Methods 5030, 5031, & 5032: ~~2~~3 x 40-mL vials with Teflon-lined septum caps.	Adjust to pH of 4-5. Cool to ~~4ºC~~0-6ºC	~~14~~7 days
Soil/Sediments and Sludges:	Method 5035: 40-mL vials with stirring bar. Method 5021: See method. Methods 5031 & 5032: 125-mL WM[c]-G[d]. Use Teflon-lined lids for all procedures.	See the individual method	14 days

Table C-~~15~~10 (continued)
Recommended Sample Containers[a], Preservation Techniques, and Holding Times[b]

Analyte Class and Sample Type	Container	Preservative	Holding Time
Semivolatile Organics/Organochlorine Pesticides and Herbicides			
Concentrated Waste Samples:	125 mL WM[c]-G[d] with Teflon-lined lid	None	Samples must be extracted within 14 days and analyzed within 40 days following extraction.
Soil/Sediments and Sludges:	250 mL WM[c]-G[d] with Teflon-lined lid	Cool to ~~4ºC~~0-6ºC	Samples must be extracted within 14 days and analyzed within 40 days following extraction.
Liquid Samples:			
No Residual Chlorine Present	1-gallon (gal.), 2 x 0.5 gal., or 4 x 1 liter (L) AG[g] container with Teflon-lined lid	Cool to ~~4ºC~~0-6ºC	Samples must be extracted within 7 days and extracts analyzed within 40 days following extraction
Residual Chlorine Present	1-gal., 2 x 0.5 gal., or 4 x 1-L AG[g] with Teflon-lined lid	Add 3-mL 10% sodium thiosulfate solution per gallon (or 0.008%). Addition of sodium thiosulfate solution to sample container may be performed in the laboratory prior to field use. Cool to 4ºC.	Samples must be extracted within 7 days and extracts analyzed within 40 days following extraction
Metals			
Aqueous Samples:			
Metals (except hexavalent chromium and mercury)	1-L P[h] or G[d]	Add nitric acid to adjust pH to less than 2.	180 days
Hexavalent chromium	500-mL P[h] or G[d]	Cool to ~~4ºC~~<6ºC	24 hours
Mercury	500-mL P[h] or G[d]	Add nitric acid to adjust pH to less than 2.	28 days
Soil/Sediments and Sludges:			
Metals (except hexavalent chromium and mercury)	500-mL WM[c]-P[h] or G[d]	Cool to ~~4ºC~~<6ºC	180 days
Hexavalent chromium	500-mL WM[c]-P[h] or G[d]	Cool to ~~4ºC~~<6ºC	~~Not established – analyze as soon as possible.~~Samples must be extracted within 30 days and extracts analyzed within 7 days following extraction.
Mercury	500-mL WM[c]-P[h] or G[d]	Cool to ~~4ºC~~<6ºC	28 days

a Smaller sample containers may be required due to health and safety concerns associated with potential radiation exposure, transportation requirements, and waste management considerations
b Information primarily from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*, U.S. Environmental Protection Agency, 1986 and all approved updates
c Wide-mouth
d Glass
e Adjust to pH of less than 2 with sulfuric acid, hydrochloric acid, or solid sodium bisulfate
f A term used to describe the hydrogen-ion activity of a system

[g] Amber glass[h]; P = Polyethylene

Table C-~~16~~11
Summary of Characterization Methods for Non-Mixed Hazardous Waste

Parameter	Method Numbers	Test Methods	Rationale
Volatile organic compounds in waste matrix: Spent halogenated solvents Spent nonhalogenated solvents	ASTM Method D4547-91[a] U.S. EPA/540/4-91/001[b] *SW-846* (1311, ~~8260B~~8260D, 8275A)[c] or equivalent methods[d] Methods included in 20.4.1 NMAC §§ 265.1084(a)(2), (a)(3), and (a)(4)	Total and/or toxicity characteristic leaching procedure (TCLP) VOC analysis by gas chromatography/mass spectrometry (GC/MS) Semivolatile organic compound (SVOC) analysis by thermal extraction/gas chromatography/mass spectrometry (TE/GC/MS) Acceptable Knowledge	Determine total and/or TCLP and SVOC/VOC concentration in samples of solids or liquids
SVOCs in waste:	*SW-846* (1311 and 8270C)[c] or equivalent methods[d]	Total or TCLP SVOC analysis by GC/MS Acceptable Knowledge	Determine total and/or TCLP and SVOC concentration in samples of solids or liquids
Resource Conservation and Recovery Act-regulated metals in waste: Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	*SW-846* (1311, ~~6010B~~6010D, 7060A, 7061A)[c] (1311, ~~6010B~~6010D, 7080A, 7081)[c] (1311, ~~6010B~~6010D, 7130, 7131A)[c] (1311, ~~6010B~~6010D, 7190, 7191)[c] (1311, ~~6010B~~6010D, 7420, 7421)[c] (1311, ~~6010B~~6010D, 7470A, ~~7471A~~7471B, 7472)[c] (1311, ~~6010B~~6010D, 7740, 7741A, 7742)[c] (1311, ~~6010B~~6010D, 7760A, 7761)[c] or equivalent methods[d]	Total and/or TCLP Inductively-coupled plasma atomic emission spectroscopy Atomic absorption Manual cold vapor atomic absorption Anodic stripping voltammetry Acceptable Knowledge	Determine total and/or TCLP concentration in samples of solids or liquids
Reactive Sulfide	*SW-846*, Test Method to Determine Hydrogen Sulfide Released from Wastes[e] *SW-846* (9030B, 9031, 9034)[c] or equivalent methods[d]	Colorimetric, titrametric, or spectrophotometric measurement of hydrogen sulfide released from waste following reflux distillation under acidic conditions	Determine concentration of reactive sulfides
Ignitability (Flash Point)	*SW-846* (1010, ~~1020A~~1020B, 1030)[c] or equivalent methods[d]	Pensky-Martens closed cup Setaflash closed cup Ignitability of solids	Determine ignitablity
pH (Corrosivity)	*SW-846* (~~9040B~~9040C, 9041A, ~~9045C~~9045D)[c] or equivalent methods[d]	pH electrometric measurement pH paper Soil and waste pH	Determine corrosivity

[a] American Society for Testing and Materials, 1991, "Standard Practice for Sampling Waste and Soils for Volatile Organic Compounds," ASTM D4547-91, *Annual Book of ASTM Standards*, Philadelphia, Pennsylvania, American Society for Testing and Materials

[b] U.S. Environmental Protection Agency (EPA), 1991, "Soil Sampling and Analysis for Volatile Organic Compounds," EPA 154014-91001, Office of Research and Development

[c] U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*

[d] Equivalent methods subject to EPA approval may be substituted

[e] *SW-846*, Section 7.3.4.2 contains specialized methods to determine if a sulfide-containing waste exhibits the reactivity characteristic

Table C-~~17~~12
Summary of Characterization Methods for Mixed Low-Level Waste

Parameter	Method Numbers	Test Method	Rationale
Solid Wastes			
Volatile organic compounds in waste matrix: Spent halogenated solvents Spent nonhalogenated solvents	ASTM Method D4547-91[a] U.S. EPA/540/4-91/001[b] *SW-846* (1311, ~~8260B~~8260D, 8275A)[c] or equivalent methods[d] Methods included in 20.4.1 NMAC §§ 265.1084(a)(2), (a)(3), and (a)(4)	Total and/or toxicity characteristic leaching procedure (TCLP) VOC analysis by gas chromatography/mass spectrometry (GC/MS) Semivolatile organic compounds (SVOC) analysis by thermal extraction/gas chromatography/mass spectrometry (TE/GC/MS) Acceptable Knowledge	Determine total and/or TCLP and VOC concentration in samples of solid process residues and soils
SVOCs in waste:	*SW-846* (1311 and 8270C)[c] or equivalent methods[d]	Total and/or TCLP SVOC analysis by GC/MS Acceptable Knowledge	Determine total and/or TCLP and SVOC concentration in samples of solid process residues and soils
Resource Conservation and Recovery Act (RCRA)-regulated metals in waste: Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	*SW-846* (1311, ~~6010B~~6010D, 7060A, 7061A)[c] (1311, ~~6010B~~6010D, 7080A, 7081)[c] (1311, ~~6010B~~6010D, 7130, 7131A)[c] (1311, ~~6010B~~6010D, 7190, 7191)[c] (1311, ~~6010B~~6010D, 7420, 7421)[c] (1311, ~~6010B~~6010D, 7470A, ~~7471A~~7471B, 7472)[c] (1311, ~~6010B~~6010D, 7740, 7741A, 7742)[c] (1311, ~~6010B~~6010D, 7760A, 7761)[c] or equivalent methods[d]	Total and/or TCLP Inductively-coupled plasma atomic emission spectroscopy Atomic absorption Manual cold vapor atomic absorption Acceptable Knowledge	Determine total and/or TCLP concentration in samples of solid process residues and soils
Liquid Wastes			
VOCs in waste matrix: Spent halogenated solvents Spent nonhalogenated solvents	ASTM Method D4547-91[a] EPA/540/4-91/001[b] *SW-846* (1311 and ~~8260B~~8260D)[c] or equivalent methods[d]	Total and/or TCLP VOC analysis by GC/MS Acceptable Knowledge	Determine total and/or TCLP and VOC concentration in samples of liquid
SVOCs in waste:	*SW-846* (1311 and 8270B)[c] or equivalent methods[d]	Total and/or TCLP SVOC analysis by GC/MS Acceptable Knowledge	Determine total and/or TCLP and SVOC concentration in samples of liquid

Table C-~~17~~12 (continued)
Summary of Characterization Methods for Mixed Low-Level Waste

Parameter	Method Numbers	Test Method	Rationale
Liquid Wastes (cont.)			
RCRA-regulated metals in waste: Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	*SW-846* (1311, ~~6010B~~6010D, 7060A, 7061A)[c] (1311, ~~6010B~~6010D, 7080A, 7081)[c] (1311, ~~6010B~~6010D, 7130, 7131A)[c] (1311, ~~6010B~~6010D, 7190, 7191)[c] (1311, ~~6010B~~6010D, 7420, 7421)[c] (1311, ~~6010B~~6010D, 7470A, ~~7471A~~7471B, 7472)[c] (1311, ~~6010B~~6010D, 7740, 7741A, 7742)[c] (1311, ~~6010B~~6010D, 7760A, 7761)[c] or equivalent methods[d]	Total and/or TCLP Inductively-coupled plasma atomic emission spectroscopy Atomic absorption Manual cold vapor atomic absorption Anodic stripping voltammetry Acceptable Knowledge	Determine total and/or TCLP concentration in samples of liquid
Ignitability (Flash Point)	*SW-846* (1010, ~~1020A~~1020B, 1030)[c] or equivalent methods[d]	Pensky-Martens closed cup Setaflash closed cup Acceptable Knowledge	Determine ignitability
pH (Corrosivity)	*SW-846* (~~9040B~~9040C, 9041A, ~~9045C~~9045D)[c] or equivalent methods[d] Equivalent methods: *HALO smart Electrode HI12302 polyetherimide gel-filled Bluetooth* (TA-54-0231 and TA-54-0412 units only. *HI98190 Professional Waterproof Portable pH/ORP Meter* (TA-54-0231 and TA-54-0412 units only)	pH electrometric Measurement pH paper Soil and waste pH Acceptable Knowledge	Determine corrosivity

[a] American Society for Testing and Materials, 1991, "Standard Practice for Sampling Waste and Soils for Volatile Organic Compounds," ASTM D4547-91, *Annual Book of ASTM Standards*, Philadelphia, Pennsylvania, American Society for Testing and Materials

[b] U.S. Environmental Protection Agency (EPA), 1991, "Soil Sampling and Analysis for Volatile Organic Compounds," EPA 154014-91991, Office of Research and Development

[c] U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*

[d] Equivalent methods, subject to EPA approval, may be substituted

Table C-~~18~~13
Summary of Characterization Methods for Mixed Transuranic Waste

Parameter	Method Numbers	Test Methods	Rationale
	Storage		
Physical Waste Form (Free liquids in waste matrix)		Waste inspection procedures Real-time radiography Visual examination Acceptable Knowledge	Verify waste container contents
Volatile organic compounds in waste matrix: Spent halogenated solvents Spent nonhalogenated solvents	ASTM Method D4547-91[a] U.S. EPA/540/4-91/001[b] *SW-846* (1311, ~~8260B~~8260D, 8275A)[c] or equivalent methods[d] Methods included in 20.4.1 NMAC §§ 265.1084(a)(2), (a)(3), and (a)(4)	Total and/or toxicity characteristic leaching procedure (TCLP) VOCs in container headspace gas VOC analysis by gas chromatography/mass spectrometry (GC/MS) Semivolatile organic compound (SVOC) analysis by thermal extraction/gas chromatography/mass spectrometry (TE/GC/MS) Acceptable Knowledge	Determine the presence or absence of VOCs in samples
SVOCs in waste	*SW-846* (1311 and 8270C)[c] or equivalent methods[d]	Total and/or TCLP SVOC analysis by GC/MS Acceptable Knowledge	Determine the presence or absence of SVOCs in samples
Resource Conservation and Recovery Act (RCRA)-regulated metals in waste: Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	*SW-846* (1311, ~~6010B~~6010D, 7060A, 7061A)[c] (1311, ~~6010B~~6010D, 7080A, 7081)[c] (1311, ~~6010B~~6010D, 7130, 7131A)[c] (1311, ~~6010B~~6010D, 7190, 7191)[c] (1311, ~~6010B~~6010D, 7420, 7421)[c] (1311, ~~6010B~~6010D, 7470A, ~~7471A~~7471B, 7472)[c] (1311, ~~6010B~~6010D, 7740, 7741A, 7742)[c] (1311, ~~6010B~~6010D, 7760A, 7761) or equivalent methods[d]	Total and/or TCLP Inductively-coupled plasma atomic emission spectroscopy Atomic absorption Manual cold vapor atomic absorption Anodic stripping voltammetry Acceptable Knowledge	Determine total and/or TCLP concentration in samples
Ignitability	*SW-846* (1010, ~~1020A~~1020B, 1030)[c] or equivalent methods[d]	Pensky-Martens closed cup Setaflash closed cup Ignitabililty of Solids Acceptable Knowledge	Determine ignitability
pH (Corrosivity)	*SW-846* (~~9040B~~9040C, 9041A, ~~9045C~~9045D) or equivalent methods[d]	pH electrometric measurement Acceptable Knowledge	Determine corrosivity

Table C-13 (continued)
Summary of Characterization Methods for Mixed Low-Level Waste

Parameter	Method Numbers	Test Methods	Rationale
Treatment			
RCRA-regulated metals in waste: Arsenic Barium Cadmium Chromium Lead Mercury Silver	*SW-846* (1311, ~~6010B~~6010D, 7060A, 7061A)[c] (1311, ~~6010B~~6010D, 7080A, 7081)[c] (1311, ~~6010B~~6010D, 7130, 7131A)[c] (1311, ~~6010B~~6010D, 7190, 7191)[c] (1311, ~~6010B~~6010D, 7420, 7421)[c] (1311, ~~6010B~~6010D, 7470A, ~~7471A~~7471B, 7472)[c] (1311, ~~6010B~~6010D, 7760A, 7761)[c] or equivalent methods[d]	Total and/or TCLP Inductively-coupled plasma atomic emission spectroscopy Atomic absorption Manual cold vapor atomic absorption Acceptable Knowledge	Determine total and/or TCLP metals concentration in samples
pH (Corrosivity)	*SW-846* (~~9040B~~9040C, 9041A, ~~9045C~~9045D) or equivalent methods[d] Equivalent methods: *HALO smart Electrode HI12302 polyetherimide gel-filled Bluetooth* (TA-54-02031 and TA-54-0412 units only. *HI98190 Professional Waterproof Portable pH/ORP Meter* (TA-54-0231, and TA-54-0412)	pH electrometric measurement Acceptable Knowledge	Determine corrosivity

a American Society for Testing and Materials, 1991, "Standard Practice for Sampling Waste and Soils for Volatile Organic Compounds," ASTM D4547-91, *Annual Book of ASTM Standards*, Philadelphia, Pennsylvania, American Society for Testing and Materials
b U.S. Environmental Protection Agency (EPA), 1991, "Soil Sampling and Analysis for Volatile Organic Compounds," EPA 154014-91001, Office of Research and Development
c U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.
d Equivalent methods, subject to EPA approval, may be substituted

Table C-~~19~~14
Description of Cementation Waste Streams at Technical Area 55

~~(This table is for informational purposes only)~~

Summary Category Group	Waste Description	Waste-Generating Activity	Basis for Hazardous Waste Designation	Potential EPA Hazardous Waste Numbers	Potential Hazardous Constituents in the Waste	Regulatory Limits[a] (milligrams per liter)
L1000 – Aqueous Liquids/Slurries	Evaporator bottoms solutions, aqueous waste, and laboratory solutions	Process residue from evaporator bottoms and other discardable solutions.	Acceptable Knowledge	D002 D004 D005 D006 D007 D008 D009 D010 D011	Nitric acid Arsenic Barium hydroxide Cadmium Chromium Lead Mercury Selenium Silver	NA 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0
S3000 – Homogenous Solids	Inorganic process solids and cemented inorganic process solids	Process residue from evaporator bottoms and other discardable solutions; process-leached solids, ash, filter cakes, salts, metal oxides, and fines generated as a result of plutonium-processing	Acceptable Knowledge	D004 D005 D006 D007 D008 D009 D010 D011	Arsenic Barium hydroxide Cadmium Chromium Lead Mercury Selenium Silver	5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0

[a] A solid waste exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, Test Method 1311 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *EPA-SW-846*, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C., the extract from a representative sample of the waste contains any of the contaminants listed at a concentration equal to or greater than the respective value given in ~~the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart II, 261.24, revised June 14, 2000~~40 CFR 261.24

Table C-~~20~~15
Description of Stabilization Waste Streams at Technical Area 50, Building 69; Technical Area 54, Domes 231 and 375; and Technical Area 54, Building 412

~~(This table is for informational purposes only)~~

Summary Category Group	Waste Matrix Code	Waste Description[a]	Waste-Generating Activity	Basis for Hazardous Waste Designation	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and /or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents[c]
S3000 - Homogeneous	S3100	Homogeneous Inorganic, Cemented	Plutonium processing operations	Acceptable Knowledge	D001	Ignitable	NA[d]	
					D002	Corrosive	NA[d]	
					D003[e]	Reactivity	NA[d]	
		Homogeneous Inorganic, Cemented Organics	Plutonium processing operations	Acceptable Knowledge	D004	Arsenic	5.0	
					D005	Barium hydroxide	100.0	
					D006	Cadmium	1.0	
					D007	Chromium	5.0	
					D008	Lead	5.0	
		Homogeneous Inorganic, Non-cemented	Plutonium processing operations	Acceptable Knowledge	D009	Mercury	0.2	
					D010	Selenium	1.0	
					D011	Silver	5.0	
					D018	Benzene	0.5	
					D019	Carbon tetrachloride	0.5	
		Homogeneous Inorganic, Salts	Plutonium processing operations	Acceptable Knowledge	D021	Chlorobenzene	100.0	
					D022	Chloroform	6.0	
					D035	Methyl ethyl ketone	200.0	
					D038	Pyridine	5.0[e]	
					D039	Tetrachloroethylene	0.7	
					D040	Trichloroethylene	0.5	
					F001	Spent halogenated solvents	NA[d]	
					F002	Spent halogenated solvents	NA[d]	
					F003	Spent non-halogenated solvents	NA[d]	
					F004[e]	Spent non-halogenated solvents	NA[d]	
					F005	Spent non-halogenated solvents	NA[d]	
					F006[e]	Wastewater treatment sludges	NA[d]	
					F007[e]	Spent cyanide plating solutions	NA[d]	
					F008[e]	Spent strip/clean solutions	NA[d]	

Table C-~~20~~15 (continued)

~~(This table is for informational purposes only)~~

Description of Stabilization Waste Streams at Technical Area 50, Building 69; and Technical Area 54, Domes 231 and 375; and Technical Area 54, Building 412

Summary Category Group	Waste Matrix Code	Waste Description[a]	Waste-Generating Activity	Basis for Hazardous Waste Designation	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents[c]
S3000 - Homogeneous	S3100	Homogeneous Inorganic, Vermiculite	Plutonium processing operations	Acceptable Knowledge	D001	Ignitable	NA[d]	
					D002	Corrosive	NA[d]	
					D003[e]	Reactivity	NA[d]	
					D004	Arsenic	5.0	
					D005	Barium hydroxide	100.0	
					D006	Cadmium	1.0	
					D007	Chromium	5.0	
					D008	Lead	5.0	
					D009	Mercury	0.2	
					D010	Selenium	1.0	
					D011	Silver	5.0	
					D018	Benzene	0.5	
					D019	Carbon tetrachloride	0.5	
					D021	Chlorobenzene	100.0	
					D022	Chloroform	6.0	
					D027	1,4-Dichlorobenzene	7.5	
					D028	1,2-Dichloroethane	0.5	
					D030	2,4-Dinitrotoluene	0.13[e]	
					D032	Hexachlorobenzene	0.13[e]	
					D033	Hexachlorobutadiene	0.5	
					D034	Hexachloroethane	3.0	
					D035	Methyl ethyl ketone	200.0	
					D036	Nitrobenzene	2.0	
					D037	Pentachlorophenol	100.0	
					D038	Pyridine	5.0[e]	
					D039	Tetrachloroethylene	0.7	
					D040	Trichloroethylene	0.5	
					D042	2,4,6-Trichlorophenol	2.0	
					D043	Vinyl Chloride	0.2	
					F001	Spent halogenated solvents	NA[d]	
					F002	Spent halogenated solvents	NA[d]	
					F003	Spent non-halogenated solvents	NA[d]	
					F004[e]	Spent non-halogenated solvents	NA[d]	
					F005	Spent non-halogenated solvents	NA[d]	
					F006[e]	Wastewater treatment sludges	NA[d]	
					F007[e]	Spent cyanide plating solutions	NA[d]	
					F008[e]	Spent strip/clean solutions	NA[d]	

Table C-~~20~~15 (continued)

~~(This table is for informational purposes only)~~Description of Stabilization Waste Streams at Technical Area 50, Building 69; and Technical Area 54, Domes 231 and 375; and Technical Area 54, Building 412

Summary Category Group	Waste Matrix Code	Waste Description[a]	Waste-Generating Activity	Basis for Hazardous Waste Designation	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents[c]
S5000 - Debris	S5300	Combustible Debris	Plutonium processing operations	Acceptable Knowledge	D001	Ignitable	NA[d]	
					D002	Corrosive	NA[d]	
					D003	Reactive	NA[d]	
					D004	Arsenic	5.0	
					D005	Barium hydroxide	100.0	
	S5400	Heterogeneous Debris	Plutonium processing operations; D&D	Acceptable Knowledge	D006	Cadmium	1.0	
					D007	Chromium	5.0	
					D008	Lead	5.0	
					D009	Mercury	0.2	
					D010	Selenium	1.0	
					D011	Silver	5.0	
					D018	Benzene	0.5	
					D019	Carbon tetrachloride	0.5	
					D021	Chlorobenzene	100.0	
					D022	Chloroform	6.0	
					D035	Methyl ethyl ketone	200.0	
					D038	Pyridine	5.0[e]	
					D039	Tetrachloroethylene	0.7	
					D040	Trichloroethylene	0.5	
					D043	Vinyl Chloride	0.2	
					F001	Spent halogenated solvents	NA[d]	
					F002	Spent halogenated solvents	NA[d]	
					F003	Spent non-halogenated solvents	NA[d]	
					F004	Spent non-halogenated solvents	NA[d]	
					F005	Spent non-halogenated solvents	NA[d]	
					U080	Methylene Chloride	NA[d]	

[a] This table is based on information from the *Acceptable Knowledge Information Summary for Los Alamos National Laboratory Transuranic Waste Streams (*AKIS), (TWCP-AK-2.1, 1-019, R.0)(LA-UR-03-4870); and from waste characterization documentation information maintained by the Facility and Waste Operations Division. Waste with EPA Hazardous Waste Numbers that are not included in the Waste Isolation Pilot Plant (WIPP) Hazardous Waste Facility Permit will not be transported to WIPP. Additionally, recharacterization efforts for nitrate salt-bearing waste have been conducted and documented in several documents as outlined in Enclosure 3 of *Response to Ordered Action 2/3; Attachment A to Settlement Agreement and Stipulated Final Order HWB-14-20; Los Alamos National Laboratory.*

[b] A solid waste exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, Test Method 1331 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1986), the extract from a representative sample of solid waste contains any of the contaminants listed at a concentration equal to or greater than the respective value given in ~~the New Mexico Administrative Code , Title 20, Chapter 4, Part 1, Subpart II,~~40 CFR Part 261, Subpart C~~[6-14-00].~~.

[c] Potential underlying hazardous constituents (UHC) have been included, where the information is available. UHC characterization for the purpose of Land Disposal Restrictions will apply for mixed transuranic waste to be disposed of at WIPP.

[d] Not Applicable: Refers to the absence of regulatory limits for ignitable, corrosive and reactive characteristic waste and F-, P-, and U-listed wastes.

[e] Potential EPA Hazardous Waste Numbers only present at TA-54-0231~~, TA-54-0375,~~ and TA-54-0412.

[f] Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level.

Table C-~~21~~16

Description of Hazardous and Mixed Macroencapsulation Waste Streams at Container Storage ~~Permitted~~ Units

~~(This table is for informational purposes only)~~

Waste Description[a]	Waste Generating Activity[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Radioactive Lead Solids	Radioisotope experiments and other reactor, accelerator, laser, and x-ray activities	Acceptable Knowledge	D008	Lead	5.0	All applicable constituents identified above the UHC regulatory limit
Noncombustible Debris	Maintenance, D&D, R&D, and ER activities	Acceptable Knowledge	D004 D005 D006 D007 D008 D009 D010 D011 D018 D019 D020 D021 D022 D023 D024 D025 D026 D027 D028 D029 D030 D031 D032 D033 D034 D035 D036 D037 D038 D039 D040 D041 D042 D043 F001 F002 F004	Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Benzene Carbon tetrachloride Chlordane Chlorobenzene Chloroform o-Cresol m-Cresol p-Cresol Cresol 1,4-Dichlorobenzene 1,2-Dichloroethane 1,1-Dichloroethylene 2,4-Dinitrotoluene Heptachlor (and its epoxide) Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Methyl ethyl ketone Nitrobenzene Pentachlorophenol Pyridine Tetrachloroethylene Trichloroethylene 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol Vinyl chloride Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents	5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 0.5 0.03 100.0 6.0 200.0[d] 200.0[d] 200.0[d] 200.0[d] 7.5 0.5 0.7 0.13 0.008 0.13 0.5 3.0 200.0 2.0 100.0 5.0 0.7 0.5 400.0 2.0 0.2 NA[c] NA[c] NA[c]	Arsenic, Barium, Cadmium, Chromium (Total), Lead, Mercury-all others, Selenium, Silver, and all applicable constituents identified above the UHC regulatory limit

Table C-~~21~~16 (continued)

~~(This table is for informational purposes only)~~

Description of Hazardous and Mixed Macroencapsulation Waste Streams at Container Storage Units

Waste Description[a]	Waste Generating Activity[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Combustible Debris	Maintenance, R&D, D&D, and ~~ER~~environmental restoration activities	Acceptable Knowledge	D004	Arsenic	5.0	Arsenic, Barium, Chromium, Lead, Mercury-all others, Selenium, Silver, Nickel, Zinc and all applicable constituents identified above the UHC regulatory limit
			D005	Barium	100.0	
			D006	Cadmium	1.0	
			D007	Chromium	5.0	
			D008	Lead	5.0	
			D009	Mercury	0.2	
			D010	Selenium	1.0	
			D011	Silver	5.0	
			D018	Benzene	0.5	
			D019	Carbon tetrachloride	0.5	
			D020	Chlordane	0.03	
			D021	Chlorobenzene	100.0	
			D022	Chloroform	6.0	
			D023	o-Cresol	200.0[d]	
			D024	m-Cresol	200.0[d]	
			D025	p-Cresol	200.0[d]	
			D026	Cresol	200.0[d]	
			D027	1,4-Dichlorobenzene	7.5	
			D028	1,2-Dichloroethane	0.5	
			D029	1,1-Dichloroethylene	0.7	
			D030	2,4-Dinitrotoluene	0.13	
			D031	Heptachlor (and its epoxide)	0.008	
			D032	Hexachlorobenzene	0.13	
			D033	Hexachlorobutadiene	0.5	
			D034	Hexachloroethane	3.0	
			D035	Methyl ethyl ketone	200.0	
			D036	Nitrobenzene	2.0	
			D037	Pentachlorophenol	100.0	
			D038	Pyridine	5.0	
			D039	Tetrachloroethylene	0.7	
			D040	Trichloroethylene	0.5	
			D041	2,4,5-Trichlorophenol	400.0	
			D042	2,4,6-Trichlorophenol	2.0	
			D043	Vinyl chloride	0.2	
			F001	Spent halogenated solvents	NA[c]	
			F002	Spent halogenated solvents	NA[c]	
			F004	Spent non-halogenated solvents	NA[c]	

[a] Denotes informatio from the Los Alamos National Laboratory waste characterization documentation database

[b] A solid waste exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, Test Method 1311 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1986), the extract from a representative sample of the waste contains any of the contaminants listed (D004-D043) at a concentration equal to or greater than the respective value given in 40 CFR Part 261, Subpart C.

~~[a] Denotes information from the Los Alamos National Laboratory waste characterization documentation database~~

[b] ~~A solid waste exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, Test Method 1311 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1986), the extract from a representative sample of the waste contains any of the contaminants listed (D004-D043) at a concentration equal to or greater than the respective value given in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20.4.1 NMAC), Subpart II, Part 261, Subpart C [6-14-00]~~

[c] Not applicable: Refers to the absence of regulatory limits for ignitable, corrosive, and reactive characteristic wastes and F-, P-, and U-listed wastes

[d] If o-, m-, and p-Cresol concentrations cannot be differentiated, the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 milligrams per liter

Attachment 8

Revised Supplement 3-1,
Permittees' Proposed Changes to
Attachments G.1 through G.30, Closure Plans

G.1 - TECHNICAL AREA 3, BUILDING 29 INDOOR CONTAINER STORAGE UNIT

G.2 - TECHNICAL AREA 36-8 OPEN DETONATION UNIT CLOSURE PLAN

G.3 - TECHNICAL AREA 39-6 OPEN DETONATION UNIT CLOSURE PLAN

G.4 - TECHNICAL AREA 50, BUILDING 69, INDOOR CONTAINER STORAGE UNIT

G.5 - TECHNICAL AREA 50, BUILDING 69, OUTDOOR CONTAINER STORAGE UNIT

G.6 - TECHNICAL AREA 54, AREA G, PAD 1, OUTDOOR CONTAINER STORAGE UNIT

G.7 - TECHNICAL AREA 54, AREA G, PAD 3, OUTDOOR CONTAINER STORAGE UNIT

G.8 - TECHNICAL AREA 54, AREA G, PAD 5, OUTDOOR CONTAINER STORAGE UNIT

G.9 - TECHNICAL AREA 54, AREA G, PAD 6, OUTDOOR CONTAINER STORAGE UNIT

G.10 - TECHNICAL AREA 54, AREA G, PAD 9, OUTDOOR CONTAINER STORAGE UNIT

G.11 - TECHNICAL AREA 54, AREA G, PAD 10, OUTDOOR CONTAINER STORAGE UNIT

G.12 - TECHNICAL AREA 54, AREA G, PAD 11, OUTDOOR CONTAINER STORAGE UNIT

G.13 - TECHNICAL AREA 54, AREA G, STORAGE SHED 8, INDOOR CONTAINER STORAGE UNIT

G.14 - TECHNICAL AREA 54, AREA G, BUILDING 33, INDOOR CONTAINER STORAGE UNIT

G.15 - TECHNICAL AREA 54, AREA L, OUTDOOR CONTAINER STORAGE UNIT

G.16 - TECHNICAL AREA 54 WEST, BUILDING 38, INDOOR CONTAINER STORAGE UNIT

G.17 - TECHNICAL AREA 54, WEST, OUTDOOR CONTAINER STORAGE UNIT

G.18 - TECHNICAL AREA 55, BUILDING 4 ROOM B40, INDOOR CONTAINER STORAGE UNIT

G.19 - TECHNICAL AREA 55, BUILDING 4 ROOM K13, INDOOR CONTAINER STORAGE UNIT

G.20 - TECHNICAL AREA 55, BUILDING 4, ROOM B05, INDOOR CONTAINER STORAGE UNIT

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G.22 - TECHNICAL AREA 55, BUILDING 4, VAULT, INDOOR CONTAINER STORAGE UNIT

G.23 - TECHNICAL AREA 55, BUILDING 4, ROOM 401, INDOOR STORAGE TANK UNIT

G.24 - TECHNICAL AREA 55, BUILDING 4, ROOM 401, INDOOR MIXED WASTE STABILIZATION TREATMENT UNIT

G.25 - TECHNICAL AREA 55, 0355 PAD

G.26 - TECHNICAL AREA 55, OUTDOOR STORAGE PAD

G.27 - TECHNICAL AREA 63, TRANSURANIC WASTE FACILITY

G.28 - CLOSURE PLAN OPEN BURNING TREATMENT UNIT TECHNICAL AREA 16-388 FLASH PAD

G.29 – TECHNICAL AREA 55, BUILDING 4 ROOM B13 INDOOR CONTAINER STORAGE UNIT

G.30 – TECHNICAL AREA 55, BUILDING 4 ROOM G12 INDOOR CONTAINER STORAGE UNIT

ATTACHMENT G.1
TECHNICAL AREA 3, BUILDING 29
INDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

Table G.1-5

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

Table G.1-5

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded concrete	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Sampling equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT G.2

TECHNICAL AREA 36-8

OPEN DETONATION UNIT

CLOSURE PLAN

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1.0 INTRODUCTION

This closure plan describes the activities necessary to close the open detonation (OD) treatment unit at Technical Area 36 (TA-36) at the Los Alamos National Laboratory (LANL), hereinafter referred to as the TA-36-8 OD Unit. The information provided in this closure plan addresses the closure requirements specified in Part 9 of the Los Alamos National Laboratory Hazardous Waste Facility Permit (NMED 2010) (the Permit), and Title 40 Code of Federal Regulations (CFR) Part 264, Subparts G and X for hazardous waste management units operated at LANL under RCRA and the New Mexico Hazardous Waste Act.

Until closure is complete and has been certified in accordance with Permit Section 9.5, a copy of the approved closure plan or the Permit containing the plan, any approved revisions, and closure activity documentation associated with the closure will be on file with hazardous waste compliance personnel at LANL and at the DOE Los Alamos Site Office. Prior to closure of the TA-36-8 OD Unit, this closure plan may be amended in accordance with Permit Section 9.4.8, as necessary and appropriate, to provide updated sampling and analysis plans and to incorporate updated decontamination technologies. Amended closure plans will be submitted to NMED for approval prior to implementing closure activities.

The TA-36-8 OD Unit is collocated with solid waste management units not yet scheduled for clean-up activities; therefore, if closure performance standards listed in Section 4.1 cannot be attained, the TA-36-8 OD Unit will undergo RCRA clean closure activities in conjunction with the corrective action processes at TA-36. Final closure of the TA-36-8 OD Unit will be conducted in accordance with the requirements set forth in 40 CFR 264 Subpart G and X.

2.0 DESCRIPTION OF UNIT TO BE CLOSED

This section provides an overview of past operations and waste management practices at the TA-36-8 OD Unit. It includes the location of the unit, a description of the unit and operational and waste management practices associated with the unit.

2.1 Description of the Treatment Unit

The unit is located near Building TA-36-8 and is used to treat solid and liquid hazardous explosives waste. A list of waste explosives that have been treated by OD at the unit to date is presented in Table G.2-2. This table will be updated, as necessary at the time of closure. The TA-36-8 OD Unit consists of a sand- and grass-covered area that measures approximately 500 feet east to west and 300 feet north to south. The western portion is relatively flat; the eastern portion is concave to minimize fragment dispersion. The unit is used primarily for non-treatment-related experimental test detonations, sanitization of classified parts, and treatment of hazardous explosives waste. Following waste placement at the unit, detonation operations are conducted from Building TA-36-8, the control building.

2.2 Description of the Wastes Treated at the Unit

The TA-36-8 OD Unit has a maximum treatment capacity of 2,000 pounds of explosives waste per detonation and an annual treatment limit of 15,000 pounds. The wastes are treated to remove the characteristic of reactivity, although other characteristic hazardous waste (e.g., toxicity for barium) may be present in the wastes being treated.

There are two basic categories of explosives that may be treated at the TA-36-8 OD Unit. The first category consists of explosives-contaminated waste; the second category consists of explosives waste. Generally, explosives-contaminated waste includes make-up room wastes and infrequently firing site debris. Make-up room waste can consist of explosives-contaminated debris such as paper towels, gloves, swabs, and similar materials that contain no tangible pieces of explosives but are used in the preparation of shots in the preparation building. Firing site debris that is potentially contaminated with explosives consists of wood scraps, cardboard, burlap, Plexiglas®/Lexan®, plastic, glass, styrofoam, electrical cables, and metallic foils used for pin switches or metals such as target plates. Explosives waste generally includes identifiable scrap explosives that are safe to handle. These materials include explosives assemblies and explosives, identifiable booster charge scrap, and any other process wastes that have the potential to react.

3.0 ESTIMATE OF MAXIMUM WASTE TREATED

Since RCRA Subtitle C regulations became effective in November 1980, an average of approximately 1100 pounds of waste has been treated annually at the TA-36-8 OD Unit. Based on the 1100 pound per year rate for treated wastes, it is estimated that approximately 33,000 pounds of waste have been treated at the TA-36-8 OD Unit through 2010.

4.0 GENERAL CLOSURE INFORMATION

4.1 Closure Performance Standard

As required by Permit Section 9.2, the TA-36-8 OD Unit will be closed to meet the following performance standards:

a. Remove all hazardous waste residues and hazardous constituents; and

b. Ensure contaminated media do not contain concentrations of hazardous constituents greater than the clean-up levels established in accordance with Permit Sections 11.4 and 11.5. For soils, the cleanup levels will be established based on residential use. LANL will also demonstrate that there is no potential to contaminate groundwater.

If LANL is unable to achieve either of the clean closure standards above, they will:

c. Coordinate cleanup closure activities for the TA-36-8 OD Unit with the corrective action cleanup processes at TA-36 in its entirety;

d. Comply with Closure Requirements in 40 CFR 265.113(b)(1)(ii)(C) and (2);

e. Minimize the need for further maintenance;

f. Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground, groundwater, surface waters, or to the atmosphere; and

g. Comply with the closure requirements of Permit Part 9 (Closure) and 40 CFR Part 264 Subparts G and X for miscellaneous units.

Closure of the TA-36-8 OD Unit will be deemed complete when: 1) all surfaces and equipment have been decontaminated, or otherwise properly disposed of; 2) closure has been certified by an independent, professional engineer licensed in the State of New Mexico; and 3) closure certification has been submitted to, and approved by, NMED.

4.2 Closure Schedule

This closure plan schedule is intended to address closure requirements for the TA-36-8 OD Unit within the authorized timeframe of the Permit (see Permit Section 9.4). The following section provides the schedule of closure activities (see also Table G.2-1 of this closure plan).

Notification of closure will occur at least 45 days prior to when LANL expects to begin closure (see 40 CFR § 264.112(d)(1)). Closure activities will begin according to the requirements of 40 CFR § 264.112(d)(2). However, pursuant to 40 CFR § 264.112(e), removing hazardous wastes and decontaminating or dismantling equipment in accordance with an approved closure plan may be conducted at any time before or after notification of closure. Notification of the structural assessment (assessment), as described in Section 5.2 of this closure plan, will occur in accordance with Permit Section 9.4.6.2.

Within 100 days of the final treatment of hazardous waste, LANL will conduct the records review (review) and assessment and submit an amended closure plan, if necessary, to the NMED for review and approval as a permit modification. Upon approval of the modified closure plan, if applicable, LANL will decontaminate unit structures, surfaces, and equipment.

Decontamination verification sampling activities, and soil sampling if applicable, will be conducted to demonstrate that surfaces, related equipment, and media, if applicable, at the TA-36-8 OD Unit meet the closure performance standards in Permit Section 9.2.

All closure activities, including submittal of a final closure certification report to the NMED for review and approval, will be completed within 180 days after the final treatment of waste. Submittal of the final closure report and certification will be submitted to NMED 240 days after initiating closure. In the event that closure of the TA-36-8 OD Unit cannot proceed according to schedule, LANL will notify the NMED in accordance with the extension request requirements in Permit Section 9.4.1.1.

5.0 CLOSURE PROCEDURES

Closure activities at the TA-36-8 OD Unit will include: proper management and disposal of hazardous waste residues and contaminated surfaces and equipment associated with the unit; verification that the closure performance standards in Permit Section 9.2 have been achieved; and submittal of a final closure certification report. The following sections describe closure activities applicable to the TA-36-8 OD Unit.

5.1 Records Review and Structural Assessment

Prior to commencing closure decontamination and sampling activities, the TA-36-8 OD Unit Operating and Inspection Records will be reviewed and a structural assessment will be conducted to determine any previous finding(s) or action(s) that may influence closure activities or potential sampling locations.

5.1.1 Records Review

The TA-36-8 OD Unit Operating Record (including, but not limited to, inspection and contingency plan implementation records) will be reviewed at the time of closure and in accordance with the schedule in Section 4.2 of this closure plan. The goals of the review will be to:

1. Confirm the specific hazardous waste constituents of concern listed in Table G.2-2 of this closure plan; and
2. identify additional sampling locations (*e.g.*, locations of spills or chronic conditions identified in the TA-36-8 OD Unit Operating and Records).

A determination will be made on whether any spills or releases, defects, deterioration, damage, or hazards affecting waste containment or treatment occurred or developed during the operational life of the TA-36-8 OD Unit. If the records indicate any such incidents, LANL will amend this closure plan (Section 4.3) in order to update the Sampling and Analysis Plan (SAP) (Section 6.0) to incorporate the locations of these incidents as additional sampling locations. All additional sampling procedures, as applicable, will be included in the amended closure plan.

5.1.2 Structural Assessment

The structural assessment is an evaluation of the unit's physical condition. The assessment will include inspecting the unit for any conditions that indicate a potential for release of hazardous constituents. If the assessment reveals any evidence of a release (*e.g.*, stains), this closure plan will be amended in order to update the SAP (Section 6.0) to incorporate these additional sampling locations. All additional sampling procedures, as applicable, will be included in the amended closure plan. This assessment will be documented with photographs, drawings, and other documentation, as necessary.

5.2 Decontamination and Removal of Structures and Related Equipment

In accordance with Permit Section 9.4.3, all remaining hazardous waste residues will be removed from the TA-36-8 OD Unit. The TA-36-8 OD Unit's equipment will be decontaminated, removed, or both and managed appropriately. All waste material will be controlled, handled, characterized, and disposed of in accordance with Permit Attachment C (Waste Analysis Plan), Permit Section 9.4.5, and LANL's waste management procedures.

5.2.1 Removal of Structures and Related Equipment

Building TA-36-8 will not be removed as part of closure of the TA-36-8 OD Unit, but will be assessed as part of the clean-up activities at TA-36 in its entirety. At the time of closure of TA-36, the removal of these structures will be in accordance with Section 7.0 of this closure plan. Any related equipment will be removed as part of closure of the TA-36-8 OD Unit.

5.2.2 Decontamination of Structures and Related Equipment

Equipment at the unit is not expected to be left in place at final closure of TA-36. However, if equipment, identified during the assessment, is expected to be left in place, it will be decontaminated by pressure washing or steam cleaning and sampled according to Section 6.1. The steam cleaning or pressure washing solution will consist of a surfactant detergent (*e.g.*, Alconox®) and water mixed in accordance with the manufacturer's recommendations. Portable berms or other such devices (*e.g.*, absorbent socks, plastic sheeting, wading pools) will collect excess wash water and provide complete containment during the decontamination process.

5.2.3 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during decontamination activities will be cleaned with a wash water solution. Residue, disposable equipment, and small reusable equipment that cannot be decontaminated will be containerized and managed as waste in accordance with Section 7.0.

6.0 SAMPLING AND ANALYSIS PLAN

This SAP identifies the specific sampling and analysis requirements for this unit and ensures the closure requirements of 40 CFR Part 264 Subparts G and X are met. It also describes the sampling, analysis, and quality assurance/quality control (QA/QC) methods that will be used to demonstrate that LANL has met the closure performance standards in Section 4.1 of this closure plan. LANL will comply with all the requirements in this closure plan section (6.0) as well as the requirements in Part 11.10 of the Permit.

This SAP is designed to verify decontamination of surfaces, equipment, and materials; and determine whether a release of hazardous constituents to any environmental media has occurred. It includes:

1. The hazardous waste constituents of concern listed in Table G.2-2 that will be included in the analysis for soil, wipe, and chip samples. This list includes all hazardous constituents defined as:
    a. any constituent identified in 40 CFR Part 261 Appendix VII that caused the United States Environmental Protection Agency (EPA) to list a hazardous waste in 40 CFR Part 261 Subpart D;
    b. any constituent identified in 40 CFR Part 261, Appendix VIII; or
    c. any constituent identified in 40 CFR Part 264 Appendix IX, and perchlorate.
2. The list of hazardous constituents of concern will be utilized to select the EPA approved analytical methods capable of detecting those constituents.
3. A site plan for verification and soil samples. The site plan includes:
    a. Figure G.2-1 depicting the boundaries of the unit and verification and soil sampling locations;
    b. locations of known spills or other releases of hazardous waste or hazardous constituents during operation of the unit;
    c. other potential release locations; and
    d. a rationale for the number and locations of samples.
4. Type of samples. The type of samples to be collected (*e.g.*, wipe, soil) and the rationale for the selection of the sample type.
5. Sampling methods including a description of the EPA-approved sampling methods and procedures that will be used to collect each type of sample as specified in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846) (EPA 1986) and other methods approved by NMED as listed within the Waste Analysis Plan (Attachment C) of the permit.
6. A description of the EPA approved laboratory analytical methods that will be used to measure hazardous constituent concentrations (see Table G.2-4).
7. QA/QC procedures. This SAP includes a description of the QA/QC procedures that include, but are not limited to:
    a. duplicates, trip blanks, equipment blanks;

b. a description of methods for decontamination of re-usable sampling equipment; and

c. a description of all sample preservation, handling, labeling, and chain-of-custody procedures.

6.1 Sampling Activities

Sampling activities will be conducted to demonstrate that the units' related equipment, surfaces, and soils meet the closure performance standards in Permit Section 9.2. All samples will be collected and analyzed in accordance with the procedures in Sections 6.2, 6.3, and 6.4 of this closure plan. Soil samples will be collected from the TA-36-86 OD Unit according to the sampling grid shown in Figure G.2-1. These locations include, but are not limited to, soils surrounding the units; soils in the vicinity of the units; and soils at the storm water discharge point.

- Wipe sample(s) will be collected from each piece of decontaminated equipment related to the unit.
- Systematic composite samples will be collected from soils within and near the unit to include topographic lows or drainages. These samples will be analyzed for the applicable analytes in Table G.2-2.
    - Additional discrete soil samples will also be collected from locations where contamination is detected by composite sampling.
- Discrete soil samples will be collected from soils within the unit. These samples will be analyzed for volatile organic compounds, as these cannot be composited.
- One wipe sample will be collected from each piece of decontaminated equipment related to the unit.
- One verification wipe sample will be collected from the floor at the entry way of Building TA-36-8.

Removal of the associated structures at TA-36-8 OD Unit will occur at the time of closure of TA-36 in its entirety. Prior to removal of the Building TA-36-8 chip samples will be collected the concrete walls and floors.

Decontamination verification sampling activities will be conducted at the TA-36-8 OD Unit in order to verify that equipment at the unit meets the closure performance standards in Permit Section 9.2.

6.2 Sample Collection Procedures

Samples will be collected in accordance with Permit Section 9.4.7.1 and the procedures identified in this SAP which incorporates guidance from the EPA (EPA, 2002), DOE (DOE, 1995), and other NMED-approved procedures.

6.2.1 Surface Water and Groundwater Sampling

Surface water sampling is not included as part of the TA-36-8 OD Unit closure activities because surface water compliance is demonstrated as part of compliance with the Clean Water Act (CWA) and the National Pollutant Discharge Elimination System (NPDES) permit program. The TA-36-8 OD unit was subject to the 2008 CWA Multi-Sector General Permit (MSGP) for storm water until the modified LANL Storm water Individual Permit (IP) became effective on November 1, 2010. LANL is required to implement site-specific control measures (including best management practices [BMPs]) to address the non-numeric technology-based effluent limits contained in the IP, followed by confirmation monitoring against New Mexico water-quality criteria-equivalent target action levels (TALs) to determine the effectiveness of the site-specific measures. If TALs are exceeded, corrective actions detailed in the IP are initiated and additional confirmation monitoring is conducted following completion of corrective actions. Monitoring for the IP will start in 2011.

6.2.2 Soil Sampling

Systematic composite and discrete grab soil samples will be collected to demonstrate that soils within and in the vicinity of the TA-36-8 OD Unit meet the closure performance standards. Approximately 45 decision units will be established in the area and will consist of areas no greater than 3,600 ft^2 (see Figure G.2-1). Individual soil samples (no less than 30 subsamples per decision unit) will be collected from 0-6 inch depths (soil/tuff interface). The individual soil samples will then be composited into one sample, resulting in a total of approximately 35 composite samples (EPA 2002). Two discrete soil samples will be collected from each decision unit for volatile organic compound (VOC) analysis. Discrete soil samples will be collected from within the OD pits, from depths of 0-6 inches and at the soil/rock interface (see Figure G.2-1). Soil samples will be analyzed to determine if hazardous constituents are present in soils at, or in the vicinity of, the units and to determine if there is an immediate threat to the environment. Soil samples will be collected using a spade, scoop, auger, trowel or other tool as specified in approved methods for the type of analyte to be sampled (i.e., EPA 1986 or EPA 2002). All samples will be kept at their at-depth temperature or lower, protected from ultraviolet light, sealed tightly in the recommended container, and analyzed within the specific holding times listed in Table G.2-5.

6.2.3 Wipe Sampling

Surface wipe samples will be collected and analyzed to determine if residual hazardous constituents remain on surfaces and equipment at the unit. One wipe sample will also be collected from the floor, near the entry way for Building TA-36-8. Samples will be collected in accordance with the National Institute of Occupational Safety and Health (NIOSH) *Manual of Analytical Methods* (NIOSH 1994). The appropriate wipe sample method will consider the type of surface being sampled, the type of constituent being sampled, the solution used, and the desired constituent detection limit.

The NIOSH method includes wiping a 100 square centimeter area at each discrete location with a gauze wipe or Ghost Wipes, whichever is prescribed by the analytical laboratory, wetted with a liquid solution appropriate for the desired analysis (*e.g.*, deionized water for lead). For wipe sampling, guidance from the analytical laboratory will be obtained prior to wipe verification sampling to confirm that the solution chosen for each analysis is appropriate for the analysis to be conducted and that wipe sampling is a proper technique for the analysis.

6.2.4 Cleaning of Sampling Equipment

A disposable sampler is considered clean only when directly removed from a factory-sealed wrapper. Reusable decontamination equipment, including protective clothing and tools, and sampling equipment used during closure activities will be scraped, as necessary, to remove residue, cleaned prior to each use with a wash solution, rinsed several times with tap water, and air-dried to prevent cross-contamination of samples. Sampling equipment rinsate blanks will be collected and analyzed only if reusable sampling equipment is used.

6.3 Sample Management Procedures

The following sections provide a description of sample documentation, handling, preservation, storage, packaging, and transportation requirements that will be followed during the sampling activities associated with the closure.

6.3.1 Sample Documentation

Sampling personnel will complete and maintain records to document sampling and analysis activities. Sample documentation will include: sample labels and custody seals; sample identification numbers; chain-of-custody forms; analysis requested; sample logbooks detailing sample collection activities; and shipping forms (if necessary).

6.3.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel until the samples are relinquished to the analytical laboratory. This will ensure the integrity of the samples and provide for an accurate and defensible written record of sample possession and handling from the time of collection until laboratory analysis. One chain-of-custody form may be used to document all of the samples collected from a single sampling event. The sample collector will be responsible for the integrity of the samples collected until properly transferred to another person. The EPA considers a sample to be in a person's custody if it is:

1. in a person's physical possession;
2. in view of the person in possession; or
3. secured by that person in a restricted access area to prevent tampering.

The sample collector will document all pertinent sample collection data. Individuals relinquishing or receiving custody of the samples will sign, date, and note the time on the analysis request and chain-of-custody form. A chain-of-custody form must accompany all samples from collection through laboratory analysis. The analytical laboratory will return the completed chain-of-custody form to LANL and it will become part of the permanent sampling record documenting the sampling efforts.

6.3.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- a unique sample identification number;
- name of the sample collector;
- date and time of collection;
- type of preservatives used, if any; and
- location from which the sample was collected.

A custody seal will be placed on each sample container to detect unauthorized tampering with the samples. These labels will be initialed, dated, and affixed by the sample collector in such a manner that it is necessary to break the seal to open the container.

6.3.1.3 Sample Logbook

All pertinent information on the sampling effort will be recorded in a bound logbook. Information will be recorded in indelible ink and any cross outs will be made with a single line and the change initialed and dated by the author. The sample logbook will include the following information:

- the sample location;
- suspected composition;
- sample identification number;
- volume/mass of sample taken;
- purpose of sampling;
- description of sample point and sampling methodology;
- date and time of collection;
- name of the sample collector;
- sample destination and how it will be transported;
- observations; and
- name(s) of personnel responsible for the observations.

6.3.2 Sample Handling, Preservation, and Storage

Samples will be collected and containerized in appropriate pre-cleaned sample containers. Table G.2-5 presents the requirements in SW-846 (EPA 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE requirements, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate LANL documents establish the requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, waste, and defense program materials.

Off-site transportation of samples will occur via private, contract, or common motor carrier, or air carrier. All off-site transportation will be processed through the LANL packaging and transportation organization unless the shipper is specifically authorized through formal documentation by that organization to independently tender shipments to common motor or air carriers.

6.4 Sample Analysis Requirements

Samples will be analyzed for all hazardous constituents listed in Table G.2-2; if at closure it has been determined that other constituents listed in Appendix VIII of 40 CFR Part 261 and in Appendix IX of 40 CFR Part 264 were managed or treated at the units over their operational history, this closure plan will be amended to include those constituents for sampling and analysis. Samples will be analyzed by an independent laboratory using the methods outlined in

Table G.2-4. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.2-4. If any of the information from these tables has changed at the time of closure, LANL will amend this closure plan to update all methods in this SAP.

6.4.1 Analytical Laboratory Requirements

The analytical laboratory will perform the detailed qualitative and quantitative chemical analyses specified in Section 6.4.2. This analytical laboratory will have:

- a documented comprehensive QA/QC program;
- technical analytical expertise;
- a document control/records management plan; and
- the capability to perform data reduction, validation, and reporting.

The selection of the analytical testing methods identified in Table G.2-4 is based on the following considerations:

- the physical form of the waste;
- constituents of interest;
- required detection limits (*e.g.*, regulatory thresholds); and
- information requirements (*e.g.*, waste classification).

6.4.2 Quality Assurance/Quality Control

All sampling and analysis will be conducted in accordance with QA/QC procedures defined by the latest revision of SW-846 (EPA 1986) or other NMED-approved procedures. Field sampling procedures and laboratory analyses will be evaluated through the use of QA/QC samples to assess the overall quality of the data produced. QC samples evaluate precision, accuracy, and the potential for sample contamination associated with the sampling and analysis process which is described in the following sections. Information on calculations necessary to evaluate the QC results is also described below.

6.4.2.1 Field Quality Control

The field QC samples that may be collected include trip blanks, field blanks, field duplicates, and equipment rinsate blanks. Table G.2-6 presents a summary of QC sample types, applicable analyses, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

6.4.2.2 Analytical Laboratory Quality Control Samples

QA/QC considerations are an integral part of analytical laboratory operations. Laboratory QA ensures that analytical methods generate data that are technically sound, statistically valid, and that can be documented. QC procedures are the tools employed to measure the degree to which these QA objectives are met.

6.4.3 Data Reduction, Verification, Validation, and Reporting

Analytical data generated by the activities described in this closure plan will be verified and validated. Data reduction is the conversion of raw data to reportable units, transfer of data between recording media, and computation of summary statistics, standard errors, confidence intervals, and statistical tests.

6.4.4 Data Reporting Requirements

Analytical results will include all pertinent information about the condition and appearance of the sample as-received. Analytical reports will include:

- a summary of analytical results for each sample;
- results from QC samples such as blanks, spikes, and calibrations;
- reference to standard methods or a detailed description of analytical procedures; and
- raw data printouts for comparison with summaries.

The laboratory will describe the analysis in sufficient detail so that the data user can understand how the sample was analyzed.

7.0 WASTE MANAGEMENT

By removing any hazardous waste or hazardous waste constituents during closure, LANL may become a generator of hazardous waste. LANL will control, handle, characterize, and dispose of all wastes generated during closure activities in accordance with this Section (7.0), LANL waste management procedures, and in compliance with applicable state, federal, and local requirements (*see* 40 CFR § 264.114). These wastes include, but are not limited to:

1. demolition debris;
2. concrete;
3. containerized waste;
4. decontamination wash water;
5. decontamination waste; and
6. soil

The different types of wastes generated at closure, including the units' decontaminated structures and related equipment, and their disposition options are listed in Table G.2-3 of this closure plan.

8.0 CLOSURE CERTIFICATION REPORT

Upon completion of the closure activities at the units, LANL will submit, by registered mail, a closure certification report (Report) for NMED review and approval. The Report will document that the units have been closed in compliance with the specifications in this closure plan. The Report will summarize all activities conducted during closure including, but not limited to:

- the results of all investigations;
- remediation waste management;
- decontamination;
- decontamination verification and soil sampling activities; and
- results of all chemical analyses and other characterization activities.

LANL will submit the Report to NMED no later than 60 days after completion of closure of the unit. NMED may require interim reports that document the progress of closure. The certification will be signed by LANL and by an independent professional engineer registered in the State of New Mexico (*see* 40 CFR § 264.115).

The report will document the units' closure and contain, at a minimum, the following information:

1. a copy of the certification pursuant to 40 CFR § 264.115;
2. any variance, and the reason for the variance, from the activities approved in this closure plan;
3. documentation of the records review and structural assessment conducted;
4. a summary of all sampling results, showing:
   a. sample identification;
   b. sampling location;
   c. data reported;
   d. detection limit for each analyte;
   e. a measure of analytical precision (*e.g.*, uncertainty, range, variance);
   f. identification of analytical procedure;
   g. identification of analytical laboratory;
5. a QA/QC statement on analytical data validation and decontamination verification;
6. the location of the file of supporting documentation, including:
   a. field logbooks;
   b. laboratory sample analysis reports;
   c. QA/QC documentation; and
   d. chain-of-custody forms;
7. storage or disposal location of hazardous waste resulting from closure activities;
8. a copy of the Human Health and Ecological Risk Assessment Reports, if a site-specific risk assessment was conducted pursuant to Section 11.5 of the Permit, for the units; and
9. a certification statement of the accuracy of the Closure Report.

Documentation supporting the independent registered professional engineer's certification must be furnished to NMED before LANL is released from the closure financial assurance requirements in 40 CFR § 264.143. If LANL leaves waste in place, they will submit to NMED a survey plat as required by 40 CFR § 264.116 in conjunction with the closure certification report.

9.0 REFERENCES

DOE 1995. *DOE Methods for Evaluating Environmental and Waste Management Samples*, DOE/EM-0089T, Rev. 2, Pacific Northwest Laboratory, Richland, Washington.

EPA 2002. *RCRA Waste Sampling Draft Technical Guidance Planning, Implementation, and Assessment*, EPA530-D-02-002, U.S. Environmental Protection Agency, Office of Solid Waste, U.S. Government Printing Office, Washington, DC.

EPA 1986 (and all approved updates). *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, EPA-SW-846, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, DC.

NIOSH 1994. *NIOSH Manual of Analytical Methods*, National Institute for Occupational Health and Safety 4th ed. Issue 1.

NMED 2010. *Los Alamos National Laboratory Hazardous Waste Facility Permit*, EPA No. NM0890010515, New Mexico Environment Department, Santa Fe, NM.

Table G.2-1
Schedule for Closure of the TA-36-8 OD Unit

Closure Activity	Schedule
Notify the Department of the initiation of closure.	Day 0
Remove all wastes including hazardous, mixed, and solid waste	No later than Day 90
Conduct records review	After initiating closure and before Structural Assessment
Conduct structural assessment	After removal of all wastes and before decontamination
Submit a request to modify the Closure Plan and the records review and structural assessment report	After conducting the records review and structural assessment and before decontamination
Complete all closure activities	No later than Day 180
Submit final Closure Report and Certification to the Department.	No later than Day 240

Note: The schedule above indicates calendar days in which the listed activities shall be completed from the day closure activities are initiated. Some activities may be conducted simultaneously.

Table G.2-2

Hazardous Waste Constituents of Concern at the TA-36-8 OD Unit[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
HE and associated compounds	D001, D003	HMX, RDX, TNT, PETN, Tertyl and Other Nitrobenzenes and Nitrotoluenes
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Semi-volatile Organic Compounds	D030, D036, F004, D038	2,4-Dinitrotoluene, Nitrobenzene, Pyridine
Volatile Organic Compounds	F001, F002, F003, F004, F005, D018, D022, D028, D029, D035; D040	Acetone, Ethanol, Benzene, Methyl ethyl ketone, Methylene Chloride, Toluene, methyl isobutyl ketone, Xylene, Ethyl Acetate, Methanol, 1,2 dichloroethane, 1,1 dichloroethylene Trichloroethylene, Chloroform
Other constituents of concern [b]		Dioxins/Furans, Perchlorates, PFAS, kerosene, and depleted uranium

[a] Based on the unit operating record.
[b] These constituents are included as other constituents of concern for purposes of closure due to uncertain relating to operation of this unit prior to 1980.
PETN = pentaerythrioltetranitrate (2,2-bis[(nitroxy)methyl]-1,3-propanediol dinitrate
HMX = cyclotetramethylene - tetranitramine
RDX = Cyclotrimethylene - trinitramine
TNT = trinitrotoluene

Table G.2-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plan (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	High Explosives Waste Treatment Facility (HEWTF) or sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Soil and tuff	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Discarded concrete	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Discarded sampling and decontamination equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

Table G.2-4

Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method [a]	Test Methods/ Instrumentation	Target Detection Limit [b]	Rationale
Metal Analysis				
Barium	6010, 7010	ICP-AES,GFAA	200 ug/L	Determine the metal concentration in the samples.
Cadmium	6010, 7010	ICP-AES,GFAA	2 ug/L	
Chromium	6010, 7010	ICP-AES,GFAA	10 ug/L	
Lead	6010, 7010	ICP-AES,GFAA	5 ug/L	
Mercury	6010, 7010, 7471B	ICP-AES,GFAA, CVAA	0.2 ug/L	
Silver	6010, 7010	ICP-AES,GFAA	10 ug/L	
Organic Analysis				
Target compound list VOCs plus 10 TICs	8260B	GC/MS	10 mg/L	Determine the VOCs concentration in the samples.
Target compound list SVOCs plus 20 TICs	8270D, 8275	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.
Other Analysis				
Perchlorates	6850	HPLC-ESI/MS or MS/MS	1 µg/L	Determine concentration of perchlorate in the samples.

[a] EPA, 1986, and all approved updates, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846).

[b] Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.

CVAA = Cold-vapor atomic absorption spectroscopy
GC/MS = gas chromatography/mass spectrometry
GFAA = Graphite furnace atomic absorption spectroscopy
ICP-AES = Inductively coupled plasma-atomic emission spectrometry
HPLC = high performance liquid chromatograph
ESI/MS = electrospray ionization/mass spectrometry
MS/MS = tandem mass spectrometry
SVOC = semi-volatile organic compound
TIC = tentatively identified compound
VOC = volatile organic compound
mg/L = milligrams per liter
ug/L = micrograms per liter.

Table G.2-5

Sample Containers[a], Preservation Techniques, and Holding Times[b]

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP/Total Metals: Barium, Cadmium, Chromium, Lead, Silver	Aqueous Media: 500-mL Wide Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO_3 to pH <2 Cool to 4 °C	180 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO_3 to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Solid Media Cool to 4 °C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	
Semi-Volatile Organic Compounds			
Target Compound Semi-volatile Organic Compounds	Aqueous Media: Four 1-L Amber Glass with Teflon-Lined Lid	Aqueous Media: Cool to 4 °C	Seven days from field collection to preparative extraction. 40 days from preparative extraction to determinative analysis.
	Solid Media: 250-mL Glass	Solid Media: Cool to 4 °C	

[a] Smaller sample containers may be required due to health and safety concerns associated with potential radiation exposure, transportation requirements, and waste management considerations.

[b] Information obtained from *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846), EPA, 1986, and all approved updates.

°C = degrees Celsius — HNO_3 = nitric acid
L=Liter — HCL-hydrochloric acid
mL = milliter — TCLP = Toxicity Characteristic Leaching Procedure

Table G.2-6

Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis[a]	Frequency	Acceptance Criteria
Trip Blank	VOC	One set per shipping cooler containing samples to be analyzed for VOCs	Not Applicable
Field Blank	VOC/SVOC, metals	One sample daily per analysis	Not Applicable
Field Duplicate	Chemical	One for each sampling sequence	Relative percent difference less than or equal to 20 percent
Equipment Rinsate Blank[b]	VOC/SVOC, metals	One sample daily	Not Applicable

[a] For VOC and SVOC analysis, if blank shows detectable levels of any common laboratory contaminant (*e.g.*, methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

[b] Collected only if reusable sampling equipment used.

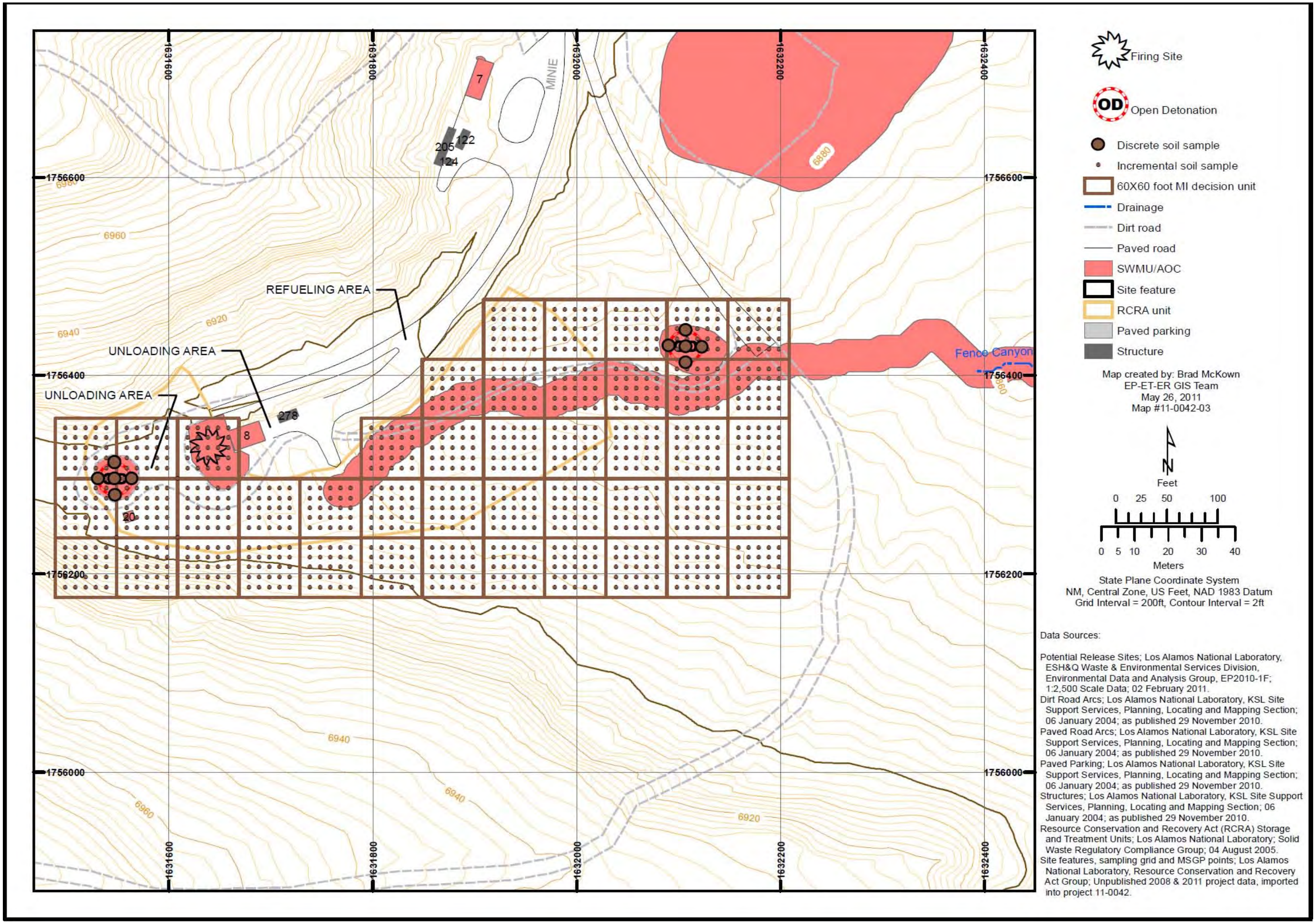

Figure G.2-1. Sampling Locations for Closure of the TA-36-8 Open Detonation Unit

ATTACHMENT G.3
TECHNICAL AREA 39-6
OPEN DETONATION UNIT
CLOSURE PLAN

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1.0 INTRODUCTION

This closure plan describes the activities necessary to close the open detonation (OD) treatment unit at Technical Area 39 (TA-39) at the Los Alamos National Laboratory (LANL), hereinafter referred to as the TA-39-6 OD Unit. The information provided in this closure plan addresses the closure requirements specified in Part 9 of the Los Alamos National Laboratory Hazardous Waste Facility Permit (NMED 2010) (the Permit), 40 CFR Part 264, Subparts G and X for hazardous waste management units operated at LANL under RCRA and the New Mexico Hazardous Waste Act.

Until closure is complete and has been certified in accordance with Permit Section 9.5, a copy of the approved closure plan or the Permit containing the plan, any approved revisions, and closure activity documentation associated with the closure will be on file with hazardous waste compliance personnel at LANL and at the Department of Energy (DOE) Los Alamos Site Office. Prior to closure of the TA-39-6 OD Unit, this closure plan may be amended in accordance with Permit Section 9.4.8, as necessary and appropriate, to provide updated sampling and analysis plans and to incorporate updated decontamination technologies. Amended closure plans will be submitted to NMED for approval prior to implementing closure activities.

The TA-39-6 OD Unit is collocated with solid waste management units not yet scheduled for clean-up; therefore, if closure performance standards listed in Section 4.1 cannot be attained, TA-39-6 OD Unit will undergo RCRA clean closure activities in conjunction with the corrective action processes at TA-39. Final closure of the TA-39-6 OD Unit will be conducted in accordance with the requirements set forth in 40 CFR 264 Subpart G and X.

2.0 DESCRIPTION OF UNIT TO BE CLOSED

This section provides an overview of past operations and waste management practices at the TA-39-6 OD Unit. It includes the location of the unit, a description of the unit and operational and waste management practices associated with the unit.

2.1 Description of the Treatment Unit

The TA-39-6 OD unit consists of a relatively flat, sand-covered area that measures approximately 40 feet by 40 feet in Ancho Canyon. Steep canyon walls rise to heights of 100 feet or more in the immediate vicinity of the TA-39-6 OD Unit, roughly forming a semicircle around the unit. The canyon walls serve to attenuate the force of the detonations. The TA-39-6 OD unit is used to treat solid and liquid hazardous explosives waste, including unexploded ordnance. The unit is used primarily for non-treatment-related experimental test detonations and is also occasionally used for treatment of explosive hazardous waste. Following waste placement at the unit, detonation operations are conducted from Building TA-39-6. Building TA-39-6 is a reinforced concrete structure extending partially beneath the detonation area.

2.2 Description of the Wastes Treated at the Unit

The TA-39-6 OD Unit has a maximum waste treatment capacity of 250 pounds of explosives waste per detonation. Up to four detonations may be performed per hour. Since 1980, an average of approximately 500 pounds of waste has been treated annually at the TA-39-6 OD unit.

The TA-39-6 OD Unit is used for thermal treatment of explosive hazardous waste and explosive-contaminated hazardous waste that exhibits the characteristic of reactivity in accordance with 40 CFR Part 265, Subpart P. The purpose of waste treatment at the unit is to remove the characteristic of reactivity by OD. OD of waste is accomplished by using a predetermined amount of explosive (fuel) to initiate the detonation. The detonation may create temperatures ranging from 4,500 to 9,000 degrees Fahrenheit (2,500 to 5,600 degrees Celsius) (Erickson et. al., 2005).

There are two basic categories of explosives waste that may be managed at the TA-39-6 OD Unit. The first category consists of explosives-contaminated waste; the second category consists of explosives waste. Generally, explosives-contaminated waste includes make-up room wastes and infrequently firing site debris. Make-up room waste can consist of explosives contaminated debris such as paper towels, gloves, swabs, and similar materials that contain no tangible pieces of explosives but are used in the preparation of shots in the preparation building. Firing site debris that is potentially contaminated with explosives consists of wood scraps, cardboard, burlap, Plexiglas®/Lexan®, plastic, glass, styrofoam, electrical cables, and metallic foils used for pin switches or metals such as target plates. Explosives waste generally includes identifiable excess explosives that are safe to handle. These materials include explosives assemblies and explosives, identifiable booster charge scrap, and any other process wastes that have the potential to react.

3.0 ESTIMATE OF MAXIMUM WASTE TREATED

Since RCRA Subtitle C regulations became effective in November 1980, an average of approximately 260 pounds of waste has been treated annually at the TA-39-6 OD Unit. Based on the 260 pound per year rate for treated wastes, it is estimated that 7,800 pounds of waste have been treated at the TA-39-6 OD Unit through 2010.

4.0 GENERAL CLOSURE INFORMATION

4.1 Closure Performance Standard

As required by Permit Section 9.2, the TA-39-6 OD Unit will be closed to meet the following performance standards:

a. Remove all hazardous waste residues and hazardous constituents; and

b. Ensure contaminated media do not contain concentrations of hazardous constituents greater than the clean-up levels established in accordance with Permit Sections 11.4 and 11.5. For soils the cleanup levels will be established based on residential use. LANL will also demonstrate that there is no potential to contaminate groundwater.

If LANL is unable to achieve either of the clean closure standards above, they will:

c. Coordinate cleanup closure activities for the TA-39-6 OD Unit with the corrective action cleanup processes at TA-39 in its entirety;

d. Comply with Closure Requirements in 40 CFR 265.113(b)(1)(ii)(C) and (2);

e. Minimize the need for further maintenance;

f. Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground, groundwater, surface waters, or to the atmosphere; and

g. Comply with the closure requirements of Permit Part 9 (Closure) and 40 CFR Part 264 Subparts G and X for miscellaneous units.

Closure of the TA-39-6 OD Unit will be deemed complete when: 1) all surfaces and equipment have been decontaminated, or otherwise properly disposed of; 2) closure has been certified by an independent, professional engineer licensed in the State of New Mexico; and 3) closure certification has been submitted to, and approved by, the NMED.

4.2 Closure Schedule

This closure plan schedule is intended to address closure requirements for the TA-39-6 OD Unit within the authorized timeframe of the Permit (see Permit Section 9.4). The following section provides the schedule of closure activities (see also Table G.3-1 of this closure plan).

Notification of closure will occur at least 45 days prior to when LANL expects to begin closure (see 40 CFR § 264.112(d)(1)). Closure activities will begin according to the requirements of 40 CFR § 264.112(d)(2). However, pursuant to 40 CFR § 264.112(e), removing hazardous wastes and decontaminating or dismantling equipment in accordance with an approved closure plan may be conducted at any time before or after notification of closure. Notification of the structural assessment (assessment), as described in Section 5.2 of this closure plan, will occur in accordance with Permit Section 9.4.6.2.

Within 100 days of the final treatment of hazardous waste, LANL will conduct the records review (review) and assessment and submit an amended closure plan, if necessary, to the NMED for review and approval as a permit modification. Upon approval of the modified closure plan, if applicable, LANL will decontaminate unit structures, surfaces, and equipment.

Decontamination verification sampling activities, and soil sampling if applicable, will be conducted to demonstrate that surfaces, related equipment, and media, if applicable, at the TA-39-6 OD Unit meet the closure performance standards in Permit Section 9.2.

All closure activities, including submittal of a final closure certification report to the NMED for review and approval, will be completed within 180 days after the final treatment of waste. Submittal of the final closure report and certification will be submitted to NMED 240 days after initiating closure. In the event that closure of the TA-39-6 OD Unit cannot proceed according to schedule, LANL will notify the NMED in accordance with the extension request requirements in Permit Section 9.4.1.1.

5.0 CLOSURE PROCEDURES

Closure activities at the TA-39-6 OD Unit will include: proper management and disposal of hazardous waste residues and contaminated surfaces and equipment associated with the unit; verification that the closure performance standards in Permit Section 9.2 have been achieved; and submittal of a final closure certification report. The following sections describe closure activities applicable to the TA-39-6 OD Unit.

5.1 Records Review and Structural Assessment

Prior to commencing closure decontamination and sampling activities, the TA-39-6 OD Unit Operating and Inspection Records will be reviewed and a structural assessment will be conducted to determine any previous finding(s) or action(s) that may influence closure activities or potential sampling locations.

5.1.1 Records Review

The TA-39-6 OD Unit Operating Record (including, but not limited to, inspection and contingency plan implementation records) will be reviewed at the time of closure and in accordance with the schedule in Section 4.2 of this closure plan. The goals of the review will be to:

1. Confirm the specific hazardous waste constituents of concern listed in Table G.3-2 of this closure plan; and
2. identify additional sampling locations (*e.g.*, locations of spills or chronic conditions identified in the TA-39-6 OD Unit Operating and Inspection Records).

A determination will be made on whether any spills or releases, defects, deterioration, damage, or hazards affecting waste containment or treatment occurred or developed during the operational life of the TA-39-6 OD Unit. If the records indicate any such incidents, LANL will amend this closure plan (Section 4.3) in order to update the Sampling and Analysis Plan (SAP) (Section 6.0) to incorporate the locations of these incidents as additional sampling locations. All additional sampling procedures, as applicable, will be included in the amended closure plan.

5.1.2 Structural Assessment

The structural assessment is an evaluation of the unit's physical condition. The assessment will include inspecting the unit for any conditions that indicate a potential for release of hazardous constituents. If the assessment reveals any evidence of a release (*e.g.*, stains), the closure plan will be amended in order to update the SAP (Section 6.0) to incorporate these additional sampling locations. All additional sampling procedures, as applicable, will be included in the amended closure plan. This assessment will be documented with photographs, drawings, and other documentation, as necessary.

5.2 Decontamination and Removal of Structures and Related Equipment

In accordance with Permit Section 9.4.3, all remaining hazardous waste residues will be removed from the TA-39-6 OD Unit. The TA-39-6 OD Unit's equipment will be decontaminated, removed, or both and managed appropriately. All waste material will be controlled, handled, characterized, and disposed of in accordance with Permit Attachment C (Waste Analysis Plan), Permit Section 9.4.5, and Facility waste management procedures.

5.2.1 Removal of Structures and Related Equipment

Building TA-39-6 will not be removed as part of closure of the TA-39-6 OD Unit, but will be assessed as part of the clean-up activities at TA-39 in its entirety. At the time of closure of TA-39, the removal of these structures will be in accordance with Section 7.0 of this closure plan. Any related equipment will be removed as part of closure of the TA-39-6 OD Unit.

5.2.2 Decontamination of Structures and Related Equipment

Equipment at the unit is not expected to be left in place at final closure of TA-39. However, if equipment, identified during the assessment, is expected to be left in place, it will be decontaminated by pressure washing or steam cleaning and sampled according to Section 6.1. The steam cleaning or pressure washing solution will consist of a surfactant detergent (*e.g.*, Alconox®) and water mixed in accordance with the manufacturer's recommendations. Portable berms or other such devices (*e.g.*, absorbent socks, plastic sheeting, wading pools) will collect excess wash water and provide complete containment during the decontamination process.

5.2.3 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during decontamination activities will be cleaned with a wash water solution. Residue, disposable equipment, and small reusable equipment that cannot be decontaminated will be containerized and managed as waste in accordance with Section 7.0.

6.0 SAMPLING AND ANALYSIS PLAN

This SAP identifies the specific sampling and analysis requirements for this unit and ensures the closure requirements of 40 CFR Part 264 Subparts G and X are met. It also describes the sampling, analysis, and quality assurance/quality control (QA/QC) methods that will be used to demonstrate that LANL has met the closure performance standards in Section 4.1 of this closure plan. LANL will comply with all the requirements in this closure plan section (6.0) as well as the requirements in Part 11.10 of the Permit.

This SAP is designed to verify decontamination of surfaces, equipment, and materials; and determine whether a release of hazardous constituents to any environmental media has occurred. It includes:

1. The hazardous waste constituents of concern listed in Table G.3-2 that will be included in the analysis for soil, wipe, and chip samples. This list includes all hazardous constituents defined as:
   a. any constituent identified in 40 CFR Part 261 Appendix VII that caused the United States Environmental Protection Agency (EPA) to list a hazardous waste in 40 CFR Part 261 Subpart D;
   b. any constituent identified in 40 CFR Part 261, Appendix VIII; or
   c. any constituent identified in 40 CFR Part 264 Appendix IX, and perchlorate.
2. The list of hazardous constituents of concern will be utilized to select the EPA approved analytical methods capable of detecting those constituents.
3. A site plan for verification and soil samples. The site plan includes:
   a. Figure G.3-1 depicting the boundaries of the unit and verification and soil sampling locations. The locations include:
      i. locations of known spills or other releases of hazardous waste or hazardous constituents during operation of the units;
      ii. other potential release locations; and
      iii. a rationale for the number and locations of samples.
4. Type of samples. The type of samples to be collected (*e.g.*, wipe, soil) and the rationale for the selection of the sample type.
5. Sampling methods including a description of the EPA-approved sampling methods and procedures that will be used to collect each type of sample as specified in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846) (EPA 1986) and other methods approved by NMED as listed within the Waste Analysis Plan (Attachment C) of the Permit.
6. A description of the approved EPA laboratory analytical methods that will be used to measure hazardous constituent concentrations (see Table G.3-4).

7. QA/QC procedures. This SAP includes a description of the QA/QC procedures that include, but are not limited to:
   a. duplicates, trip blanks, equipment blanks;
   b. a description of methods for decontamination of re-usable sampling equipment; and
   c. a description of all sample preservation, handling, labeling, and chain-of-custody procedures.

6.1 Sampling Activities

Sampling activities will be conducted to demonstrate that the units' related equipment, surfaces, and soils meet the closure performance standards in Permit Section 9.2. All samples will be collected and analyzed in accordance with the procedures in Sections 5.6.2, 5.6.3, and 5.6.4 of this closure plan. Soil samples will be collected from the TA-39-6 OD Unit according to the sampling grid shown in Figure G.3-1. These locations include, but are not limited to, soils surrounding the units; soils in the vicinity of the units; and soils at the storm water discharge point.

- Wipe sample(s) will be collected from each piece of decontaminated equipment related to the units.
- Systematic composite samples will be collected from soils within and near the unit to include topographic lows or drainages. These samples will be analyzed for volatile organic compounds, as these cannot be composited.
  - Additional discrete soil samples will also be collected from locations where contamination is detected by composite sampling.
- Discrete soil samples will be collected from soils within the unit.
- One wipe sample will be collected from each piece of decontaminated equipment related to the unit.
- One verification wipe sample will be collected from the floor at the entry way of the Building TA-39-6.

Removal of the associated structures at the TA-39-6 OD Unit will occur at the time of closure of TA-39 in its entirety. Prior to removal of the Building TA-39-6 chip samples will be collected along the concrete walls and floors.

Decontamination verification sampling activities will be conducted at the TA-39-6 OD Unit in order to verify that equipment at the unit meets the closure performance standards in Permit Section 9.2. All samples will be collected and analyzed in accordance with the procedures in Sections 5.6.2, 5.6.3, and 5.6.4 of this closure plan.

6.2 Sample Collection Procedures

Samples will be collected in accordance with Permit Section 9.4.7.1 and the procedures identified in this SAP which incorporates guidance from the EPA (EPA, 2002), DOE (DOE, 1995), and other NMED-approved procedures.

6.2.1 Surface Water and Groundwater Sampling

Surface water sampling is not included as part of the TA-39-6 closure activities because surface water compliance is demonstrated as part of compliance with the Clean Water Act (CWA) and the

National Pollutant Discharge Elimination System (NPDES) permit program. The TA-39-6 OD unit was subject to the 2008 CWA Multi-Sector General Permit (MSGP) for storm water until the modified LANL Storm water Individual Permit (IP) became effective on November 1, 2010. LANL is required to implement site-specific control measures (including BMPs) to address the non-numeric technology-based effluent limits contained in the IP, followed by confirmation monitoring against New Mexico water-quality criteria-equivalent target action levels (TALs) to determine the effectiveness of the site-specific measures. If TALs are exceeded, corrective actions detailed in the IP are initiated and additional confirmation monitoring is conducted following completion of corrective actions. Monitoring for the IP will start in 2011. Therefore, surface water sampling is not required as part of closure activities.

6.2.2 Soil Sampling

Systematic composite and discrete grab soil samples will be collected to demonstrate that soils within and in the vicinity of the TA-39-6 OD Unit meet the closure performance standards. Approximately nine decision units will be established in the area and will consist of areas no greater than 2,500 ft^2 (see Figure G.3-1). Individual soil samples (no less than 25 subsamples per decision unit) will be collected from 0-6 inch depths (soil/tuff interface). The individual soil samples will then be composited into one sample, resulting in a total of approximately nine composite samples (EPA 2002). Two discrete soil samples will be collected from random locations from within each decision unit for volatile organic compound (VOC) analysis. Discrete soil samples have been collected from nearby drainages. Discrete soil samples will be collected from within the OD pit, from depths of 0-6 inches and at the soil/rock interface. Soil samples will be analyzed to determine if hazardous constituents are present in soils at, or in the vicinity of, the units and to determine if there is an immediate threat to the environment. No soil samples have been collected to date in this area. Sampling of the drainage and bone yard at the Potrillo/Fence Canyon Aggregate Area has been completed and the Investigation Report is due to the NMED in May 2011.

Soil samples will be collected using a spade, scoop, auger, trowel or other tool as specified in approved methods for the type of analyte to be sampled (i.e., EPA 1986 or EPA 2002). All samples will be kept at their at-depth temperature or lower, protected from ultraviolet light, sealed tightly in the recommended container, and analyzed within the specific holding times listed in Table G.3-5.

6.2.3 Wipe Sampling

Surface wipe samples will be collected and analyzed to determine if residual hazardous constituents remain on surfaces and equipment at the unit. One wipe sample will also be collected from the floor, near the entry way for Building TA-39-6. Samples will be collected in accordance with the National Institute of Occupational Safety and Health (NIOSH) *Manual of Analytical Methods* (NIOSH 1994). The appropriate wipe sample method will consider the type of surface being sampled, the type of constituent being sampled, the solution used, and the desired constituent detection limit.

The NIOSH method includes wiping a 100 square centimeter area at each discrete location with a gauze wipe or Ghost Wipes, whichever is prescribed by the analytical laboratory, wetted with a liquid solution appropriate for the desired analysis (*e.g.*, deionized water for lead). For wipe sampling, guidance from the analytical laboratory will be obtained prior to wipe verification sampling to confirm that the solution chosen for each analysis is appropriate for the analysis to be conducted and that wipe sampling is a proper technique for the analysis.

6.2.4 Cleaning of Sampling Equipment

A disposable sampler is considered clean only when directly removed from a factory-sealed wrapper. Reusable decontamination equipment, including protective clothing and tools, and sampling equipment used during closure activities will be scraped, as necessary, to remove residue, cleaned prior to each use with a wash solution, rinsed several times with tap water, and air-dried to prevent cross-contamination of samples. Sampling equipment rinsate blanks will be collected and analyzed only if reusable sampling equipment is used.

6.3 Sample Management Procedures

The following sections provide a description of sample documentation, handling, preservation, storage, packaging, and transportation requirements that will be followed during the sampling activities associated with the closure.

6.3.1 Sample Documentation

Sampling personnel will complete and maintain records to document sampling and analysis activities. Sample documentation will include: sample identification numbers; chain-of-custody forms; analysis requested; sample logbooks detailing sample collection activities; and shipping forms (if necessary).

6.3.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel until the samples are relinquished to the analytical laboratory. This will ensure the integrity of the samples and provide for an accurate and defensible written record of the sampling possession and handling from the time of collection until laboratory analysis. One chain-of-custody form may be used to document all of the samples collected from a single sampling event. The sample collector will be responsible for the integrity of the samples collected until properly transferred to another person. The EPA considers a sample to be in a person's custody if it is:

1. in a person's physical possession;
2. in view of the person in possession; or
3. secured by that person in a restricted access area to prevent tampering.

The sample collector will document all pertinent sample collection data. Individuals relinquishing or receiving custody of the samples will sign, date, and note the time on the analysis request and chain-of-custody form. A chain-of-custody form must accompany all samples from collection through laboratory analysis. The analytical laboratory will return the completed chain-of-custody form to LANL and it will become part of the permanent sampling record documenting the sampling efforts.

6.3.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- a unique sample identification number;
- name of the sample collector;
- date and time of collection;

- type of preservatives used, if any; and
- location from which the sample was collected.

A custody seal will be placed on each sample container to detect unauthorized tampering with the samples. These labels will be initialed, dated, and affixed by the sample collector in such a manner that it is necessary to break the seal to open the container.

6.3.1.3 Sample Logbook

All pertinent information on the sampling effort will be recorded in a bound logbook. Information will be recorded in indelible ink and any cross outs will be made with a single line and the change initialed and dated by the author. The sample logbook will include the following information:

- the sample location;
- suspected composition;
- sample identification number;
- volume/mass of sample taken;
- purpose of sampling;
- description of sample point and sampling methodology;
- date and time of collection;
- name of the sample collector;
- sample destination and how it will be transported;
- observations; and
- name(s) of personnel responsible for the observations.

6.3.2 Sample Handling, Preservation, and Storage

Samples will be collected and containerized in appropriate pre-cleaned sample containers. Table G.3-5 presents the requirements in SW-846 (EPA 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE requirements, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate LANL documents establish the requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, waste, and defense program materials.

Off-site transportation of samples will occur via private, contract, or common motor carrier, or air carrier. All off-site transportation will be processed through LANL packaging and transportation organization unless the shipper is specifically authorized through formal documentation by that organization to independently tender shipments to common motor or air carriers.

6.4 Sample Analysis Requirements

Samples will be analyzed for all hazardous constituents listed in Table G.3-2; if at closure it has been determined that other constituents listed in Appendix VIII of 40 CFR Part 261 and in

Appendix IX of 40 CFR Part 264 were managed or treated at the units over their operational history, this closure plan will be amended to include those constituents for sampling and analysis. Samples will be analyzed by an independent laboratory using the methods outlined in Table G.3-4. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.3-4. If any of the information from these tables has changed at the time of closure, LANL will amend this closure plan to update all methods in this SAP.

6.4.1 Analytical Laboratory Requirements

The analytical laboratory will perform the detailed qualitative and quantitative chemical analyses specified in Section 6.4.2. This analytical laboratory will have:

- a documented comprehensive QA/QC program;
- technical analytical expertise;
- a document control/records management plan; and
- the capability to perform data reduction, validation, and reporting.

The selection of the analytical testing methods identified in Table G.3-4 is based on the following considerations:

- the physical form of the waste;
- constituents of interest;
- required detection limits (*e.g.*, regulatory thresholds); and
- information requirements (*e.g.*, waste classification).

6.4.2 Quality Assurance/Quality Control

All sampling and analysis will be conducted in accordance with QA/QC procedures defined by the latest revision of SW-846 (EPA 1986) or other NMED-approved procedures. Field sampling procedures and laboratory analyses will be evaluated through the use of QA/QC samples to assess the overall quality of the data produced. QC samples evaluate precision, accuracy, and the potential for sample contamination associated with the sampling and analysis process which is described in the following sections. Information on calculations necessary to evaluate the QC results is also described below.

6.4.2.1 Field Quality Control

The field QC samples that may be collected include trip blanks, field blanks, field duplicates, and equipment rinsate blanks. Table G.3-6 presents a summary of QC sample types, applicable analyses, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

6.4.2.2 Analytical Laboratory Quality Control Samples

QA/QC considerations are an integral part of analytical laboratory operations. Laboratory QA ensures that analytical methods generate data that are technically sound, statistically valid, and that can be documented. QC procedures are the tools employed to measure the degree to which these QA objectives are met.

6.4.3 Data Reduction, Verification, Validation, and Reporting

Analytical data generated by the activities described in this closure plan will be verified and validated. Data reduction is the conversion of raw data to reportable units, transfer of data between recording media, and computation of summary statistics, standard errors, confidence intervals, and statistical tests.

6.4.4 Data Reporting Requirements

Analytical results will include all pertinent information about the condition and appearance of the sample as-received. Analytical reports will include:

- a summary of analytical results for each sample;
- results from QC samples such as blanks, spikes, and calibrations;
- reference to standard methods or a detailed description of analytical procedures; and
- raw data printouts for comparison with summaries.

The laboratory will describe the analysis in sufficient detail so that the data user can understand how the sample was analyzed.

7.0 WASTE MANAGEMENT

By removing any hazardous waste or hazardous waste constituents during closure, LANL may become a generator of hazardous waste. LANL will control, handle, characterize, and dispose of all wastes generated during closure activities in accordance with this Section (7.0), LANL waste management procedures, and in compliance with applicable state, federal, and local requirements (*see* 40 CFR § 264.114). These wastes include, but are not limited to:

1. demolition debris;
2. concrete;
3. containerized waste;
4. decontamination wash water;
5. decontamination waste; and
6. soil

The different types of wastes generated at closure, including the units' decontaminated structures and related equipment, and their disposition options are listed in Table G.3-3 of this closure plan.

8.0 CLOSURE CERTIFICATION REPORT

Upon completion of the closure activities at the units, LANL will submit, by registered mail, a closure certification report (Report) for NMED review and approval. The Report will document that the units have been closed in compliance with the specifications in this closure plan. The Report will summarize all activities conducted during closure including, but not limited to:

- the results of all investigations;
- remediation waste management;
- decontamination;
- decontamination verification and soil sampling activities; and

- results of all chemical analyses and other characterization activities.

LANL will submit the Report to NMED no later than 60 days after completion of closure of the units. NMED may require interim reports that document the progress of closure. The certification will be signed by LANL and by an independent professional engineer registered in the State of New Mexico (*see* 40 CFR § 264.115).

The report will document the units' closure and contain, at a minimum, the following information:

1. a copy of the certification pursuant to 40 CFR § 264.115;
2. any variance, and the reason for the variance, from the activities approved in this closure plan;
3. documentation of the records review and structural assessment conducted;
4. a summary of all sampling results, showing:
   a. sample identification;
   b. sampling location;
   c. data reported;
   d. detection limit for each analyte;
   e. a measure of analytical precision (*e.g.*, uncertainty, range, variance);
   f. identification of analytical procedure;
   g. identification of analytical laboratory;
5. a QA/QC statement on analytical data validation and decontamination verification;
6. the location of the file of supporting documentation, including:
   a. field logbooks;
   b. laboratory sample analysis reports;
   c. QA/QC documentation; and
   d. chain-of-custody forms;
7. storage or disposal location of hazardous waste resulting from closure activities;
8. a copy of the Human Health and Ecological Risk Assessment Reports, if a site-specific risk assessment was conducted pursuant to Section 11.5 of the Permit, for the units; and
9. a certification statement of the accuracy of the Closure Report.

Documentation supporting the independent registered professional engineer's certification must be furnished to NMED before LANL is released from the closure financial assurance requirements in 40 CFR § 264.143. If LANL leaves waste in place, they will submit to NMED a survey plat as required by 40 CFR § 264.116 in conjunction with the closure certification report.

9.0 REFERENCES

DOE 1995. *DOE Methods for Evaluating Environmental and Waste Management Samples*, DOE/EM-0089T, Rev. 2, Pacific Northwest Laboratory, Richland, Washington.

EPA 2002. *RCRA Waste Sampling Draft Technical Guidance Planning, Implementation, and Assessment*, EPA530-D-02-002, U.S. Environmental Protection Agency, Office of Solid Waste, U.S. Government Printing Office, Washington, DC.

EPA 1986 (and all approved updates). *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, EPA-SW-846, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, DC.

Erickson, E.D., A. P. Chafin, T.L. Boggs, L.A. Zellmer, and B.M. Abernathy, 2005: *Emissions from the Energetic Component of Energetic Wastes During Treatment by Open Detonation*, NAWCWD TP 8603, June 2005, Naval Air Warfare Center Weapons Division, China Lake, California.

NIOSH 1994. *NIOSH Manual of Analytical Methods*, National Institute for Occupational Health and Safety 4th ed. Issue 1.

NMED 2010. *Los Alamos National Laboratory Hazardous Waste Facility Permit*, EPA No. NM0890010515, New Mexico Environment Department, Santa Fe, NM.

Table G.3-1
Schedule for Closure of the TA-39-6 OD Unit

Closure Activity	Schedule
Notify the Department of the initiation of closure.	Day 0
Remove all wastes including hazardous, mixed, and solid waste	No later than Day 90
Conduct records review	After initiating closure and before Structural Assessment
Conduct structural assessment	After removal of all wastes and before decontamination
Submit a request to modify the Closure Plan and the records review and structural assessment report	After conducting the records review and structural assessment and before decontamination
Complete all closure activities	No later than Day 180
Submit final Closure Report and Certification to the Department.	No later than Day 240

Note: The schedule above indicates calendar days in which the listed activities shall be completed from the day closure activities are initiated. Some activities may be conducted simultaneously.

Table G.3-2

Hazardous Waste Constituents of Concern at the TA-39-6 OD Unit[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
HE and associated compounds	D001, D003	HMX, RDX, TNT, PETN, Tertyl and Other Nitrobenzenes and Nitrotoluenes
Toxic Metals	D005, D006, D007, D008, D009, D011	Barium, Cadmium, Chromium, Lead, Mercury, Silver
Semi-volatile Organic Compounds	D030, D036, F004, D038	2,4-Dinitrotoluene, Nitrobenzene, Pyridine
Volatile Organic Compounds	F001, F002, F003, F004, F005, D018, D022, D028, D029, D035; D040	Acetone, Ethanol, Benzene, MEK, Methylene Chloride, Toluene, MIBK, Xylene, Ethyl Acetate, Methanol, 1,2 dichloroethane (D028), 1,1 dichloroethylene Trichloroethylene, chloroform
Other constituents of concern[b]		Dioxins/Furans, Perchlorates, PFAS, kerosene, and depleted uranium

[a] Based on the unit operating record.
[b] These constituents are included as other constituents of concern for purposes of closure due to uncertain relating to operation of this unit prior to 1980.
PETN = pentaerythrioltetranitrate (2,2-bis[(nitroxy)methyl]-1,3-propanediol dinitrate
HMX = cyclotetramethylene - tetranitramine
RDX = cyclotrimethylene - trinitramine
MEK= methyl ethyl ketone
TNT = trinitrotoluene
MIBK = 4-methyl-2-pentanone

Table G.3-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plan (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	High Explosives Waste Treatment Facility (HEWTF) or sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Soil and tuff	Non-regulated solid waste	Subtitle D landfill

Potential Waste Materials	**Waste Types**	**Disposal Options**
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Discarded concrete	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Discarded sampling and decontamination equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

Table G.3-4

Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method [a]	Test Methods/ Instrumentation	Target Detection Limit [b]	Rationale
Metal Analysis				
Barium	6010, 7010	ICP-AES,GFAA	200 µg/L	Determine the metal concentration in the samples.
Cadmium	6010, 7010	ICP-AES,GFAA	2 µg/L	
Chromium	6010, 7010	ICP-AES,GFAA	10 µg/L	
Lead	6010, 7010	ICP-AES,GFAA	5 µg/L	
Mercury	6010, 7010, 7471B	ICP-AES,GFAA, CVAA	0.2 µg/L	
Silver	6010, 7010	ICP-AES,GFAA	10 µg/L	
Organic Analysis				
Target compound list VOCs plus 10 TICs	8260B	GC/MS	10 mg/L	Determine the VOCs concentration in the samples.
Target compound list SVOCs plus 20 TICs	8270D, 8275	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.
Other Analysis				
Perchlorates	6850	HPLC-ESI/MS or MS/MS	1 µg/L	Determine concentration of perchlorate in the samples.

[a] EPA, 1986, and all approved updates, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846).

[b] Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.

CVAA = Cold-vapor atomic absorption spectroscopy
GC/MS = gas chromatography/mass spectrometry
GFAA = Graphite furnace atomic absorption spectroscopy
ICP-AES = Inductively coupled plasma-atomic emission spectrometry
SVOC = semi-volatile organic compound
TIC = tentatively identified compound
VOC = volatile organic compound
HPLC = high performance liquid chromatograph
ESI/MS = electrospray ionization/mass spectrometry
MS/MS = tandem mass spectrometry
mg/L = milligrams per liter
µg/L = micrograms per liter.

Table G.3-5

Sample Containers[a], Preservation Techniques, and Holding Times[b]

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP/Total Metals: Barium, Cadmium, Chromium, Lead, Silver	Aqueous Media: 500-mL Wide Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO_3 to pH <2 Cool to 4 °C	180 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO_3 to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Solid Media Cool to 4 °C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	
Semi-Volatile Organic Compounds			
Target Compound Semi-volatile Organic Compounds	Aqueous Media: Four 1-L Amber Glass with Teflon-Lined Lid	Aqueous Media: Cool to 4 °C	Seven days from field collection to preparative extraction. 40 days from preparative extraction to determinative analysis.
	Solid Media: 250-mL Glass	Solid Media: Cool to 4 °C	

[a] Smaller sample containers may be required due to health and safety concerns associated with potential radiation exposure, transportation requirements, and waste management considerations.

[b] Information obtained from *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846), EPA, 1986, and all approved updates.

°C = degrees Celsius
HNO_3 = nitric acid
L=Liter
HCL-hydrochlori acid
mL = milliter
TCLP = Toxicity Characteristic Leaching Procedure

Table G.3-6

Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis[a]	Frequency	Acceptance Criteria
Trip Blank	VOC	One set per shipping cooler containing samples to be analyzed for VOCs	Not Applicable
Field Blank	VOC/SVOC, metals	One sample daily per analysis	Not Applicable
Field Duplicate	Chemical	One for each sampling sequence	Relative percent difference less than or equal to 20 percent
Equipment Rinsate Blank[b]	VOC/SVOC, metals	One sample daily	Not Applicable

[a] For VOC and SVOC analysis, if blank shows detectable levels of any common laboratory contaminant (*e.g.*, methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

[b] Collected only if reusable sampling equipment used.

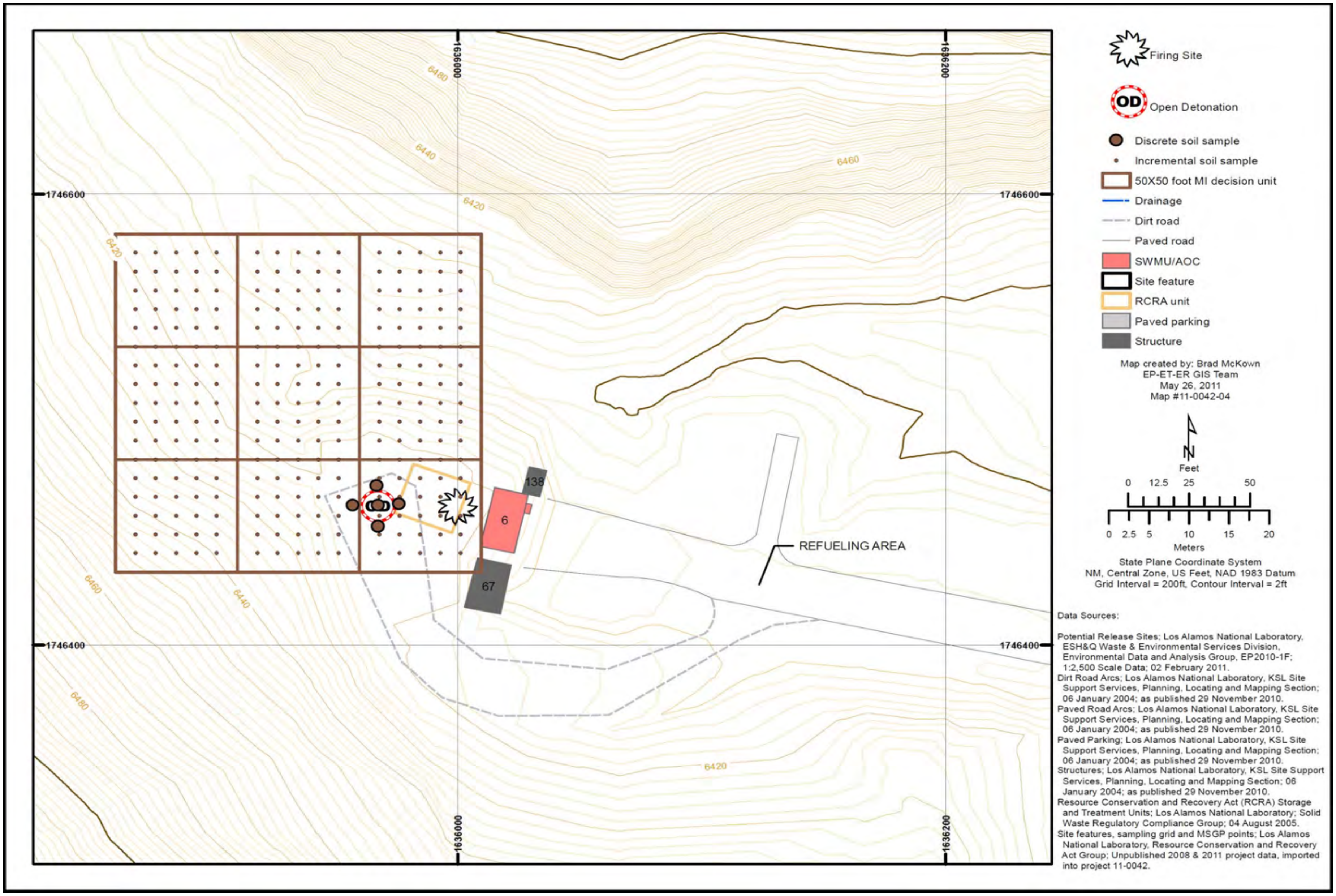

Figure G.3-1. Sampling Locations for Closure of the TA-39-6 Open Detonation Unit

ATTACHMENT G.4
TECHNICAL AREA 50, BUILDING 69
INDOOR CONTAINER STORAGE/TREATMENT UNIT
CLOSURE PLAN

Table G.4-6

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded concrete	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Sampling equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid	Subtitle D landfill

ATTACHMENT G.5
TECHNICAL AREA 50, BUILDING 69
OUTDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

Table G.5-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Asphalt and concrete	Non-regulated solid waste	Subtitle D landfill or potentially, as included in corrective action activities at Area G.
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid~~	~~Either an authorized on-site radioactive waste~~

Potential Waste Materials	Waste Types	Disposal Options
	~~waste~~	~~disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT G.6

TECHNICAL AREA 54, AREA G, PAD 1

OUTDOOR CONTAINER STORAGE UNIT

CLOSURE PLAN

Table G.6-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.

Potential Waste Materials	Waste Types	Disposal Options
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Dome structures	Non-regulated solid waste	Subtitle D landfill

Potential Waste Materials	**Waste Types**	**Disposal Options**
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Asphalt	Non-regulated solid waste	Subtitle D landfill or potentially, as included in corrective action activities at Area G.
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT G.7
TECHNICAL AREA 54, AREA G, PAD 3
OUTDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

Table G.7-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.

Potential Waste Materials	Waste Types	Disposal Options
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Dome structures	Non-regulated solid waste	Subtitle D landfill

Potential Waste Materials	Waste Types	Disposal Options
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Asphalt	Non-regulated solid waste	Subtitle D landfill or potentially, as included in corrective action activities at Area G.
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT G.8

TECHNICAL AREA 54, AREA G, PAD 5

OUTDOOR CONTAINER STORAGE UNIT

CLOSURE PLAN

Table G.8-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Dome structures	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Asphalt	Non-regulated solid waste	Subtitle D landfill or potentially, as included in corrective action activities at Area G.
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT G.9

TECHNICAL AREA 54, AREA G, PAD 6

OUTDOOR CONTAINER STORAGE UNIT

CLOSURE PLAN

Table G.9-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Verification water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	RLWTF

Table G.9-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.

Table G.9-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Dome structures	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Asphalt	Non-regulated solid waste	Subtitle D landfill or potentially, as included in corrective action activities at Area G.
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

ATTACHMENT G.10
TECHNICAL AREA 54, AREA G, PAD 9
OUTDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

Table G.10-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.

Potential Waste Materials	Waste Types	Disposal Options
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Dome structures	Non-regulated solid waste	Subtitle D landfill

Potential Waste Materials	Waste Types	Disposal Options
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Asphalt	Non-regulated solid waste	Subtitle D landfill or potentially, as included in corrective action activities at Area G.
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT G.11

TECHNICAL AREA 54, AREA G, PAD 10

OUTDOOR CONTAINER STORAGE UNIT

CLOSURE PLAN

Table G.11-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.

Potential Waste Materials	Waste Types	Disposal Options
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

Potential Waste Materials	Waste Types	Disposal Options
Asphalt	Non-regulated solid waste	Subtitle D landfill or potentially, as included in corrective action activities at Area G.
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT G.12
TECHNICAL AREA 54, AREA G, PAD 11
OUTDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

Table G.12-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.

Table G.12-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

Table G.12-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Dome structures	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Asphalt	Non-regulated solid waste	Subtitle D landfill or potentially, as included in corrective action activities at Area G.
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT G.13
TECHNICAL AREA 54, AREA G, STORAGE SHED 8
INDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

Table G.13-3

Potential Waste Materials, Waste Types, and Disposal Options

Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

Table G.13-3

Waste Materials, Waste Types, and Disposal Options

Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded concrete	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Sampling equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT G.14

TECHNICAL AREA 54, AREA G, BUILDING 33

INDOOR CONTAINER STORAGE UNIT

CLOSURE PLAN

Table G.14-2

Potential Waste Materials, Waste Types, and Disposal Options

Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Dome structures	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.

Waste Materials	Waste Types	Disposal Options
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Asphalt	Non-regulated solid waste	Subtitle D landfill or potentially, as included in corrective action activities at Area G.
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT G.15
TECHNICAL AREA 54, AREA L
OUTDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

Table G.15-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Dome structures	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.

Potential Waste Materials	Waste Types	Disposal Options
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Asphalt	Non-regulated solid waste	Subtitle D landfill or potentially, as included in corrective action activities at Area G.
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT G.16
TECHNICAL AREA 54 WEST, BUILDING 38
INDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

Table G.16-4

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste~~

Figure G.16-4 (cont.)

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
		~~disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded concrete	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Sampling equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

ATTACHMENT G.17
TECHNICAL AREA 54, WEST
OUTDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

Table G.17-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Asphalt	Non-regulated solid waste	Subtitle D landfill or potentially, as included in corrective action activities at Area G.
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid~~	~~Either an authorized on-site radioactive waste~~

Potential Waste Materials	Waste Types	Disposal Options
	~~waste~~	~~disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT G.18
TECHNICAL AREA 55, BUILDING 4 ROOM B40
INDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

Table G.18-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste~~

Table G.18-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
		~~disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded concrete	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Sampling equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

ATTACHMENT G.19

TECHNICAL AREA 55, BUILDING 4 ROOM K13

INDOOR CONTAINER STORAGE UNIT

CLOSURE PLAN

Table G.19-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded concrete	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards,

Potential Waste Materials	Waste Types	Disposal Options
		if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Sampling equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.

ATTACHMENT G.20
TECHNICAL AREA 55, BUILDING 4, ROOM B05
INDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

Table G.20-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste~~

Table G.20-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	**Waste Types**	**Disposal Options**
		~~disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded concrete	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Sampling equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

ATTACHMENT G.21

TECHNICAL AREA 55, BUILDING 4, ROOM B45

INDOOR CONTAINER STORAGE UNIT

CLOSURE PLAN

Table G.21-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste~~

Potential Waste Materials	Waste Types	Disposal Options
		~~disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded concrete	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Sampling equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill

ATTACHMENT G.22
TECHNICAL AREA 55, BUILDING 4, VAULT
INDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

Table G.22-3

Waste Materials, Waste Types, and Disposal Options

Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

Table G.22-3

Waste Materials, Waste Types, and Disposal Options

Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded concrete	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Sampling equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT G.23

TECHNICAL AREA 55, BUILDING 4, ROOM 401

INDOOR STORAGE TANK UNIT

CLOSURE PLAN

Table G.23-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste~~

Table G.23-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
		~~disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded concrete	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Sampling equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

ATTACHMENT G.24

TECHNICAL AREA 55, BUILDING 4, ROOM 401

INDOOR MIXED WASTE STABILIZATION TREATMENT UNIT

CLOSURE PLAN

Table G.24-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

Table G.24-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded concrete	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Sampling equipment	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill

ATTACHMENT G.25
TECHNICAL AREA 55, 0355 PAD
CLOSURE PLAN

Table G.25-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)

Table G.25-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.

Table G.25-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

Table G.25-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Concrete	Non-regulated solid waste	Subtitle D landfill or potentially, as included in corrective action activities at Area G.
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT G.26
TECHNICAL AREA 55
OUTDOOR STORAGE PAD
CLOSURE PLAN

Table G.26-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal~~

Table G.26-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	**Waste Types**	**Disposal Options**
		~~facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Asphalt	Non-regulated solid waste	Subtitle D landfill or potentially, as included in corrective action activities at Area G.

Table G.26-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT G.27
TECHNICAL AREA 63
TRANSURANIC WASTE FACILITY
CLOSURE PLAN

Table G.27-2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA, or an authorized off-site radioactive waste disposal facility.[a]~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D mixed waste landfill or the WIPP, as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D mixed waste landfill or WIPP, as appropriate.
Verification water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	RLWTF
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D mixed waste landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled

Potential Waste Materials	Waste Types	Disposal Options
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA, or an authorized off-site radioactive waste disposal facility.[a]~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D mixed waste landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA, or an authorized off-site radioactive waste disposal facility.[a]~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D mixed waste landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA , or an authorized off-site radioactive waste disposal facility.[a]~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D mixed waste landfill or WIPP, as appropriate.
Storage Structures	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.

Potential Waste Materials	Waste Types	Disposal Options
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA, or an authorized off-site radioactive waste disposal facility.~~ [a]
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D mixed waste landfill or WIPP, as appropriate.
Concrete Pad	Non-regulated solid waste	Subtitle D landfill or potentially, re-use/recycle
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA, or an authorized off-site radioactive waste disposal facility.~~ [a]
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D mixed waste landfill or WIPP, as appropriate.

[a] This description of the disposal option for low level waste may be subject to revision pending the resolution of the LANL Appeal of the November 2010 LANL Hazardous Waste Facility Permit.

ATTACHMENT G.28 CLOSURE PLAN OPEN BURNING TREATMENT UNIT TECHNICAL AREA 16-388 FLASH PAD

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1.0 INTRODUCTION

This closure plan describes the activities necessary to close one of the hazardous waste open burning treatment units at Technical Area (TA) 16 at the Los Alamos National Laboratory (LANL or the Facility), hereinafter referred to as the "TA-16-388 Flash Pad" or "the unit". The information provided in this closure plan addresses the closure requirements specified in the Code of Federal Regulations (CFR), Title 40, Part 265, Subparts G and P for the thermal treatment units operated at the Facility under the Resource Conservation and Recovery Act (RCRA) and the New Mexico Hazardous Waste Act. Closure of the open burning treatment unit will be completed in accordance with Section 4.1 of this closure plan.

2.0 DESCRIPTION OF UNIT TO BE CLOSED

TA-16 is located in the southwestern quadrant of the Facility at the West end of the Pajarito Plateau near the foothills of the Jemez Mountains. It is managed by the owner/operator's high explosives engineering personnel who are responsible for the safe treatment, storage, and handling of explosives waste and explosives-contaminated wastes generated by the explosives production facilities at LANL.

2.1 Description of the Unit and the Wastes Treated at the Unit

The TA-16 Burn Ground is located in the northeast corner of TA-16. It is located on the mesa and drains to the north, east, and south and is bordered on the northern side by Cañon de Valle and on the southern side by Water Canyon.

The OB unit, known as the TA-16-388 Flash Pad, consists of a 22-foot (ft) by 22-ft concrete pad set on a secondary containment area. The base of the pad is 12 inches thick. The entire concrete pad is on a 45-mil Hypalon liner, which is 6 inches below the bottom of the pad and curved up to ground level on all 4 sides, extending out 2 ft from the pad perimeter. Inset one foot from the edge of the concrete pad along the two sides and back is a 3-ft-high, 8-inch-thick, integrally-poured concrete wall. The pad is slanted down toward the back concrete wall. The TA-16-388 Flash Pad is also equipped with a retractable steel cover that covers the unit when not in use (Figure G.28-1). The unit is surrounded by a chain-link fence and brick retaining wall. An entry gate is located directly in front of the loading area.

Three 5-ft long forced air propane burners with adjustable mounts are mounted on the concrete wall. These propane burners provide the heat source for treatment activities at the unit. A burner is mounted outside the wall on each side and the back of the pad. One to three burners can be used, depending on the amount and configuration of the material to be treated. Most treatment events utilize two burners. The total capacity of the propane supply system is approximately 7 million British thermal units per hour (BTU/hr). Therefore, the output of each burner is dependent on how many are used for a burn. Usually, they are operated at approximately 2 million BTU/hr. This provides adequate heat to bring the material being flashed to a temperature sufficient to destroy explosives, typically to a temperature above 400 degrees centigrade (ºC) (see Section 2.2.3). The burners and other components are maintained, modified, and/or replaced, as needed to ensure proper operation and treatment effectiveness.

The TA-16-388 Flash Pad is used to treat dry explosives; wet explosives; and waste that is contaminated with explosives to destroy the characteristic of reactivity (D003). Descriptions of waste streams that may be treated by OB at the unit are discussed in Section C.3.1.4 of Attachment C, *Waste Analysis Plan*. The maximum treatment capacity of the TA-16-388 Flash Pad is 200 pounds (lbs) of explosives for each treatment; however, burns are usually much smaller to assure that all materials are sufficiently heated to destroy the explosives. The maximum treatment capacity for contaminated liquids (e.g., solvent) is approximately 100 gallons. However, the amount of liquid waste treated per burn is adjusted to the amount of liquid that can be treated in a single day. This amount is usually 5 to 30 gallons, considerably less than the maximum treatment capacity. Additionally, the treatment quantity is limited to the quantity of waste treated and does not include the quantity of fuel (i.e. propane) or the weight of metal equipment when a large piece of equipment is treated for explosives contamination.

The TA-16-388 Flash Pad is used exclusively for OB waste treatment operations, and no other activities. Following waste placement at the unit, open burning operations are conducted from Building 16-389 (the control building). Operations at the unit require visual surveys and post-burn covering of the unit. This practice minimizes the potential for precipitation contacting untreated hazardous waste, if any exists.

3.0 ESTIMATE OF MAXIMUM WASTE TREATED

The maximum treatment capacity of explosives waste at the TA-16-388 Flash Pad was 1,000 pounds per burn or 50 gallons per burn until 2012, when it was reduced to 200 pounds per burn. Additionally, large pieces of equipment that are flashed at the unit may weigh in excess of 10,000 pounds. Only the estimated quantity of explosives is counted as the quantity treated by OB.

4.0 GENERAL CLOSURE INFORMATION

4.1 Closure Performance Standard

The TA-16-388 Flash Pad will be closed to meet the following performance standards (40 CFR § 265.111):

- minimize the need for further maintenance;
- control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters, or to the atmosphere; and
- comply with the closure requirements of 40 CFR Part 265 Subparts G and P.

This will be accomplished through one of two methods:

a) ensure that contaminated media do not contain concentrations of hazardous constituents that are greater than the clean-up levels established in the *New Mexico Environment Department Risk Assessment Guidance for Site Investigations and Remediation* (updated 2012) (NMED, 2012), and in LANL's *Screening Level Ecological Risk Assessment Methods* (LANL, 2012a) (as updated and approved by the NMED). For soils, the cleanup levels shall be established based on residential use; or

b) conduct a human health and ecological risk evaluation utilizing the screening levels described above and utilizing the objectives set forth in the *New Mexico Environment Department Risk Assessment Guidance for Site Investigations and Remediation* (NMED, 2012).

If the owner/operator is unable to achieve any one of the risk-based clean closure standards in (a) or (b) above, they must:

- control the migration of hazardous waste residues, hazardous constituents, and, as applicable, contaminated media such that they do not pose an unacceptable risk to human health and the environment; and
- control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate,

contaminated run-off, or hazardous waste decomposition products to the ground, groundwater, surface waters, or to the atmosphere.

The owner/operator shall demonstrate that the unit does not pose an unacceptable risk by complying with the post closure requirements in 40 CFR § 265.117 as well as conduct the following to protect human health and the environment:

- maintain the integrity and effectiveness of the unit by making repairs necessary to correct the effects of erosion, animal intrusion, or other events that compromise the unit;
- maintain surface water controls to prevent run-on and run-off from eroding or otherwise causing damage;
- conduct corrective action as necessary to protect human health and the environment;
- maintain fencing, security signs and locks;
- maintain training, operating, inspection, and monitoring, and other required records; and
- submit an annual report to the NMED providing the results of the required inspections, sampling results, and a summary of any needed repairs and whether repairs were effective.

Closure of the unit will be deemed complete when: 1) all surfaces and equipment have been decontaminated, or otherwise properly managed as waste; 2) closure has been completed in accordance with the closure plan and been certified by an independent, professional engineer licensed in the State of New Mexico; and 3) closure certification has been submitted to, and approved by, the NMED.

4.2 Closure Schedule

This closure plan schedule is intended to address the closure requirements for the TA-16-388 Flash Pad. The following section provides the schedule of closure activities (see also Table G.28-1 in this closure plan).

Closure activities will begin according to the requirements in 40 CFR § 265.112 (d)(2). However, pursuant to 40 CFR § 265.112(e), removing hazardous wastes decontaminating or dismantling equipment, in accordance with an approved closure plan, may be conducted at any time before or after notification of closure.

The owner/operator shall complete the records review (review) and structural assessment (assessment), as described in Sections 5.1.1 and 5.1.2 of this closure plan, and shall notify the Department at least 20 days prior to the scheduled assessment so the Department may have the opportunity to participate in the assessment. The notification shall include the date on which the owner/operator expects to conduct the assessment.

The owner/operator shall complete all closure activities, including submittal of a final closure certification report to the Department for review and approval, in accordance with this closure plan (*see* 40 CFR § 265.113(b)). In the event that this timeframe cannot be met, the owner/operator may request from the Department an extension in accordance with 40 CFR § 265.113(c)(2) (*see* 40 CFR § 265.113(b)(1)(i)).

4.3 Amendment of the Closure Plan

The owner/operator may amend this closure plan in accordance with the requirements in 40 CFR § 265.112(c), which is incorporated herein by reference. If the results of the review or assessment require any changes to this closure plan (*e.g.*, the sampling and analysis plan), the owner/operator shall submit an amended closure plan to the Department, for review and approval, in accordance with this Section (4.3).

5.0 CLOSURE PROCEDURES

Closure activities at the unit shall include: a physical review of the unit and a review of the unit's records; proper management and disposal of hazardous waste residues, if applicable, contaminated surfaces and equipment associated with the unit; sampling to verify the closure performance standards in Section 4.1 of this closure plan have been achieved; and submittal of a final closure certification report. The following sections describe more specifically these closure activities applicable to the unit.

5.1 Records Review and Structural Assessment

Before starting closure decontamination and sampling activities, the Operating and Inspection Records for the unit will be reviewed and a structural assessment will be conducted to determine any previous finding(s) or action(s) that may influence closure activities or potential sampling locations. Specific results of the records review and structural assessment will be included in the closure certification report.

5.1.1 Records Review

The Facility Operating Record (including, but not limited to, inspection and contingency plan implementation records) shall be reviewed at the time of closure and in accordance with the schedule in Section 4.2 of this closure plan. The goals of the review will be to:

a. confirm the specific hazardous waste constituents of concern listed in Table G.28-2;

b. update the above-mentioned list as necessary;

c. update the estimated quantity of waste treated in Section 3.0; and

d. confirm additional sampling locations (*e.g.*, locations of spills or chronic conditions identified in the Operating and Inspection Records).

The owner/operator shall determine whether any spills or releases, defects, deterioration, damage, or hazards (*e.g.*, damage to the concrete pad or other unit materials) affecting waste containment or treatment occurred or developed during the operational life of the unit during which hazardous waste was treated. If the records indicate any such incidents, the owner/operator shall amend this closure plan (*see* Section 4.3) in order to update the sampling and analysis plan (SAP) (*see* Section 6.0) to incorporate the locations of these incidents as additional sampling locations. All additional sampling procedures, as applicable, shall be included in the amended closure plan.

5.1.2 Structural Assessment

The structural assessment is an assessment of the unit's physical condition. The assessment will include inspecting the unit's concrete pad (for any existing cracks or conditions that indicate a potential for release of hazardous constituents) and assessing the unit for evidence of any releases. If the assessment reveals any evidence of a release (*e.g.*, stains) or damage (*e.g.*, cracks, gaps, chips) to the pad, the owner/operator shall amend this closure plan (*see* Section 4.3) in order to update the SAP (*see* Section 6.0) to incorporate these additional sampling locations. All additional sampling procedures, as applicable, shall be included in the amended closure plan. This assessment will be documented with photographs and drawings, as necessary.

5.2 Decontamination and Removal of Structures and Equipment

In accordance with 40 CFR § 265.112(b)(4) (which is incorporated herein by reference), the unit's related equipment and materials (*e.g.*, concrete pad) will be decontaminated, or removed and managed according to Section 7.0 of this closure plan. The concrete pad and liner will remain at the unit and will be reused for other programmatic activities. All surfaces and related equipment that are removed and not intended for recycle will not require decontamination, will be considered solid and potentially hazardous waste when removed, and will be disposed of in accordance with Section 7.0. Decontamination activities will ensure the removal of all hazardous waste residues and hazardous waste constituents from the unit to meet the closure performance standards in Section 4.1.

5.2.1 Removal of Structures and Related Equipment

The burn tray, the three propane burners, and the metal retractable cover (and its mechanisms) will all be removed from the unit at closure (but after the structural assessment) and may be recycled.

5.2.2 Decontamination of Structures and Related Equipment

The unit's concrete pad will be decontaminated by hot water/steam cleaning or pressure washing with a solution consisting of a surfactant detergent (*e.g.*, Alconox®) and water mixed in accordance with the manufacturer's recommendations. Portable berms or other devices (*e.g.*, absorbent socks, plastic sheeting, wading pools) will collect excess wash water and provide containment during the decontamination process; however, no excess water is expected to be generated. If results of the solid concrete chip or soil samples (see Section 6.1) from below the pad indicate contamination from the unit, the entire concrete pad will be removed and disposed of according to Section 7.0.

No equipment at the unit is expected to be left in place. However, if equipment, identified during the assessment, is expected to be left in place, it will be decontaminated by pressure washing or hot water and sampled according to Section 6.1.

5.2.3 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during decontamination activities will be cleaned with a wash water solution that consists of a surfactant detergent and water mixed in accordance with the manufacturers recommendations. The tools and equipment will be wiped down with the wash water solution and rinsed. Residue and disposable equipment will be containerized, characterized, and managed as waste in accordance with Section 7.0.

6.0 SAMPLING AND ANALYSIS PLAN

This SAP identifies the specific sampling and analysis requirements for this unit and describes the sampling, analysis, and quality assurance/ quality control (QA/QC) methods that will be used to demonstrate that the owner/operator has met the closure performance standards in Section 4.1. The owner/operator shall comply with all the requirements in Section 6.0.

This SAP is designed to verify decontamination of surfaces, equipment, and materials; and determine whether a release of hazardous constituents to any environmental media has occurred. The SAP includes:

1) A list of hazardous constituents of concern (*see* Table G.28-2) for which soil and chip samples will be analyzed. This list includes all hazardous constituents defined as:

   a) any constituent identified in 40 CFR Part 261 Appendix VII that caused the United States Environmental Protection Agency (USEPA) to list a hazardous waste in 40 CFR Part 261 Subpart D;

   b) any constituent identified in 40 CFR Part 261, Appendix VIII; or

   c) any constituent identified in 40 CFR Part 264 Appendix IX, perchlorate, and nitrates.

2) The list of hazardous constituents of concern shall be utilized to select the analytical methods capable of detecting those constituents.

3) A site plan for verification and soil samples. The site plan includes Figure G.28-2 depicting the boundaries of the unit and verification and soil sampling locations. The locations include ten grab sample locations that represent locations immediately around the unit, locations of known spills, or other releases of hazardous waste or hazardous constituents during operation of the unit, and locations where run-off likely occurred from the unit.

4) The type of samples to be collected (*e.g.*, wipe, soil, surface water) and the rationale for the selection of the sample type.

5) Sampling methods including a description of the approved EPA sampling methods and procedures that will be used to collect each type of sample as specified in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846) (EPA, 1986).

6) A description of the approved EPA SW-846 laboratory analytical methods that will be used to measure hazardous constituent concentrations (see Table G.28-4).

7) description of the quality assurance and quality control (QA/QC) procedures that include, but are not limited to:

   a) field duplicates, trip blanks, equipment blanks;

   b) a description of methods for decontamination of re-usable sampling equipment; and

   c) a description of all sample preservation, handling, labeling, and chain-of-custody procedures.

6.1 Sampling Activities

Sampling activities will be conducted in order to demonstrate that unit-related equipment and soils in and around the unit meet the closure performance standards in Section 4.1. All samples will be collected and analyzed in accordance with the procedures in Sections 6.2, 6.3, and 6.4 of this closure plan.

- All metal equipment will be flashed prior to shipment off-site.
- The concrete pad will be hot water/steam cleaned or pressure washed.
- Soil samples will be collected from locations in and around the unit from the sample locations depicted in Figure G.28-2.

6.2 Sample Collection Procedures

Samples will be collected in accordance with the procedures identified in this SAP which incorporates guidance from the EPA (EPA, 1986 and EPA, 2002), DOE (DOE, 1995), and other Department-approved procedures. Before samples are collected, the sampling plan must be approved by the area Explosives Safety Officer. The Explosives Safety Officer will evaluate the area to determine the potential for detonable explosives or explosives contamination, and whether or not any extracted samples may be released from the area without initial internal explosives analysis.

6.2.1 Surface Water and Groundwater Sampling

Surface water sampling and groundwater sampling are included as part of the TA-16-388 Flash Pad closure activities because compliance for these media are demonstrated as part of compliance with the Clean Water Act (CWA) and the National Pollutant Discharge Elimination System (NPDES). Sample locations, analytical suites, and sampling schedules for the groundwater monitoring network at LANL are identified in the LANL Interim Facility-Wide Groundwater Monitoring Plan (IFGMP) for the 2013 Monitoring Year, October 2012-September 2013 (LANL, 2012b). The IFGMP is a document that is updated annually with approval by NMED in accordance with the March 1, 2005 (and modified in 2008) Compliance Order on Consent.

6.2.2 Soil Sampling

Soil samples will be collected from 10 locations surrounding the unit. Ten samples will be collected from the top two inches of soil and ten samples will be collected from a 6-10 inch depth. The soil sample locates are based on areas of potential deposition from air to soil and areas of potential storm water runoff.

Soil samples will be collected using a non-ferrous spade, scoop, auger, trowel, or other tool as specified in approved methods for the type of analyte to be sampled (*i.e.*, EPA 1996 or 2002). The sample collection process will be completed in accordance with American Society for Testing and Materials (ASTM), Active Standard D4823-95 (2008) Standard Guide for Core Sampling and ASTM D5633-04 (2008) for scoop sampling. Global positioning system (GPS) data utilizing Trimble GeoExplorer Unit will be collected for each sample location.

Soil sample analysis will include the following:

- 10 surface (0-2 inch depth) samples and 2 subsurface samples (6-10 inch depth) at TA-16 to be analyzed for:
    - Target analyte list (TAL) metals analysis 24 analytes using *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)* Methods 6010B, 6020 (inductively coupled plasma – mass spectrometry), and 7471A (cold-vapor technique for mercury), collected in a 250 milliliter (mL) polyethylene container;
    - Dioxins/Furans analysis for 26 target compounds using SW-846 Method 8290A (high resolution gas chromatography/mass spectrometry (HRGC/MS)), collected in two 125 mL glass containers;
    - High explosives analysis for 24 target compounds using SW-846 Method 8321A (high performance liquid chromatography/thermospray/mass spectrometry) with a modification to add explosives compounds generated specifically at LANL, collected in a 500 mL amber glass container;

- Analysis for 89 target semi-volatile organic compounds (SVOCs) using SW-846 Method 8270C (GC/MS), collected in a 500 mL amber glass container;
- Analysis for 88 target volatile organic compounds (VOCs) using SW-846 Method 8260B (GC/MS), collected in a 125 mL amber glass container; and
- Perchlorate anion (ClO_4^-) using SW-846 Method 6850 (HPLC/electrospray ionization/MS), collected in a 250 mL polyethylene container.

- Field quality control samples: One field duplicate soil sample will be collected for each analytical suite. A single trip blank for VOC analysis will be submitted per day per shipping cooler.

The samples will be shipped to and analyzed by a LANL-contracted independent analytical laboratory using the methods described above. Results from the sample collection activity will be submitted with the closure certification report.

6.2.3 Solid Chip Sampling

Solid chip samples will be collected from and analyzed to verify if residual hazardous constituents remain on the concrete pad and side walls of the unit. Any non-porous inclusions from the sampling location will be removed by brushing or wiping. Using a chisel, drill, hole saw, or similar tool, a minimum 100 grams of the sample will be collected to a depth of 2 centimeters or to an alternate depth specified in the assessment. The material will be transferred to an appropriate container and the holding time and the preservation techniques to be used for each analysis will be selected from those listed on Table G.28-5. A total of three chip samples will be collected and analyzed for:

- High explosives analysis for 24 target compounds using SW-846 Method 8321A (high performance liquid chromatography/thermospray/mass spectrometry) with a modification to add explosives compounds generated specifically at LANL, collected in a 500 mL amber glass container; and
- Analysis for 89 target semi-volatile organic compounds (SVOCs) using SW-846 Method 8270C (GC/MS), collected in a 500 mL amber glass container.

6.2.4 Cleaning of Sampling Equipment

A disposable sampler is considered clean only when directly removed from a factory-sealed wrapper. Reusable decontamination equipment, including protective clothing and tools, and sampling equipment used during closure activities will be scraped, as necessary, to remove residue, cleaned prior to each use with a wash solution, rinsed several times with tap water, and air-dried to prevent cross-contamination of samples. Sampling equipment rinsate blanks will be collected and analyzed only if reusable sampling equipment is used.

6.3 Sample Management Procedures

The following sections provide a description of sample documentation, handling, preservation, storage, packaging, and transportation requirements that will be followed during the sampling activities associated with the closure.

6.3.1 Sample Documentation

Sampling personnel will complete and maintain records to document sampling and analysis activities. Sample documentation will include sample identification numbers, chain-of-custody forms, analysis requested, sample logbooks detailing sample collection activities, and shipping forms (if necessary).

6.3.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel and sample management personnel until the samples are relinquished to the analytical laboratory. Chain of custody protocols will ensure the integrity of the samples and provide for an accurate and defensible written record of the sampling possession and handling from the time of collection until laboratory analysis. One chain-of-custody form may be used to document all of the samples collected from a single sampling event. The sample collector will be responsible for the integrity of the samples collected until properly transferred to another person. The EPA considers a sample to be in a person's custody if it is:

a. in a person's physical possession;

b. in view of the person in possession; or

c. secured by that person in a restricted access area to prevent tampering.

The sample collector will document all pertinent sample collection data. Individuals relinquishing or receiving custody of the samples will sign, date, and note the time on the analysis request and chain-of-custody form. A chain-of-custody form must accompany all samples from collection through laboratory analysis. The analytical laboratory will return the completed chain-of-custody form to the Facility and it will become part of the permanent sampling record documenting the sampling efforts.

6.3.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

a. a unique sample identification number;

b. name of the sample collector;

c. date and time of collection;

d. type of preservatives used, if any; and

e. location from which the sample was collected.

A custody seal will be placed on each sample container to detect unauthorized tampering with the samples. These labels must be initialed, dated, and affixed by the sample collector in such a manner that it is necessary to break the seal to open the container.

6.3.1.3 Sample Logbook

All pertinent information on the sampling effort must be recorded in a bound logbook. Information must be recorded in ink and any cross-outs must be made with a single line with the change initialed and dated by the author. Any deviations from the sampling plan will be noted in the sample logbook and reported in the closure certification report. The sample logbook will include the following information:

a. the sample location;

b. suspected composition;

c. sample identification number;

d. volume/mass of sample taken;

e. purpose of sampling;

f. description of sample point and sampling methodology;

g. date and time of collection;

h. name of the sample collector;

i. sample destination and how it will be transported;

j. observations; and

k. name(s) of personnel responsible for the observations.

6.3.2 Sample Handling, Preservation, and Storage

Samples will be collected and containerized in appropriate pre-cleaned sample containers. Table G.28-5 presents the requirements in SW-846 (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate Facility documents establish the requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, waste, and defense program materials.

The samples are maintained at appropriate temperatures after collection and throughout the shipping process. All samples are chilled to 2 degrees Celsius before shipment occurs. Samples are then wrapped, placed in the DOT approved shipping container with ample blue ice to hold the required temperature. Temperature blanks are placed in the cooler and sealed with custody tape. Off-site transportation of samples will occur via contract, or common motor carrier, air carrier, or freight. All off-site transportation will be processed through the Facility packaging and transportation organization unless the shipper is specifically authorized through formal documentation by that organization to independently tender shipments to common motor or air carriers. All shipments are sent overnight delivery. Once received, the analytical laboratory verifies that the custody tape is still intact and measures the temperature of the cooler. All the information is recorded and presented in the analytical data package. For all discrepancies the sender is notified for resolution.

6.4 Sample Analysis Requirements

Samples will be analyzed for all the hazardous constituents listed in Table G.28- 2. These constituents have been determined to be applicable constituents listed in Appendix VIII of 40 CFR Part 261 and in Appendix IX of 40 CFR Part 264 that were managed or treated at the unit over its operational history. If new information is discovered during the records review, this closure plan shall be amended to include additional constituents for sampling and analysis. Samples will be analyzed by an independent laboratory using the methods outlined in Table G.28-4. Analytes, test methods and instrumentation, estimated quantitation limits, and rationale for metals and organic analyses are presented in Table G.28-4. If any of the information from these tables has changed at the time of closure, the owner/operator will amend this closure plan to update all methods in this SAP.

6.4.1 Analytical Laboratory Requirements

The analytical laboratory will perform the detailed qualitative and quantitative chemical analyses specified in Section 6.4.2. The analytical laboratory will have:

a. a documented comprehensive QA/QC program;

b. technical analytical expertise;

c. a document control/records management plan; and

d. the capability to perform data reduction, validation, and reporting.

The selection of the analytical testing methods identified in Table G.28-4 is based on the following considerations:

a. the physical form of the waste;

b. constituents of interest;

c. required detection limits (*e.g.*, regulatory thresholds); and

d. information requirements (*e.g.*, waste classification).

6.4.2 Quality Assurance/Quality Control

All sampling and analysis will be conducted in accordance with quality assurance (QA)/quality control (QC) procedures defined by the latest revision of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (*SW-846*) (EPA, 1986) or other Department-approved procedures. Field sampling procedures and laboratory analyses will be evaluated through the use of QA/QC samples to assess the overall quality of the data produced. QC samples evaluate precision, accuracy, and the potential for sample contamination associated with the sampling and analysis process which is described in the following sections. Information on calculations necessary to evaluate the QC results is also described below.

6.4.2.1 Field Quality Control

The field QC samples that will be collected include trip blanks, and field duplicates. Table G.28-6 presents a summary of the field QC sample types, applicable analyses, frequency, and acceptance criteria. Field QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. Field QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

6.4.2.2 Analytical Laboratory Quality Control Samples

QA/QC considerations are an integral part of analytical laboratory operations. Laboratory QA ensures that analytical methods generate data that are technically sound, statistically valid, and that can be documented. QC procedures described in EPA SW-846 are the tools employed to measure the degree to which these QA objectives are met, and include method blank, matrix spike, and laboratory duplicate samples. The results for analytical laboratory QC samples will be reported along with the regular sample analyses.

6.4.3 Data Reduction, Verification, Validation, and Reporting

Analytical data generated by the activities described in this closure plan will be verified and validated. Data reduction is the conversion of raw data to reportable units, transfer of data between recording media, and computation of summary statistics, standard errors, confidence intervals, and statistical tests.

6.4.4 Data Reporting Requirements

Analytical results will include all pertinent information about the condition and appearance of the sample-as-received. Analytical reports will include:

a. a summary of analytical results for each sample;

b. results from QC samples such as blanks, spikes, and calibrations;

c. reference to standard methods or a detailed description of analytical procedures; and

d. raw data printouts for comparison with summaries.

The laboratory will describe the analysis in sufficient detail so that the data user can understand how the sample was analyzed.

7.0 WASTE MANAGEMENT

By removing any hazardous waste or hazardous waste constituents during closure, the owner/operator may become a generator of hazardous waste. The owner/operator shall control, handle, characterize, and dispose of all wastes generated during closure activities in accordance with this Section (7.0), Facility waste management procedures, and in compliance with applicable state, federal, and local requirements (*see* 40 CFR § 265.114). These wastes may include, but are not limited to:

(a) demolition debris;

(b) concrete;

(c) containerized waste;

(d) personnel protective equipment;

(e) soil;

(f) decontamination wash water; and

(g) decontamination waste.

The different types of wastes generated at closure, including the unit's decontaminated structures and related equipment, and their disposition options (*e.g.*, reuse, recycling, or disposal) are listed in Table G.28-3 of this closure plan.

8.0 CLOSURE CERTIFICATION REPORT

Upon completion of the closure activities at the unit, the owner/operator shall submit, by registered mail, a closure certification report for Department review and approval. The Report shall document that the unit has been closed in compliance with the specifications in this closure plan. The Report shall summarize all activities conducted during closure including, but not limited to:

a) the results of the records review and structural assessment;

b) the results of all investigations;

c) remediation waste management;

d) decontamination;

e) decontamination verification and soil sampling activities; and

f) results of all chemical analyses and other characterization activities.

The owner/operator shall submit the closure certification report to the Department no later than 60 days after completion of closure of the unit. The Department may require interim reports that document the progress of closure. The certification must be signed by the owner/operator and by an independent professional engineer registered in the State of New Mexico (*see* 40 CFR § 265.115).

The report shall document the unit's closure and contain, at a minimum, the following information:

a) a copy of the certification pursuant to 40 CFR § 265.115;

b) any variance, and the reason for the variance, from the activities approved in this closure plan;

c) documentation of the records review and structural assessment conducted;

d) a summary of all sampling results, showing:

   1. sample identification;
   2. sampling location;
   3. data reported;
   4. detection limit for each analyte;
   5. a measure of analytical precision (*e.g.*, uncertainty, range, variance);
   6. identification of analytical procedure;
   7. identification of analytical laboratory;

e) a QA/QC statement on analytical data validation and decontamination verification;

f) the location of the file of supporting documentation, including:

   1. field logbooks;
   2. laboratory sample analysis reports;
   3. QA/QC documentation; and
   4. chain-of-custody forms;

g) storage or disposal location of hazardous waste resulting from closure activities;

h) a copy of the Human Health and Ecological Risk Assessment Reports, if a site-specific risk assessment was conducted pursuant to Section 4.1 for the unit; and

i) a certification statement supporting the accuracy of the closure certification report.

Documentation supporting the independent registered professional engineer's certification must be furnished to the Department before the closure of the unit is approved.

9.0 REFERENCES

DOE, 1995. "DOE Methods for Evaluating Environmental and Waste Management Samples," DOE/EM-0089T, Rev. 2. Prepared for the U.S. Department of Energy by Pacific Northwest Laboratory, Richland, Washington.

EPA, 1986 and all approved updates. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA-*SW-846*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.

EPA, 2000. US Environmental Protection Agency, Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity, Authorization to Discharge under the NPDES, NPDES Permits No. NMR05A734 and NMR05A735, issued to the University of California and the DOE, respectively. Effective December 23, 2000.

EPA, 2002. *RCRA Waste Sampling Draft Technical Guidance Planning, Implementation, and Assessment*," EPA530-D-02-002, August 2002, Office of Solid Waste, U.S. Environmental Protection Agency, Washington, DC.

LANL, 2012a. *Ecorisk Database (Release 3.1)*, on CD, ERID-228726, Los Alamos National Laboratory, Los Alamos, New Mexico.

LANL, 2012b. *Interim Facility-Wide Groundwater Monitoring Plan for the 2013 Monitoring Year, October 2012-September 2013*. Los Alamos National Laboratory document LA-UR-12-21331, EP2012-0092. Los Alamos National Laboratory, Los Alamos, New Mexico. August 2012.

NMED, 2012. *New Mexico Environment Department Risk Assessment Guidance for Site Investigations and Remediation.* February 2012, New Mexico Environment Department, Santa Fe, New Mexico.

Table G.28-1

Closure Schedule for the Technical Area 16-388 Open Burning Treatment Unit

Activity	**Maximum Time Required**
Notify the Department of initiation of closure	Day 0
Remove all waste including hazardous and solid waste	No later than Day 90
Complete records review and structural assessment	After removal of all waste and before decontamination
Complete all closure activities	No later than Day 180
Submit final closure certification report to the Department	No later than Day 240

Table G.28-2

Hazardous Waste Constituents of Concern at the TA-16-388 Open Burning Treatment Unit[a]

Category	**EPA Hazardous Waste Numbers**	**Specific Constituents**
High explosives and associated compounds	D003	HMX, RDX, TNT, PETN, TATB, Tetryl, and mixtures of explosives including; ANFO, Composition B, Cyclotol, IMX-101, PBX 9404, PBX 9407, PBX 9501, PBX 9502, PBX 9601, X0233, X0533, XTX 8003, XTX 8004, LX-02, LX-07, LX-10, and LX-14
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Semi-volatile Organic Compounds	D030, D036, F004	2,4-Dinitrotoluene, Nitrobenzene
Volatile Organic Compounds	F002, F003, F004, F005	Acetone, Ethanol, Benzene, MEK, Methylene Chloride, Toluene, MIBK, Xylene, Ethyl Acetate, Methanol
Other constituents of concern		Dioxins/Furans, Perchlorate, and kerosene

[a] Based on the unit operating record.
ANFO = Ammonium nitrate/Fuel oil
PETN = pentaerythrioltetranitrate (2,2-bis[(nitroxy)methyl]-1,3-propanediol dinitrate
HMX = cyclotetramethylenetetranitramine (octahydro, 1,3,5,7-tetranitro, 1,3,5,7-tetrazocine)
RDX = cyclonite (cyclo-1,3,5-trimethylene-2,4,6-trinitramine)
MEK= methyl ethyl ketone (2-butanone)
TNT = 2,4,6-trinitrotoluene
MIBK = methyl isobutyl ketone (4-methyl-2-pentanone)
TATB = 1,3,5-triamino-2,4,6-trinitrobenzene

Table G.28-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Decontamination water	Non-regulated liquid waste	High Explosives Waste Treatment Facility (HEWTF) or sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Firebrick	Non-regulated solid waste	Subtitle D landfill or reuse
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Metal covers/trays	Non-regulated solid waste	Recycled
	Hazardous waste	Treated if necessary to remove explosives and recycled.
Soil and tuff	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Recycled, salvaged, or sent to a Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded concrete	Non-regulated solid waste	Subtitle D landfill or reuse
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded sampling and	Non-regulated solid waste	Subtitle D landfill

Table G.28-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	**Waste Types**	**Disposal Options**
decontamination equipment	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.

Table G.28-4

Summary of Analytical Methods

Analyte	EPA *SW-846* Analytical Method [a]	Analytical Technique	Estimated Quantitation Limits [b] (mg/kg)	Rationale
Metal Analysis				
Aluminum	6010B	ICP-AES	20	Determine the environmentally available metal concentration in the soil samples following strong acid digestion.
Antimony	6010B	ICP-AES	0.03	
Arsenic	6020	ICP-MS	1.5	
Barium	6010B	ICP-AES	0.5	
Beryllium	6020	ICP-MS	0.1	
Cadmium	6010B	ICP-AES	0.03	
Calcium	6010B	ICP-AES	30	
Chromium	6010B	ICP-AES	0.5	
Cobalt	6010B	ICP-AES	0.5	
Copper	6010B	ICP-AES	1	
Iron	6010B	ICP-AES	30	
Lead	6010B	ICP-AES	1	
Magnesium	6010B	ICP-AES	50	
Manganese	6010B	ICP-AES	1.0	
Mercury	7471A	CVAA	0.01	
Nickel	6020	ICP-MS	0.4	
Potassium	6010B	ICP-AES	30	
Selenium	6020	ICP-AES	1.5	
Silver	6020	ICP-MS	0.01	
Sodium	6010B	ICP-AES	20	
Thallium	6020	ICP-MS	0.2	
Vanadium	6010B	ICP-AES	0.5	
Zinc	6010B	ICP-AES	1	
Organic Analysis				
VOCs	8260B	GC/MS	0.001 to 0.005	Determine the solvent-extractable VOCs concentration in the soil samples.
SVOCs	8270C	GC/MS	0.033 to 0.33	Determine the solvent-extractable SVOCs concentration in the soil samples.
Other Analysis				
Dioxins/Furans	8290	HRGC/MS	0.00001 to 0.0003	Determine the solvent extractable dioxin/furan concentration in the soil samples.

Table G.28-4

Summary of Analytical Methods

Analyte	**EPA *SW-846* Analytical Method [a]**	**Analytical Technique**	**Estimated Quantitation Limits [b] (mg/kg)**	**Rationale**
Perchlorate [ClO_4^-]	6850	HPLC/ESI/MS	0.002 mg/kg	Determine the water-soluble [ClO_4^-] concentration in the soil samples.
High Explosives	8321A [c]	HPLC/TS/MS	0.5 to 2.0	Determine the solvent-extractable high explosives concentrations in the samples.

[a] U.S. Environmental Protection Agency (EPA), 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.

[b] Estimated quantitation limits listed for all methods are based LANL contract-required quantitation limits for subcontractor analytical laboratory services.

[c] Instrumentation published in Method SW-846-8321A can be used to identify the required analytes that would not be detected using Method SW-846-8330, thus a LANL-specific modification is used for Method SW-846-8321A to analyze for explosives compounds.

CVAA = Cold-vapor atomic absorption spectroscopy
ESI/MS = Electrospray ionization/mass spectrometry
GC/MS = Gas chromatography/mass spectrometry
HPLC = High performance liquid chromatography
HRGC/MS = High resolution gas chromatography/mass spectrometry
ICP-AES = Inductively coupled plasma-atomic emission spectrometry
ICP/MS = Inductively coupled plasma/mass spectrometry
SVOC = Semivolatile organic compound(s)
TS/MS = Thermospray/mass spectrometry
VOC = Volatile organic compound(s)
mg/kg = milligrams per kilogram

Table G.28-5

Recommended Sample Containers[a], Preservation Techniques, and Holding Times[b]

Analytical Suite	Container Type and Materials	Preservation	Holding Time
Metals			
	Solid Media: 250 - mL polyethylene		
	Solid Media: 250 - mL polyethylene	Solid Media: Cool to 4 °C	
Volatile Organic Compounds			
	Solid Media: 125 - mL Glass Amber Glass Vials with Teflon-Lined Septa	Solid Media Cool to 4 °C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	
Semi-Volatile Organic Compounds			
	Solid Media: 500 - mL Amber Glass	Solid Media: Cool to 4 °C	
Other Analysis			
Dioxins/Furans	2 - 125 mL Glass	Solid Media: Cool to 4 °C	30 days
Perchlorate [ClO_4^-]	250 - mL polyethylene	Solid Media: Protect from temperature extremes	28 days
High Explosives	500 – mL Amber Glass	Solid Media: Cool to 4 °C	14 days

[a] Smaller sample containers may be required due to health and safety concerns associated with potential radiation exposure, transportation requirements, and waste management considerations.

[b] Information obtained from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*, U.S. Environmental Protection Agency, 1986 and all approved updates.

°C = degrees Celsius TAL = Target Analyte List

mL = milliter TCLP = Toxicity Characteristic Leaching Procedure

Table G.28-6

Recommended Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis	Frequency	Acceptance Criteria
Trip Blank	VOCs	One set per shipping cooler containing samples to be analyzed for VOCs	Verify that external VOC contamination from bottle handling and analytical processes, independent of field sampling processes, has not occurred
Field Duplicate	All suites	One field duplicate for each analytical suite	Relative percent difference less than or equal to 20 percent
Cooler Temperature Blank	All suites	Included with each shipping cooler	Verify temperature preservation requirements have been maintained during sample transport

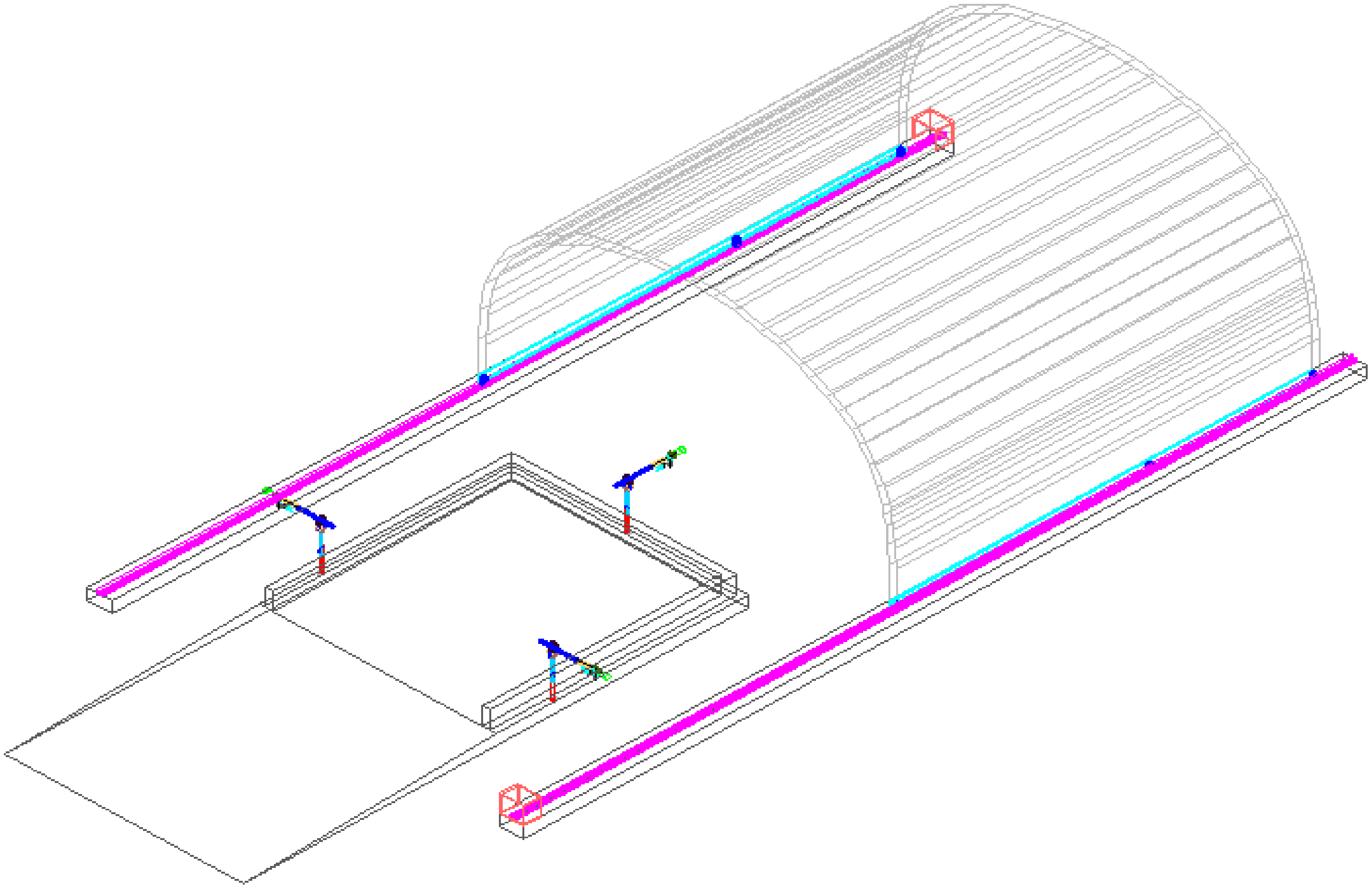

Figure G.28-1: Technical Area 16-388 Flash Pad

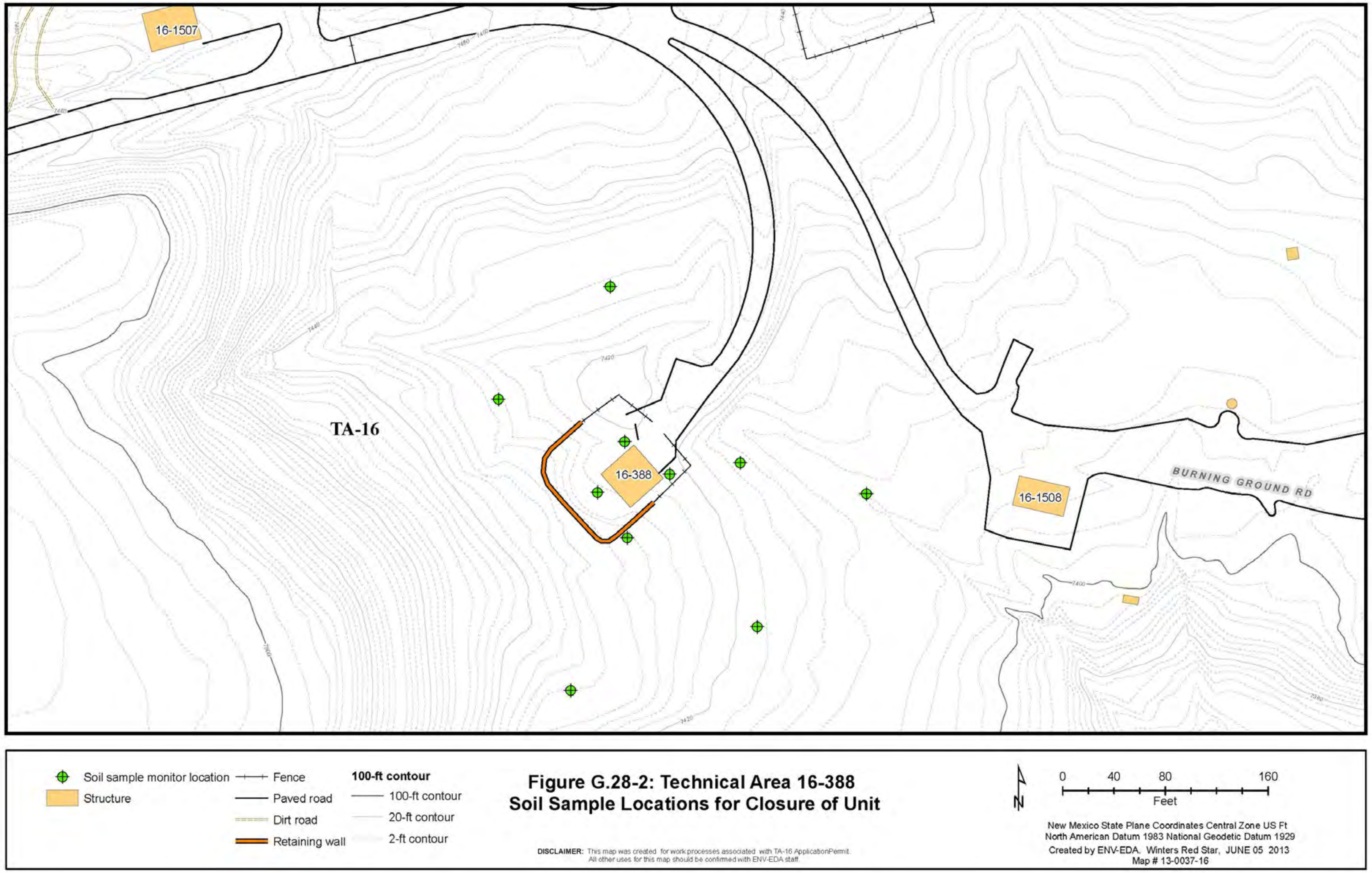

Figure G.28-2: Technical Area 16-388 Soil Sample Locations for Closure of Unit

ATTACHMENT G.29
TECHNICAL AREA 55, BUILDING 4 ROOM B13
CLOSURE PLAN

Table G.29-2
Potential Waste Materials, Waste Types, and Disposal Options

Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Decontamination wash water	Non-regulated solid waste	Sanitary sewer.
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Water Treatment Facility (RLWTF).
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	The waste will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Discarded Concrete	Non-regulated solid waste	Subtitle D landfill, recycled or reused.
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT G.30

TECHNICAL AREA 55, BUILDING 4 ROOM G12

CLOSURE PLAN

Table G.30-2
Potential Waste Materials, Waste Types, and Disposal Options

Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Decontamination wash water	Non-regulated solid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Water Treatment Facility (RLWTF).
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	The waste will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~

	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Discarded Concrete	Non-regulated solid waste	Subtitle D landfill, recycled or reused.
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill

	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~Low-level radioactive solid waste~~	~~Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.~~
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

Attachment 9

Revised Supplement 4-1,
Assessment of Alternatives for
Open Burn and Open Detonation Units

Los Alamos National Laboratory Part B Permit Application for Renewal of the LANL Hazardous Waste Facility Permit

Assessment of Alternatives for Open Burn and Open Detonation Units

May 2022

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List of Acronyms

AMSL	above mean sea level
BATF	Bureau of Alcohol, Tobacco, Firearms and Explosives
CFR	Code of Federal Regulations
CWP	contaminated waste processor
DOE	U.S. Department of Energy
DoD	U.S. Department of Defense
DOT	U.S. Department of Transportation
EWI	El Dorado Engineering Explosive Waste Incinerator
EPA	United States Environmental Protection Agency
ETSCP	Environmental Security Technology Certification Program
IHC	Interim Hazard Classification
JOCG	Joint Ordinance Commanders Group
LDR	Land Disposal Restriction
LANL	Los Alamos National Laboratory
MACT	maximum achievable control technology
NAP	National Academies of Sciences, Engineering, and Medicine
NAVAIR	Naval Air Systems Command
NMHWA	New Mexico Hazardous Waste Act
OB	Open Burn
OD	Open Detonation
RCRA	Resource Conservation and Recovery Act
SERD	Strategic Environmental Research and Development Program
TA	Technical Area
Triad	Triad National Security LLC
TSDF	treatment, storage, and disposal facilities
WAC	waste acceptance criteria

1.0 Introduction

This Assessment of Alternatives for Open Burn and Open Detonation Units (Assessment) is submitted by the U.S. Department of Energy ("DOE"), including its field offices, the National Nuclear Security Administration Los Alamos Field Office ("NA-LA"), the Environmental Management Los Alamos Field Office ("EM-LA"), along with Triad National Security, LLC ("Triad"), and Newport News Nuclear BWXT-Los Alamos, LLC ("N3B") (collectively, the "Permittees") in support of the Part B Permit Application for Renewal of the Los Alamos National Laboratory Hazardous Waste Facility Permit ("Permit Renewal Application" or "Application").

Los Alamos National Laboratory ("LANL" or the "Laboratory") is a Federally Funded Research and Development Laboratory located in Los Alamos County, New Mexico that engages in scientific research to further nuclear security, intelligence, defense, emergency response, nuclear non-proliferation, counterterrorism, energy security, and emerging national threats. To fulfill its national security-related missions, LANL must generate a small volume of explosives hazardous waste. For over seventy years, that waste has been treated on site through either open burning ("OB" or "flashing") and/or open detonation ("OD"). Currently, the explosive waste generated by LANL is treated either at the OB flash pad ("flash pad") at Technical Area (TA) 16-388 or one of the OD units at TA-36-8 and TA-39-6 (collectively, the "Units"). LANL's flash pad and OD Units have been operated under the "interim status" requirements of the New Mexico Hazardous Waste Act (HWA) and 40 C.F.R. Part 265, Subpart P. The Permit Renewal Application seeks to permit LANL's flash pad and OD units under LANL's Hazardous Waste Facility Permit (Permit), consistent with 40 C.F.R. Part 264, Subpart X.

This Assessment analyzes whether alternative treatment technologies exists that could more safely and effectively treat the explosive hazardous waste currently treated at LANL's flash pad and OD units. LANL previously submitted assessments and re-assessments of alternative technologies for OB and/or OD to the New Mexico Environment Department – Hazardous Waste Bureau (NMED-HWB) in 2002, 2007, 2011, and 2013. In 2010, NMED-HWB stated that LANL should re-evaluate the alternatives to open burning, which LANL did in 2013 and has done again through this Assessment.

In accordance with the approach that the U.S. Environmental Protection Agency ("EPA") EPA Region III outlined in its 2002 draft guidance for the permitting and operation of OB/OD units, this Assessment considered the following factors when evaluating alternative treatment technologies for OB and OD (EPA 2002):

- Site specific safety;
- Transportation hazard potential;
- Offsite treatment options; and
- Feasibility of alternatives technology considerations.

As discussed in more detail below, this Assessment concludes that there is no safer, more effective, alternative treatment method for treating the small quantities of explosives waste currently treated at LANL's flash pad and OD units. The explosives waste LANL generates, which often times has been manipulated and damages as a result of scientific experimentation, is too unstable and energetic to be treated safely and effectively in an enclosed or confined space. Furthermore, the waste must be treated on site at LANL because, among other reasons, transportation of LANL's waste off site on public roadways is illegal under federal law, would pose an exceedingly large risk to the public and the environment, and would also present a grave national security risk. The current flash pad and OD units also have the smallest environmental footprint of any technology we reviewed for a number of reasons, including but not limited to the fact that these Units have no secondary hazardous waste stream.

The conclusions of this Assessment are consistent with the guidance and reports published by EPA and the National Academies of Science, Medicine, and Engineering (NASME) regarding the availability of alternatives treatment technologies for OB/OD. EPA Region III's guidance acknowledged that:

> [B]ecause of safety hazards, as well as the site-specific feasibility factors for alternative treatment technologies, there are certain circumstances and energetic wastes that necessitate the use of OB/OD treatment. Thus, OB/OD treatment is not expected to be totally replaced by alternative technologies in the near future.

Similarly, in 2019, NASME published a study that evaluated alternative technologies to OB/OD, entitled *Alternatives for the Demilitarization of Conventional Munitions*.[1] The NASME report focused on the treatment of conventional munitions, not the explosive waste treated at LANL's flash pad and OD units, but the report's findings nonetheless support EPA Region III's conclusion that for certain waste, based on site-specific factors, it may be necessary to continue to utilize OB/OD treatment (NAP 2019).

> Alternatives to OB/OD are not being used for some munitions because the munitions have become unstable and are too hazardous for the handling and transportation required for demilitarization using alternative technologies. A determination by the [cognizant authority] that a munition is unstable and potentially shock sensitive is a valid reason for performing demilitarization via OB/OD to minimize transportation and handling and, therefore, the exposure of technicians to the explosive hazard. The capability for OB/OD will always be needed.

Also in 2019, EPA published its own report, *Alternative Treatment Technologies to Open Burning and Open Detonation of Energetic Hazardous Wastes Final Report*[2] analyzing potential alternative treatment technologies for OB/OD. Despite technological advances made since EPA Region III's 2002 guidance, the 2019 EPA report continues to acknowledge that (EPA 2019):

> [E]ven though there are many alternative treatment technologies today, some energetic hazardous wastes (e.g., certain large caliber munitions and missiles) cannot be treated with these technologies. As such, for DoD [U.S. Department of Defense] and possibly others, OB/OD will remain as the only option for certain energetic hazardous wastes until additional viable alternatives are developed or existing technologies are modified or improved upon.

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[1] *See National Academies of Sciences, Engineering, and Medicine, Alternative for the Demilitarization of Conventional Munitions* (2019), available at *https://nap.nationalacademies.org/catalog/25140/alternatives-for-the-demilitarization-of-conventional-munitions.*

[2] Environmental Protection Agency, *Alternative Treatment Technologies to Open Burning and Open Detonation of Energetic Hazardous Wastes: Final Report,* available at chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.epa.gov/sites/default/files/2019-12/documents/final_obod_alttechreport_for_publication_dec2019_508_v2.pdf.

As discussed below, the explosives waste generated by LANL is precisely the type of waste envisioned by EPA and NASME that, because of its highly energetic nature and other site-specific factors, must be treated through OB and/or OD. There is no alternative technology or combination of technologies that are commercially available and are able to safely and effectively treat all the waste streams LANL currently treats using its flash pad and OD technologies.

2.0 Background on LANL and its National Security Missions

LANL is located in Los Alamos County in north-central New Mexico, approximately 60 miles north-northeast of Albuquerque and 25 miles northwest of Santa Fe. LANL is owned by DOE and is operated jointly by DOE NA-LA and Triad. Additionally, the Los Alamos Legacy Cleanup Contractor, N3B, conducts corrective action and legacy waste cleanup activities on behalf of DOE's EM-LA. LANL is divided into Technical Areas (TAs) that occupy approximately 40 square miles.

LANL engages in scientific research to further nuclear security, intelligence, defense, emergency response, nuclear non-proliferation, counterterrorism, energy security, and emerging national threats. LANL's missions also include scientific research related to nuclear safety, air and water quality, natural and cultural resources, DNA, HIV, endangered species, the Mars Rover, and the novel COVID-19 virus. Many of the research and defense-related projects conducted at LANL are highly specialized, classified, and cannot be replicated anywhere else in the country.

LANL's national security-related missions include the annual assessment of the United States' nuclear weapons stockpile to the President of the United States. Specifically, pursuant to 50 U.S.C. § 2525, LANL is required to conduct an annual assessment and certification of the "safety, reliability, and effectiveness" of the Nation's nuclear weapons stockpile and related components. To fulfill this mandate, LANL performs assessment activities, including modeling and testing of specific weapons components. Previously, the reliability and effectiveness of the United States' nuclear weapons stockpile was assessed through underground testing of nuclear weapons at sites such as the Nevada Test Site. The assessment activities that LANL performs allows the National Nuclear Security Administration (NNSA) to evaluate the reliability and effectiveness of the Nation's nuclear weapons stockpile without having to conduct underground nuclear weapons testing.

LANL also performs other national security-related missions that involve explosives development, characterization, testing, modeling, and simulation. One of the most critical of these missions, is the manufacturing of Pentaerythritol tetranitrate (PETN) Detonators. The PETN Detonator is a critical component of the Nation's War Reserve, and LANL is the only facility in the country that creates the detonator. LANL's PETN Detonator research includes breaching or insulting the PETN Detonator with various stimuli including electrical, chemical, mechanical, thermal, impact, shock, and laser interactions to determine if a specific breach or insult causes the PETN Detonator to detonate. LANL is also responsible for manufacturing certain precision high explosives and for performing a variety of scientific experiments on energetic, hazardous, and complex system and subsystem components at various high explosive firing sites at LANL. This includes research on explosives detection technology and improvised explosive device (IED) detection and defeat.

LANL's important national security-related work generates a small amount of explosives waste that is then treated at LANL's flash pad and/or OD Units. The annual assessment of the nuclear stockpile generates explosives waste that is often highly unstable and energetic because the explosives in the waste have been intentionally manipulated or damaged in some manner as a result of the scientific experimentation process. This waste is then treated at LANL's flash pad and/or OD Units. LANL also generates explosives waste as part of the explosives fabrication process. Explosive material can become entrained within the nooks and crannies of LANL's large fabrication machines. To safely recycle the metal from those machines, LANL must first "flash" (or burn) off the explosive waste particles. Explosive waste can also be generated from LANL's explosives experiments. While LANL's explosives experiments are highly successful and typically leave behind no residual waste, on occasion, small volumes of explosive waste may remain that require treatment through OD. LANL relies on the availability of its OD Units to immediately and safely address any residual waste from its explosives experiments

3.0 Conceptual Approach to Explosives Waste Management at LANL

The overall explosives waste management approach at LANL is based on the following hierarchy of consideration:

1. **Pollution prevention** and **waste minimization activities** are first identified and implemented to the maximum extent practicable to avoid waste generation. When feasible, based on safety concerns, programmatic effectiveness, and other factors, LANL strives to eliminate and/or reduce the volume of explosives wastes and explosives contaminated waste that must be treated and disposed.

2. Explosives contaminated wastes are next reviewed stream-by-stream to **identify candidates for offsite treatment.** When feasible, LANL identifies wastes that can be safely and legally transported offsite to permitted facilities for treatment and disposal. LANL continually takes efforts to identify new opportunities for low-risk offsite shipment of waste for treatment.

3. **Only when waste generation cannot be avoided <u>and</u> offsite treatment is not feasible is onsite treatment then required**. When avoiding waste generation and offsite treatment are not feasible, then an evaluation of alternatives for onsite treatment becomes relevant. Alternative treatment methodologies and technologies to OB and OD for treating the remaining explosives waste streams onsite are evaluated using this conceptual approach to determine if alternative treatment

4.0 Description of LANL's Flash Pad and OD Units

Explosive waste generated by LANL is currently treated at either the flash pad located at TA-16-388 or the OD Units located at TA-36-8 (Minie Site) and TA-39-6 (Point 6).

4.1 TA-16-388 Flash Pad (OB)

Since the 1950s, LANL has treated hazardous wastes by open burning operations at several units within TA-16. However, LANL has consolidated and reduced its open burning operations to the maximum extent over time. Today, with the exception of the TA-16-388 Flash Pad, the subject of this Permit Renewal Application, all open burning treatment operations conducted at LANL have ceased and the remaining units have closed (or are undergoing closure).

TA-16 is situated on a broad mesa that is bounded on the north by Canon de Valle, on the south by State Road 4, and on the west by West Jemez Road (State Road 501) and the Santa Fe National Forest. Elevations ranges from approximately 7,700 ft. at the west end of the TA to approximately 6,800 ft. at the lower east end. Topography is varied, ranging from steep precipitous canyon walls to sloping mesa tops. The TA-16-388 Flash Pad is located in the northeast corner of TA-16.

The TA-16-388 Flash Pad consists of a 22 ft. by 22 ft. concrete pad located within a sloped area that provides secondary containment to prevent hazardous constituents from leaving the area. The Unit has a concrete base that is 12 inches (in.) thick. The entire concrete pad is over a 45-mil Hypalion liner, which is six inches below grade underneath the bottom of the pad, and the liner extends out 2 ft. from the pad perimeter and curves up to ground level on all four sides. Along the two sides and back of the concrete pad, and inset 12 in. is a 3 ft. high, eight-inch-thick concrete wall that prevents any potential runoff from leaving the Flash Pad. The area around the TA-16-388 Flash Pad is relatively level. The Unit is equipped with a retractable steel cover, which covers the entire pad when not in use. Three 5 ft. long forced air propane burners provide the heat source for treatment activities at the Unit. A chain-link fence and brick retaining wall surround the TA-16-388 Flash Pad.

The TA-16-388 Flash Pad is used exclusively for open burning treatment of explosives waste streams that are generated at LANL—it is not used for any other activities. Once waste is placed in the Flash Pad for treatment, open burning operations are controlled and monitored remotely from Building 16-389 (the control building). Operations at the Unit require post-treatment visual surveys and post-burn covering of the Unit. This practice minimizes the potential for precipitation contacting untreated hazardous or residual waste, if any exists.

At the TA-16-388 Flash Pad, in 2019, the average quantity per burn was approximately 40 pounds. Most treatment events are conducted in the morning when the wind is generally the lowest of the day. Technical standards generally prohibit more than one burn in a twenty-four hour period. Most OB treatment events are conducted at a single burn in approximately 30 minutes or less. In 2019, LANL conducted a total of 57 burns.

The TA-16-388 Flash Pad is located in a remote, security-controlled location within TA-16. Access into the security area can be gained only through controlled entry stations by persons possessing an appropriate security clearance and site-specific training. Entry into the secured area is controlled via an entry station manned by LANL security personnel or by badge readers 24 hours per day. In addition, entry into the high explosives exclusion area is controlled through an industrial fence, with access granted through an access control station or a locked access gate. To gain access to the area, visitors must check in at the appropriate access control station to be added to the site-specific badge reader system. Unescorted access to the high explosives exclusion area is granted only to persons possessing appropriate security clearance and meeting site-specific training requirements

4.2 TA-36-8 Minie Site (OD)

Since the 1950s, LANL has conducted treatment of solid and liquid explosive waste and explosive-contaminated waste by OD operations at TA-36-8, known as the Minie Site, and TA-39-6, known as Point 6. Construction of the TA-36 Minie Site was completed in 1950. The site has been used extensively to conduct armor-piercing experiments, in which penetrator jets are directed at targets at the canyon wall to the west of the site. Metal plates are placed behind the targets to stop the penetrators. The Minie Site has also been used for open detonation of excess high explosives determined to be reactive RCRA waste.

Located in the east central portion of LANL, TA-36 is spread over several mesa tops between a branch of Pajarito Canyon to the north and Water Canyon to the south. Mesa-top elevations at TA-36 range from approximately 6,380 to 7,120 ft. above mean sea level. TA-36 contains an OD Unit, several other firing sites, and supporting offices where research is conducted with various types of explosives.

The TA-36-8 OD Unit is located in the southern portion of TA-36. The Unit consists of an irregularly shaped area near Building TA-36-8 (the control building). The TA-36-8 OD Unit is a sand-and-grass-covered area that measures approximately 500 ft. east to west and 300 ft. north to south. The western portion is relatively flat; the eastern portion is concave to minimize fragment dispersion.

The TA-36-8 OD Unit has a maximum treatment capacity of 2,000 pounds of explosive waste per detonation and an annual treatment limit of 15,000 pounds. The unit is used primarily for non-treatment-related experimental test detonations and is only occasionally used to treat explosive hazardous waste. Operations at the Unit require post-detonation visual surveys as soon as practical for materials not consumed by the detonation. This practice minimizes the potential for precipitation contacting untreated hazardous waste, if any is generated.

The TA-36-8 is located in a remote, security-controlled location within TA-36. Entry is controlled through an industrial fence with access granted through an access control station or a locked access gate. Access into the security area through the fence can only be gained by persons possessing an appropriate security clearance and site-specific training. Entry into the secured area is controlled via a combination of an entry station that is manned by LANL security personnel or by badge readers on gates 24 hours per day. Unescorted access to the area is granted only to persons possessing appropriate security clearance and meeting site-specific training requirements. Visitors must check in at the appropriate access control station to be added to the site-specific badge-reader system to gain access to the area

4.3 TA-39-6 Point 6 (OD)

The TA-39 Point 6 site was established and began use as a test firing site in 1953. The site is used for explosives experiments and for treating reactive hazardous waste by OD. The experiments conducted at this firing site are designed to expend all high explosives in the device. The OD unit is used to treat only solid and liquid hazardous explosive waste. The OD unit is used to open air detonate waste-excess explosives and explosive-contaminated combustible waste to remove the characteristic of reactivity.

TA-39 is located in the southern portion of LANL and includes much of the mesa between Water Canyon to the north and Ancho Canyon to the south. Point 6 is located near Control Building 6 and is a relatively flat, sand covered area that measures approximately 40 ft. by 40 in a canyon bottom. Steep canyon walls rise to heights of 100 feet or more in the immediate vicinity of the OD unit, and along with a retaining wall that has been installed, form a rough semi-circle around the unit.

The TA-39-6 OD Unit has a maximum waste treatment capacity of 1,000 pounds of explosive waste per detonation and an annual treatment limit of 15,000 pounds. The unit is used primarily for non-treatment-related experimental test detonations and is also occasionally used to treat hazardous explosive waste.

The TA-39-6 OD Unit is also located in a remote, security-controlled location within TA-39. Entry is controlled through an industrial fence with access granted through an access control station or a locked access gate. Access into the security area through the fence can only be gained by persons possessing an appropriate security clearance and site-specific training. Entry into the secured area is controlled via a combination of an entry station that is manned by LANL security personnel or by badge readers on gates 24 hours per day. Unescorted access to the area is granted only to persons possessing appropriate security clearance and meeting site-specific training requirements. Visitors must check in at the appropriate access control station to be added to the site-specific badge-reader system to gain access to the area.

5.0 Waste Streams Treated at LANL's Flash Pad and OD Units

This section describes the waste streams treated at LANL's flash pad and OD units, respectively, and provides a summary of the historic and current quantities of waste treated by these Units.

5.1 Waste Streams Treated through Flashing

The explosives contaminated waste and explosives waste streams that are treated at the TA-16-388 Flash Pad are primarily generated from explosives processing operations, such as machining and pressing; research and development activities; decommissioning and demolition activities; and corrective action activities. Waste streams consist of: (i) explosive machining waste; (ii) excess explosive wastes; (iii) explosives contaminated combustible debris; (iv) explosive contaminated solvents; and (v) explosives contaminated noncombustible debris. These wastes exhibit the characteristic of reactivity, as defined in 40 CFR § 261.23. Explosive waste and explosives contaminated waste meet the regulatory definition of reactivity, because they are capable of detonation or explosive reaction if subjected to a strong initiating source or if heated under confinement. An explosive material is defined as any compound or mechanical mixture that detonates or deflagrates when subjected to heat, impact, friction, shock, or other suitable initiation stimulus.

Waste streams requiring OB treatment are:

- <u>Explosive machining waste</u> – The vast majority (>90%) of waste streams typically treated by flashing at LANL are machining waste. This waste stream consists of explosives machining chips or cuttings, similar in appearance to those generated in an ordinary machine shop. The machining process also generates some water, filters, and filter solids that result primarily from the filtration of water used during the machining activities. Cloth filters, plastic bags, and wrapping are sometimes present in the waste. Again, this waste is similar to ordinary trash generated in any machine shop but for the minimal presence of energetic waste fragments or dusts.

- <u>Explosives-contaminated combustible debris</u> – This waste stream includes detonable explosives-contaminated debris generated in research laboratories, processing areas, and prep rooms. Debris may include filters removed from laboratory equipment or may contain trace amounts of solvents. Other materials that may be present in this waste stream include plastic pieces, bags, fiber cloth, wrapping, and tubing; weigh boats; latex or nitrile gloves; glass or plastic vials; cardboard and paper; fiberboard containers; paper cleaning wipes, rags, and swabs; as well as noncombustible materials such as glassware and metal as minor components. Metal constituents may include aluminum, stainless steel, steel, brass, and copper. Small quantities of solvents such as ethanol, acetone methanol, ethyl acetate, and toluene may also be present in this waste stream.

- Explosives contaminated noncombustible debris – This waste stream consists of explosives-contaminated equipment that includes discarded, noncombustible equipment, debris from firing sites, noncombustible material from decommissioning and demolition activities, and material from explosives processing areas. Materials in this waste stream include glass, metals, and ceramics. This waste stream is typically recycled after treatment when treated by open burning. Most often this waste stream consists of metal equipment or sand/carbon from water filtration activities or maintenance and decommissioning and demolition activities.

  The incidental HE that gets entrained in large equipment is worthy of a special note. If the entrained HE could not be "flashed off" (removed), the alternative would be to land dispose the large explosives-contaminated equipment. In other words, the entirety of the large explosive entrained equipment would need to be buried. This large equipment cannot fit into vessels used for alternative treatments. Consequently, flashing the explosives waste off this large equipment allows the equipment to be safely reused or recycled as scrap metal and avoids land disposal by burial, thus conserving resources.

- Excess explosives – This waste stream includes large and small pieces of excess conventional explosives. Explosives may be in the form of flakes, granules, crystals, powders, pressings, plastic bonded, putties, rubberized solids, or extrudable solids. This waste stream can include waste generated from inventory reduction efforts, off-specification explosives, damaged explosives, and salvaged explosives. Other materials that may be present in this waste stream include plastic bags, wrapping, and casings; cardboard and paper; and fiberboard containers. A small fraction of the waste stream may contain metals such as aluminum, brass, barium, steel, stainless steel, and copper.

- Explosives-contaminated solvent waste – This waste stream consists of dimethyl sulfoxide (DMSO) that contains dissolved explosives. It is generated primarily by dissolving of explosives and polymers in support of research and development activities.

Additional information and discussion regarding the waste streams treated by flashing at LANL is available within the revised Waste Analysis Plan submitted in support of the Permittees' Permit Renewal Application. *See* Revised Supplement 1-3, Permittees' Proposed Changes to Attachment C, Waste Analysis Plan.

5.1.1 Historic and Current Waste Generation Rates

As discussed above and noted in the following tabulation, the quantities of hazardous wastes treated by OB at LANL are small and are especially small when compared to quantities treated by OB at a typical military installation.

Table 5-1 lists, by waste stream, the quantities of explosives treated at the TA-16-388 Flash Pad from 2011 to 2019. Pollution prevention and waste minimization activities (Section 6.0) have drastically reduced the routine generation of each of the waste streams described by eliminating some activities that generated portions of the waste streams and/or through substitution, segregation, or other waste minimization activities. From 1996 to 2000, LANL burned on average 10,833 pounds (excluding non-combustible materials) by OB (LANL, 2007). In recent years, LANL has burned an average of 2,000 pounds per year at TA-16 by OB, which represents an approximately 80% reduction (Table 5-1).

Table 5-1. Explosive Waste Streams Treated at the TA-16-388 Flash Pad (2011 – 2021)

Year	Explosives Machining Waste (lbs)	Explosives-Contaminated Combustible Debris (lbs)	Explosives-Contaminated Non-Combustible Debris (lbs) [1]	Excess Explosives (lbs) [2]	Explosives-Contaminated Solvents (lbs) [3]	Total Waste Treated (lbs)
2011	1,292	15	0	0	0	1,307
2012	2,555	0	1	0	0	2,556
2013	2,283	11	5	0	0	2,299
2014	935	0	4	21	0	960
2015	1,665	0	3	0	0	1,668
2016	1,465	71	3	0	0	1,539
2017	1,671	30	32	0	0	1,733
2018	1,538	29	21	0	0	1,588
2019	1,130	10	38	0	0	1,178
2020	1,509	171	64	0	0	1,744
2021	2,132	792	59	0	0	2,983

[1] The weight listed is the weight of the estimated explosives content that is suspected to contaminate the equipment not the total weight of the equipment, debris, or sand in the case of noncombustible material. Only the explosive is being treated, therefore, it is what is counted and represents the number of times noncombustible debris was treated during the year.

[2] This waste stream has been significantly decreased in generation rates due to identification of alternative use identification, instead of being generated as waste.

[3] This waste stream has largely been eliminated from being generated due to improvements in processes that must be treated as explosives waste and can be shipped off-site for disposal.

5.2 Waste Streams Treated by Open Detonation (TA-36-8 and TA-39-6)

The waste streams treated at the OD units consist of the following:

- Excess explosives – This waste stream includes large and small pieces of excess conventional explosives. Explosives may be in the form of flakes, granules, crystals, powders, pressings, plastic bonded, putties, rubberized solids, or extrudable solids. This waste stream can include waste generated from inventory reduction efforts, off-specification explosives, damaged explosives, and salvaged explosives. Other materials that may be present in this waste stream include plastic bags, wrapping, and casings; cardboard and paper; and fiberboard containers. A small fraction of the waste stream may contain metals such as aluminum, brass, barium, steel, stainless steel, and copper.

- Explosives-contaminated combustible debris – This waste stream includes detonable explosives-contaminated debris generated in research laboratories, processing areas, and prep rooms. Debris may include may contain trace amounts of solvents. Other materials that may be present in this waste stream include plastic pieces, bags, fiber cloth, wrapping, and tubing; weigh boats; latex or nitrile gloves; glass or plastic vials; cardboard and paper; fiberboard containers; paper cleaning wipes, rags, and swabs. Metal constituents may include aluminum, stainless steel, steel, brass, and copper. Small quantities of solvents such as ethanol, acetone methanol, ethyl acetate, and toluene may also be present historically in this waste stream.

- Detonators, initiators, mild detonating fuses, and blasting caps **–** This waste stream includes detonators, initiators, mild detonating fuses, and blasting caps containing conventional explosives. Explosives may be in metal or plastic casings and may contain lead-based primaries or be in metal sheaths. This waste stream includes manufactured articles (detonators) removed from fire protection systems. Other materials that may be present in this waste stream include plastic bags and wrapping; cardboard and paper; and fiberboard containers. This waste stream will include metals such as aluminum, lead, brass, stainless steel, steel, nickel, and copper.

- Shaped charges and test assemblies – This waste stream includes shaped charges consisting of cores of explosives with metal sheaths or metal liners, or high-explosives test assemblies consisting of explosives in plastic or metal holders. Assemblies may contain metal including lead, aluminum, copper, brass, steel, tantalum, and stainless steel. Other materials that may be present in this waste stream include plastic components, bags, or wrapping; cardboard or paper; and fiberboard containers

- Projectiles and munitions larger than 0.50 caliber – This waste stream includes military munitions such as projectiles and munitions larger than 0.50 caliber. Other materials that may be present in this waste stream include plastic bags and wrapping; cardboard and paper; fiberboard drums; and metal such as lead, brass, steel, stainless steel, copper, and aluminum.

Additional information discussion regarding the waste streams treated by open detonation at LANL is available within the revised Waste Analysis Plan submitted in support of the Permittees' Permit Renewal Application. *See* Revised Supplement 1-3, Permittees' Proposed Changes to Attachment C, Waste Analysis Plan.

5.2.1 Historic and Current Waste Generation Rates

Table 5-2 lists, by waste stream, the quantities of explosives treated at the TA-36-8 OD Unit and TA-39-6 OD Unit from 2011 to 2019. Pollution prevention and waste minimization activities (Section 6.0) have reduced the routine generation of each of the waste streams by eliminating some activities that generated portions of the waste streams and/or through substitution, segregation, or other waste minimization activities.

As shown in **Table 5-2**, OD operations have decreased significantly the last several years because of pollution prevention measures, including the reuse of materials for other mission requirements rather than having to be treated as waste. No OD has been performed at LANL since 2014. **Tables 5-3** and **5-4** provide unit detail for **Table 5-2**.

Table 5-2 Quantities of Explosives Treated at the TA-36-8 and TA-39-6 OD Units from 2011-2021 By Waste Stream in Pounds

Year	Excess explosives[1]	Explosives contaminated debris [2]	Black powder or gunpowder [3]	Total
2011	1,548	0	0	**1,548**
2012	374	12	0	**386**
2013	356	0	20	**376**
2014	5	2	0	**7**
2015	0	0	0	**0**
2016	0	0	0	**0**
2017	0	0	0	**0**
2018	0	0	0	**0**
2019	0	0	0	**0**
2020	0	0	0	**0**
2021	0	0	0	**0**

[1] This waste stream has been significantly decreased in generation rates due to identification of alternative use identification, instead of being generated as waste.

[2] This waste has been significantly decreased due to process improvements the decrease the quantity and rate of generation of this type of waste that will have to be treated as explosives waste.

[3] This waste stream has been eliminated.

Note: The waste streams representing (1) detonators, initiators, mild detonating fuses, and blasting caps; (2) shaped charges and test assemblies and (3) projectiles and munitions larger than 0.50 caliber have not been treated in this timeframe but are preserved due to potential for future generation.

Table 5-3 Quantities of Explosives Treated at the TA-36-8 OD Unit from 2011-2021 By Waste Stream in Pounds

Year	Excess explosives[1]	Explosives contaminated debris[2]	Black powder or gunpowder[3]	Total
2011	1,025	0	0	**1,025**
2012	206	12	0	**218**
2013	274	0	20	**294**
2014	5	2	0	**7**
2015	0	0	0	**0**
2016	0	0	0	**0**
2017	0	0	0	**0**
2018	0	0	0	**0**
2019	0	0	0	**0**
2020	0	0	0	**0**
2021	0	0	0	**0**

[1] This waste stream has been significantly decreased in generation rates due to identification of alternative use identification, instead of being generated as waste.

[2] This waste has been significantly decreased due to process improvements the decrease the quantity and rate of generation of this type of waste that will have to be treated as explosives waste.

[3] This waste stream has been eliminated.

Note: The waste streams representing (1) detonators, initiators, mild detonating fuses, and blasting caps; (2) shaped charges and test assemblies and (3) projectiles and munitions larger than 0.50 caliber have not been treated in this timeframe but are preserved due to potential for future generation.

Table 5-4 Quantities of Explosives Treated at the TA-39-6 OD Unit from 2011-2021 By Waste Stream in Pounds

Year	Excess explosives[1]	Explosives contaminated debris[2]	Black powder or gunpowder[3]	Total
2011	523	0	0	**523**
2012	168	0	0	**168**
2013	82	0	0	**82**
2014	0	0	0	**0**
2015	0	0	0	**0**
2016	0	0	0	**0**
2017	0	0	0	**0**
2018	0	0	0	**0**
2019	0	0	0	**0**
2020	0	0	0	**0**
2021	0	0	0	**0**

[1] This waste stream has been significantly decreased in generation rates due to identification of alternative use identification, instead of being generated as waste.

[2] This waste has been significantly decreased due to process improvements the decrease the quantity and rate of generation of this type of waste that will have to be treated as explosives waste.

[3] This waste stream has been eliminated.

Note: The waste streams representing (1) detonators, initiators, mild detonating fuses, and blasting caps; (2) shaped charges and test assemblies and (3) projectiles and munitions larger than 0.50 caliber have not been treated in this timeframe but are preserved due to potential for future generation.

6.0 Pollution Prevention and Waste Minimization Efforts at LANL

The first step in the LANL waste management conceptual approach is to identify and implement waste minimization activities to the maximum extent practicable. Waste minimization requires implementation of processes, practices, and procedures to reduce the volume of explosives and explosives contaminated waste that must be ultimately managed as hazardous waste. Considerable effort has been made at LANL to eliminate, minimize, or reuse wastes. Operations and waste management personnel rigorously apply waste minimization principles to "green" the processes and significantly reduce the quantity of high explosives wastes treated by OB/OD.

6.1 Pollution Prevention Practices and Waste Reduction Efforts Implemented at LANL

Waste generators and waste professionals at LANL work continuously to improve the management of regulated and non-regulated wastes that are generated by implementing the following pollution prevention and waste minimization practices:

- LANL has implemented a robust site-wide pollution prevention program. The goal of LANL's pollution prevention efforts is to reduce or eliminate waste whenever possible. However, when waste elimination is not possible, the Laboratory reduces potential adverse environmental impacts by treating waste to reduce its toxicity, segregating waste (separating it into different types) to reduce its overall volume and disposing of waste in a responsible manner. LANL's pollution prevention program provides a number of services, including: (a) opportunity assessments, which systematically evaluate existing processes and provide solutions to eliminate or reduce waste; (b) engineering and technical support to individuals or operations that generate waste; (c) funding for innovative projects that eliminate or substantially reduce waste or conserve natural resources; (d) recognition of individuals and projects that exemplify the goals of the program; (e) communicating pollution prevention success stories and best practices; and (e) facilitating process improvements to avoid or reduce the generation of waste.
- LANL has also implemented a robust site-wide Environmental Management System (EMS). LANL's EMS is certified under ISO Standard 14001, and it provides a systematic method for assessing mission activities, determining the environmental impacts of those activities, prioritizing improvement, and measuring results. The EMS covers every program in the Laboratory and examines any method by which a program impact the environment.
- LANL policies and procedures require generators of explosives contaminated combustible debris to carefully assess whether wastes generated from production and research activities have the potential to detonate. Segregating detonable explosives contaminated debris from non-detonable contaminated debris ensures that only the combustible debris is treated onsite. Non-detonable combustibles are treated and disposed offsite through incineration. As a result of these segregation practices, treatment of explosives-contaminated debris by OB or OD has generally decreased over time and is not expected to significantly increase in the future.
- LANL requires that it's "Shot Review Panel" approve all waste treatment at the Laboratory's OD Units before any waste treatment may occur. The Shot Review Panel is comprised of experts on

a range of matter related to explosives waste OD activities, including but not limited to the following: the effects of OD activities on human health, safety, environment, infrastructure, worker safety, and optimal treatment pathways for explosives wastes generated at LANL. Before any OD treatments can occur, this Panel of experts must agree to conduct the proposed treatment and physically sign-off on as much. Agreement to conduct the waste treatment can only be granted if the Panel determines that the treatment will be protective of human health, safety, and the environment

- Explosives parts can be pressed into their near final shapes using previously unavailable isostatic presses, which have reduced the amount of explosives machining wastes generated. New technology allows for pressing a cone directly, so that the shape requires only minimal finishing through machining.
- Alternative uses are found for explosive pieces that do not meet quality specifications, rather than treating them for waste.
- Explosives contaminated debris is transported for OB or OD operations using reusable containers rather than in disposable plastic bags. While this option is not always viable for some waste streams, extra waste generation is eliminated for explosives contaminated combustible debris.
- The operation of a solvent recovery system for the process generating the highest quantity of explosives contaminated solvents treated onsite. After recovery, the solvents are reused in experimental processes rather than disposed.
- Explosives contaminated oils and solvents that are contaminated with less than 25% explosives are shipped offsite for treatment and disposal. Contaminated oils and solvents with less than 25% explosives in solution are not considered an explosive hazard (DOE, 2019).
- OB waste treatment operators segregate or combine wastes streams to improve waste treatment effectiveness by reducing the burn time, reducing the amount of fuel used, and minimizing the quantity of residue generated by the waste treatment process.
- Excess explosives processing equipment resulting from decommissioning or maintenance activities that is potentially contaminated with explosives is steam cleaned or pressure washed instead of being treated with flashing when feasible.
- Explosives machining operations, as well as most explosives pressing operations, have been consolidated into one building, thereby reducing the potential for explosives contamination at many locations.
- When possible, plastics are steam cleaned and disposed of offsite as non-hazardous waste.
- Highly contaminated molds that cannot be steam cleaned are treated by OD rather than flashing because the products of combustion are more complete due to the higher temperature and pressure present during OD reactions.
- Implementation of a centralized explosive inventory system that is available to all explosives custodians provides the opportunity for owners and users to search a common inventory system

for in-stock explosives materials before ordering new materials. The explosive inventory system further reduces unnecessary explosive wastes.

- Bulk propellants and munitions containing propellants are shipped to an offsite facility for treatment and disposal when possible and practical (e.g. an off-site facility is identified that can accept the waste and the munition is not damaged from experiments).
- The implementation of mercury/explosives separation technology has reduced the amount of toxicity in waste streams and of excess explosives contaminated wastes.

In addition, LANL systematically and successfully applies pollution prevention principles to reduce the toxicity of the explosive waste streams and the amounts of excess explosives and explosives contaminated waste treated onsite. These principles have been demonstrated with the reuse of machining sludge and the reduction of overall OD treatments.

6.2 Anticipated Waste Generation Practices and Continual Improvement

The waste minimization efforts have significantly reduced the quantity of waste that is treated onsite through flashing or OD. Current onsite waste treatment activities by OB or OD is less than waste treatment quantities in the past because of careful evaluation of waste generating practices. From 2011 through 2019, LANL has treated an average of 1,794 pounds per year by OB and 257 pounds per year by OD. It is anticipated that future waste treatment quantities would remain at, or be less than, the current quantities. However, risk reduction efforts at LANL may increase the overall amounts of waste needing treatment in specific years and may occasionally increase the annual quantity of waste to be treated in the future.

Explosive inventory reduction efforts will continue to reduce the explosives waste inventory. These efforts have included the increased shipment of explosives offsite for disposal, as well as onsite reuse and onsite treatment of excess explosives as necessary. Explosives are only treated by flashing or OD when other options have not proved viable.

7.0 LANL-Specific Factors Relevant to Consideration of Alternative Treatment Technologies

EPA's 2002 guidance for the permitting and operation of OB and OD treatment units states that the selection and appropriateness of OB and OD treatment should be based upon the following factors (EPA, 2002): (1) site specific safety; (2) transportation hazard potential; (3) offsite treatment options; and (4) feasibility of alternatives technology considerations. Furthermore, as discussed above, EPA and the NASME have acknowledged that there are certain circumstances and types of energetic waste that necessitate the use of OB/OD treatment based upon safety hazards and other site-specific feasibility factors. LANL-specific factors relevant to the consideration of alternative treatment technologies for the explosive waste treated at LANL's flash pad and OD units are discussed below.

7.1 General and Site-Specific Safety and Feasibility Factors

DOE has an active role in research and development of explosive formulations, explosives synthesis, charge geometry, and explosive assemblies for national defense. DOE and operating organizations maintain explosives safety standards that fully address potential risks. Maintaining worker and public safety is paramount in all DOE explosives handling operations. The most important consideration when managing explosives waste streams is to minimize or eliminate, if possible, the danger and exposure to workers and the public from accidental ignition of the waste. At LANL, all work activities associated with explosives and other energetic materials are carefully controlled, and safety is maintained through compliance with the requirements outlined in the *DOE Standard for Explosive Safety* (DOE, 2019).

Site-specific safety and security are important concerns in every decision to treat explosives waste on- or offsite at LANL. Each onsite waste treatment activity at LANL is carefully planned to minimize worker exposure and handling of explosives. Personnel trained in explosives handling and familiar with the explosives' characteristics conduct the onsite waste treatment operations. This reduces the potential for compromising the energetic material and for the likelihood of serious injury or death. LANL explosive waste streams vary widely in form and constituents. Onsite explosives professionals are familiar with the specific types of explosives waste generated at LANL and the processes that generate them. Therefore, due to this site-specific knowledge and capability, it is safer to treat many of these specialized wastes onsite at LANL than to ship them offsite.

Likewise, site-specific safety concerns have been critically important in LANL's decisions regarding waste storage. Explosive wastes must be stored for a time to accumulate sufficient quantities for treatment or disposal, whether on- or offsite. Rigorous administrative processes are used to maintain explosives safety at LANL. Specific safety procedures address the precautions routinely taken in order to ensure compliance with established explosive weight limits in each explosives work area, in order to prevent overloading a facility or area. LANL has used multiple generator accumulation locations for explosive wastes in smaller quantities to prevent propagation of accidental explosions.

Any decision to further increase the types or quantities of explosives waste streams shipped offsite, or to adopt other onsite treatment technologies, would require additional storage areas and/or longer-term storage of explosives waste streams, which increases site-specific safety risks at LANL. Any increase in site-specific safety risks at LANL is not acceptable. Therefore, the additional safety hazards due to requiring additional storage must be taken into account when comparing treatment alternatives.

Additional site-specific feasibility factors include that security considerations can also complicate the ability to treat LANL explosive waste offsite. Security related considerations significantly delay or prohibit the acceptance by, or transport to, an offsite treatment facility. These factors further affect the decision to treat waste onsite.

7.2 Transportation Hazard Potential

Section 5.0 and 6.0 describe the composition of explosive waste streams and efforts to avoid or minimize the generation of these wastes to the maximum extent practicable. The remaining wastes must be treated or disposed in accordance with applicable requirements. As described in the Section 3.0, the next step in the waste management conceptual approach is to review the remaining explosives contaminated waste stream-by-stream to identify candidate wastes that could be safely transported offsite to permitted facilities for treatment and disposal.

Most LANL wastes can be safely and securely shipped offsite. LANL continues to review its explosive wastes to identify additional opportunities for increased offsite shipment where feasible and where it can be done safely. However, as energetic materials age or are subjected to testing, the resulting waste may develop properties that are unpredictable. LANL explosive waste that are aged, sensitive, or otherwise-unstable and cannot be stabilized are legally prohibited from transportation on public roadways, in accordance with United States Department of Transportation (DOT) regulations (49 CFR Part 173, Subpart C, § 173.53). When stabilized through desensitization, or another process, to lower the sensitivity, energy output, and flame temperature of the composition, these types of explosive wastes can be transported on public roadways and, when possible and practical, this is LANL's practice. For those LANL explosives wastes that cannot be stabilized for offsite transportation because the transportation hazard potential is too great or is legally prohibited, the wastes are accumulated onsite in compliance with generator accumulation requirements and waste storage hazards are minimized by performing flashing and/or OD treatment onsite as often as needed to avoid accumulating excess waste inventory and exceeding the work areas' explosives safety limits.

7.2.1 Transportation Safety and DOT Transportation Requirements

Shipments of numerous types of hazardous materials (including explosives) on public roads pose hazards and risks for both public and worker safety. Because of this, the DOT and States have imposed restrictions and prohibitions on transport of explosives and explosives contaminated wastes. Some waste streams generated at LANL cannot be legally or safely transported on public roadways to offsite commercial facilities. Waste streams that cannot be safely transported on public roadways are those that cannot be properly stabilized or do not meet offsite facilities waste acceptance criteria. In some cases, noncombustible debris contaminated with explosives cannot be released from LANL explosives areas without being flashed. DOT specifies explosives transportation requirements within the hazardous materials requirements in Title 49 CFR. The 49 CFR § 173.54 list of "Forbidden Explosives" that may not be offered for transport or transported includes:

- New explosives that have not been examined, classed and approved for transport;
- Explosives containing chlorates either as an ammonium salt or an acidic substance;
- Damaged packages or articles;
- Propellants that are unstable, condemned or deteriorated;
- Explosives specifically forbidden in the Table of Hazardous Materials (49 CFR § 172.101); and
- Explosives that fail to pass specified sensitivity, stability and burning tests.

In addition, all LANL explosives waste streams that have not been previously shipped offsite must be tested, classified, and assigned proper shipping names and an EX number[3] by the DOT Associate Administrator in accordance with DOT requirements in 49 CFR §§ 173.56 through 173.58 in order to transport explosives wastes on public roads or highways. Any explosives waste streams that fail the required testing series cannot be assigned numbers or transported to commercial facilities. There is currently a substantial backlog of new explosives document requests pending review by the DOT Associate

[3] An EX number is issued by DOT to identify an explosive that has been tested and classified by DOT (49 CFR 171.8 and 49 CFR 173.56).

Administrator's office. Review of new requests may take several years. An Interim Hazard Classification (IHC), valid for up to one year, theoretically could be issued by DOE for new explosives in lieu of an EX-ID-number, if a commercial facility was willing to accept a waste transported under this condition; but, this too is a difficult and lengthy process, and few commercial facilities are willing to accept such wastes.

Therefore, because of the transportation hazards, and storage and security requirements, LANL will always need to maintain onsite waste treatment capability to safely disposition those materials which are prohibited from transport by DOT.

7.2.2 Federal Requirements for Transfer of Weapons Materials and Explosive Material to Commercial Facilities

Federal security and property requirements for classified waste and military munitions (as applicable) add to the complexity of handling, transport, and treatment of explosives wastes generated at LANL. Many of the LANL explosives waste streams that require OB or OD treatment, when unreacted, may contain classified components or features. These components or features complicate LANL's ability to transport an explosive hazardous waste offsite and add to the transportation hazard for LANL wastes. Some explosive waste- items may be controlled property according to DOE or DoD requirements and may not be eligible for release to an offsite disposal facility, even for purposes of destruction. Likewise, offsite treatment may be entirely prohibited or may be significantly delayed due to prohibitions and restrictions on transportation of that waste to an offsite facility.

7.3 Offsite Treatment Options

LANL currently maintains the capability to ship several of its explosive wastes offsite to RCRA permitted commercial treatment facilities. LANL ships permissible bulk propellants, munitions containing propellants, and excess explosives to offsite facilities for treatment, storage, and disposal, when the waste meets the facility's waste acceptance criteria (WAC), offsite disposal is economically feasible, and the waste can be safely transported.

In order to be sent to an offsite permitted commercial treatment, storage, and disposal facility (TSDF), any explosive waste candidates must meet the following requirements:

- The TSDF's WAC must comply with applicable Land Disposal Restriction (LDR) requirements;
- The Department of Transportation (DOT) requirements; and
- The Federal requirements for transfer of weapons materials and explosive materials to commercial facilities, including security and property requirements for classified waste and military munitions (as applicable).

Offsite treatment decreases the overall quantity of explosive waste that must be treated onsite by OB or OD. However, wastes awaiting shipment must be accumulated and stored onsite until the treatment facility approves the waste shipments which, as noted above in Section 7.2, is a significant site-specific safety consideration.

7.3.1 Offsite Facilities' Waste Acceptance Criteria and Acceptance Process

Offsite commercial TSDFs establish criteria to ensure that explosive waste streams accepted for disposition meet the facility's individual RCRA permit requirements and can be safely handled and properly treated by the facility (i.e., to ensure compliance with applicable LDR standards). Requests for treatment and disposal must include documentation that confirms compliance with the facility's WAC including a description of the physical form, chemical constituents, EPA Hazardous Waste Numbers (EPA HW No.), DOT Proper Shipping Name (PSN), and explosive ID number.

Shipments of LANL's explosive wastes offsite are also subject to the availability of appropriate storage and treatment capacity at the receiving facility. Wastes cannot be transported until shipments are approved by the facility. The elapsed time between submitting a request for transport and receiving authorization to ship can sometimes be significant (up to six months).

7.3.2 Current Offsite Treatment Options

Options for waste treatment offsite are limited because explosive wastes streams that are considered detonable, or have the capability of exploding, require a special permit to be shipped as non-regulated waste. There are currently three commercial facilities capable of accepting and/or treating some of the explosives waste streams generated at LANL, including the Clean Harbors, Colfax Facility; the General Dynamics Ordnance and Tactical Systems, Main Office and Disposal Facility; and the Veolia ES Technical Solutions-Trade Waste Incineration (Veolia-TWI). At this time, LANL will typically send explosive-contaminated waste streams to Veolia-TWI and Clean Harbors, Colfax Facility.

The Clean Harbors, Colfax Facility, located in Colfax, Louisiana, consists of twenty separate treatment units (40 CFR Part 264, Subpart X, Thermal Treatment Units) with the capability of treating reactive (D003) characteristic hazardous wastes through OB processes. The facility is capable of treating up to 480,000 pounds of explosives waste annually and has the capability of storing up to 50,000 pounds of explosives (Clean Harbors, 2019).

Veolia-TWI, located in Sauget, Illinois, consists of three permitted treatment units (two fixed hearth thermal treatment units and one rotary kiln thermal treatment unit) with the capability of treating explosives waste that has been properly characterized; provided that the waste does not contain any prohibited wastes as listed within the facility permit (Veolia Environmental Services, 2019). The facility includes a magazine that is used to store up to 100,000 pounds Bureau of Alcohol, Tobacco, Firearms and Explosives (BATF) low explosives. The facility has no capability to store BATF high explosives or detonators, but it can process them.

The General Dynamics Ordinance and Tactical Systems facility, located in Joplin, Missouri, consists of two RCRA Part B permitted and maximum achievable control technology (MACT) compliant incinerators (one of which is a rotary kiln incinerator) and a car bottom furnace (General Dynamics, 2019).

7.3.3 Public and Worker Safety Issues with Offsite Treatment

Each of the available offsite facilities is located at some distance from LANL. Clean Harbors, Colfax Facility is located 842 miles east of LANL; General Dynamics Ordnance and Tactical Systems, Carthage, is located approximately 800 miles east of LANL; and Veolia-Trade Waste Incineration Facility is located 1,084 miles northeast of LANL. Transportation of waste from LANL to any of these facilities would be via motor carrier over public roads. Transportation of explosives by motor carrier occurs nationwide on a daily basis, but not without risk to the public. In contrast, the public has limited contact with or access to explosives transported for onsite treatment at LANL. By treating onsite, LANL can control the transportation of the waste by controlling the traffic in the area, the speed at which it can travel, and can limit the area within which the waste is moved. Treatment of waste onsite decreases the potential for the public to be exposed to these hazards. Onsite treatment also decreases the handling of waste required by workers. Packaging and transport for onsite treatment are conducted by explosives personnel that have experience handling the specific wastes generated at LANL that are not in pristine condition, have been subjected to damage, and/or are generated from unique processes. Shipment to offsite facilities increases personnel handling of these explosives, an requires that explosives wastes be handled by personnel who are less knowledgeable and experienced with these particular waste streams. In addition, offsite transportation increases offsite human and environmental impact along the transportation route, the overall carbon emissions from transport vehicles and the increased risk of transportation incidents, theft, or diversion.

Most TSDFs require a minimum volume per shipment, as specified in the facility's WAC. Quantities of explosives waste streams generated at LANL have been generally decreasing with the implementation of waste reduction initiatives; however, generation rates are not consistent because they are based on programmatic activities from year to year. Wastes treated onsite are currently treated within days or weeks of generation. Without the treatment capabilities, LANL shippable wastes would have to be accumulated until the minimum volume accepted by an offsite treatment facility was reached or a lesser quantity for transport can be brokered with the receiving facility (see Sections 7.2 and 7.3 for additional discussion on the hazards of increased storage). Explosives may deteriorate or become unsuitable for transport while waiting for disposal approval. The inability to promptly remove and dispose of excess, aging, or insulted explosives rapidly and minimize time and amounts in storage unnecessarily exposes workers to greater hazards.

7.3.4 National Security Considerations for Offsite Treatment

As part of its national security mission, DOE/Triad will continue to develop explosive formulations and assemblies that may be related to threat reduction, homeland security, and enhanced security projects. During times of heightened security risk, LANL has prohibited the shipment of certain explosives waste because of the increased risk of transportation-related incidents, theft, or diversion. These concerns affect the selection of alternatives for treating such non-shippable wastes onsite.

7.3.5 Summary of Offsite Treatment Considerations

Although LANL has worked to increase the amounts and types of explosive waste streams shipped offsite for treatment and disposal and further to reduce the overall quantity of explosives waste treated onsite, increased offsite treatment and disposal is not feasible at this time. LANL employs offsite treatment whenever practicable. However, options for increased offsite treatment are often limited and the following factors are taken into account:

- Explosives may deteriorate or become unsuitable for transport while waiting for disposal approval, presenting site-specific safety considerations and increased transportation volume pose some public risk;
- Additional storage requirements would pose greater permitting liability and increased hazards to accumulate effective shipment quantities; and
- Under any scenario, onsite treatment via both flashing and OD at LANL will always be required to treat the excess explosives, non-shippable and classified wastes, and noncombustible debris wastes that cannot be shipped offsite for disposal without prior treatment.

8.0 Assessment of Alternative Treatment Technologies

This section discusses the feasibility of onsite treatment through alternative technologies. Specifically, this section analyzes whether alternative treatment technologies exists that could more safely and effectively treat the explosive hazardous waste currently treated at LANL's flash pad and OD units. there are available alternative technologies that can more safely and effectively to OB/OD.

In accordance with the approach outlined in the 2002 EPA Region III *Draft Permitting Guidelines*, the following approach was used (EPA 2002):

1. Identify and categorize alternative treatment technologies other than OB or OD to treat explosives contaminated waste onsite.
2. Screen each candidate technology for its state of development and availability, and for its applicability to treat LANL's energetic waste streams.
3. Evaluate the effectiveness of each alternative technology relative to OB or OD using a rigorous set of evaluation criteria.

8.1 Identification of Candidate Technologies

Alternatives to OB/OD have been researched for nearly three decades, primarily by the DoD military munitions community in support of global demilitarization efforts. Most research on alternative technologies has been oriented toward the disposition of excess military munitions due to the volumes of unwanted excess munitions stockpiled at DoD facilities throughout the world and the cleanup of firing ranges. Waste munitions consist primarily of encased weapons, such as rockets, missiles, bombs, mortar rounds, artillery ammunition, grenades, cluster munitions, and land mines. Technology development has focused mainly on production-scale demilitarization activities, with little consideration of wastes from explosives research and development.

In an effort to exercise due diligence in considering all possible alternatives, DOE/Triad sought to obtain information from all likely sources, including those focused more on demilitarization of waste munitions. Publicly available information was collected and reviewed from the national and global demilitarization communities including from organizations, such as the Defense Technical Information Center (DTIC, 2019), the DoD facilities and programs recent reviews of alternatives (e.g., Naval Air Warfare Center Weapons

Division (NAVAIR-WD, 2004)); the National Academy of Sciences (NAP, 2019); the EPA (EPA, 2019); the Global Demilitarization Symposium (JOCG 2010, 2011); the Strategic Environmental Research and Development Program (ETSCP, 2006 and SERDP, 2013); and from private industry (Eldorado Engineering, 2019; Dynasafe; 2019). LANL screened each candidate's technology for its state of development and availability, and for its applicability to treat LANL's energetic waste stream.

Candidate technologies were first pre-screened to eliminate methods or technologies that are either inapplicable to the explosive waste streams at LANL, those that are pre- or post-processing steps in a treatment train rather than primary treatment processes, and those that were not considered sustainable for LANL site-specific requirements. Therefore, treatment technologies that were identified as pre-treatment, mitigation methods, or in-situ techniques were screened from identified candidate technologies. The rationale is described further below:

> **Demilitarization/pre-treatment methods.** Demilitarization/pre-treatment methods are not applicable to OB or OD at LANL. Demilitarization focuses on reclaiming and recovering the explosives from munitions for sale or reuse, and on disassembling surplus military equipment for recycling and disposal. At LANL, explosives encased in metal or plastic comprise an extremely small amount of LANL's explosives waste stream and cannot be recovered or reclaimed for sale or reuse.
>
> **Mitigation technologies.** Mitigation technologies do not destroy the explosive, but rather mitigate effects of the primary treatment activity taking place. For example, foam may be used with OD to prevent fragment dispersal and mitigate the sound of the destruction technology (i.e., sometimes, earth fill has been placed atop an OD shot for this purpose). As such, mitigation technologies are not applicable alternatives to the explosives waste streams discussed here.
>
> **In-situ technologies**. In-situ technologies such as biodegradation are applied to environmental media (soils and groundwater) as part of remedial actions. As such, they are not applicable to the LANL explosives waste streams discussed here, which do not include explosives-contaminated environmental media.

After prescreening, a list of nineteen potential technologies that could treat explosives contaminated waste to meet LDRs was compiled. Commercially available technologies identified for further evaluation are listed in **Table 8-1**. These technologies include alternatives for both OB and OD, such as case opening, chemical conversion, co-firing in boilers, contained burn (i.e., confined burn facility and energetic-contaminated waste), contained detonation, incinerator (i.e., plasma arc and rotary kiln), and oxidation (i.e., base hydrolysis). Some technologies are potential alternatives for only open burn, including a contaminated waste processor, cryofracture, flashing furnace, open detonation, and oxidation (cerium-catalyzed). Other technologies are considered potential alternatives for only open detonation, including cryogenic cutting, hydromilling, liquid ammonia extraction, and open burn.

Table 8-1. Initial Identified Technology Candidate List

	Technology	Treatment Type	Description
1	Case Opening	OB/OD	Case opening involves a variety of techniques to separate a munitions' body (projectile) from the cartridge case. The remaining energetic material will need to be treated and/or destroyed using alternative technologies.
2	Chemical Conversion	OB, OD	Chemical conversion involves using processes such as solvent extraction and solvolytic extraction to convert recovered explosives and propellants to other products. This technology can only treat specific types of explosives waste based upon the specific chemical makeup of the explosive. Extraction technologies frequently create a secondary hazardous waste stream consisting of organic solvents.
3	Co-firing in Boilers	OB, OD	Co-firing in boilers can be utilized for explosives that can be desensitized so that they can be co-fired with traditional fuels in commercial boilers for heating. The explosive must be soluble in fuel oil #2.
4	Contained Burn (#1), at a Confined Burn Facility	OB, OD	Contained burn at a confined burn facility consists of explosives contaminated wastes that are treated in blast-reinforced chambers. In some cases additional fuel (such as kerosene) must be added to the waste stream. The combustion gases are contained and processed through air emissions control equipment. This treatment is frequently used by the military to destroy small caliber ammunition and bulk explosives. Small-scale confined burn facilities are currently in use by law enforcement agencies nationwide. The waste is ignited using a squib and allowed to burn of its own accord.
5	Contained Burn (#2), Energetic-Contaminated Waste	OB, OD	Energetic-contaminated waste technology is designed for wastes contaminated with small amounts of explosive material. It is similar to contained burning, but is targeted more toward burning combustible wastes contaminated with explosives rather than ammunition or bulk explosives. It is used mostly for combustible wastes (e.g., rags, gloves, wipes, plastic, etc.) that are contaminated with small amounts of explosives. Because there is no controlled fuel supply or "controlled flame device", a contained burn unit may be permitted as a miscellaneous unit under RCRA Subpart X, rather than being permitted as an incinerator. This waste is ignited using a squib and is allowed to burn of its own accord, with the aid of added fuel (e.g. kerosene) in some cases.
6	Contained Detonation	OB, OD	Contained detonation involves the detonation of explosive wastes inside a steel chamber constructed to dampen the blast. After burning reactions are suppressed to protect the integrity of the chamber. Particulates are filtered from the detonation gases. This technology is best suited for small pieces of explosives, and residuals may transform into toxic or more complex compounds than those created when treating the same waste by OB or OD.

Table 8-1 Initial Identified Technology Candidate List (continued)

	Technology	Treatment Type	Description
7	Contaminated Waste Processor	OB	A contaminated waste processor (CWP) consists of a car bottom furnace that treats contaminated combustible waste, such as rags, gloves, wipes, fiber drums, pallets, plastic, coveralls, etc. Typically, the CWP does not require a RCRA permit and is capable of batch or continuous feed operations.
8	Cryofracture	OB	Cyrofracture process used to cool ferrous munition bodies below their embrittlement temperature and allow the munitions to be fractured in a hydraulic press. This process allows access to the energetics so they can be treated by thermal destruction. This technology is suitable for size reduction prior to a thermal treatment. This treatment method has mostly been used for projectile explosives and is not suitable for explosive materials at LANL.
9	Cryogenic cutting	OD	Cyrogenic cutting technology uses liquid nitrogen that is pressurized and then ejected through a small orifice at high velocities. The system includes a cryogenic fluid supply system, a pressurization system, a temperature control system, a nozzle system, a recovery system, and a manipulation system. This treatment is effective as a pre-treatment to cut through casings for the purpose of removing the casing from the explosive prior to treatment; however, a static charge can build up under certain circumstances and is a safety concern. Secondary materials spray is an additional waste stream. This treatment method is not suitable for explosive materials at LANL.
10	Flashing Furnace	OB	A flashing furnace thermally decontaminates metal parts with explosive contamination. Up to 10,000 pounds of contaminated metal can be flashed per hour. The furnace can be installed in a fixed location or can be trailer mounted for field applications. Because this technology is enclosed and has a controlled flame device, permitting of the unit may require adherence to 40 CFR 264, Subpart O (incinerator) requirements.
11	Incinerator, Fluidized Bed	OB, OD	A fluidized bed incineration is an enclosed incinerator that utilizes the injection of explosives waste into a turbulent bed of hot sand, created by forced air. Emissions are filtered prior to release to the environment. This process is limited to liquids, slurries, and powders with low organic content. The powders must be homogeneous in size.
12	Incinerator, Plasma Arc	OB, OD	A plasma arc incineration uses molten slag (i.e., soil with iron fluxing agent) which destroys organic compounds. The technology encapsulates inorganic toxic solid wastes in the molten slag and when hardened is disposed. Emissions are filtered prior to release to the atmosphere. This is an enclosed alternative to incineration that can be utilized for explosive wastes that are high in organic compounds (e.g., paint, solvents).
13	Incinerator, Rotary Kiln	OB, OD	A rotary kiln incineration is an enclosed incinerator treatment technology. The rotary kiln slowly moves waste from one end to the other and waste detonates or combusts within the chamber;

Table 8-1 Initial Identified Technology Candidate List (continued)

	Technology	Treatment Type	Description
			therefore, only small amounts of explosive waste can be treated at one time. Emissions are filtered prior to release to the atmosphere. Small explosive items with casings (<40 grams energetic material) can also be treated with this technology. Uniform explosive waste streams are treated most efficiently.
14	Hydromilling	OD	Hydromilling of explosive waste uses high pressure water jets to "cut" through the material. This is a pre-treatment technology that is not conducive for experimental explosive waste streams. A secondary hazardous waste stream of water and explosives is created by this process.
15	Liquid Ammonia Extraction	OD	Liquid ammonia extraction uses propellant, explosive fuel and oxidizer ingredients to extract, separate, and recover the explosive using liquid ammonia. This treatment method can treat explosive wastes that have a plastic binder associated with the waste in a limited capacity.
16	Open Burning	OB	Open burn of explosives waste destroys waste by self-sustained combustion after being ignited or by controlled burning in an open environment. This technology best serves waste generated during machining of explosives, excess explosive powders and pieces, explosive contaminated combustible wastes, laboratory samples of experimental explosives, and large pieces of equipment that must be flashed prior to shipment offsite for recycle or disposal.
17	Open Detonation	OD	Open detonation involves the detonation of explosive wastes in an open air environment. This technology is best suited for small or large pieces of explosives. OD is especially appropriate for aged explosive material with difficult to predict properties because OD requires a minimum of moving and handling.
18	Oxidation, Cerium-catalyzed	OB	Cerium-catalyzed electrochemical oxidation operates at atmospheric pressure and can convert organic hazardous waste materials into carbon dioxide and water. This technology is used to treat organic pumpable fluids.
19	Oxidation, Base Hydrolysis	OB, OD	Base hydrolysis oxidation heats waste to mild temperatures (90 to 150 ˚C) and usually elevated pressures (200 pounds per square in. gauge) with a strong base (pH>12). The explosive waste is converted to water-soluble, non-energetic products. The resulting solution is hazardous and must be further treated using bio-remediation or supercritical water oxidation.

8.2 Screening for State of Development and Availability and for Applicability to Treat LANL's Energetic Waste Streams

The screening, summarized in **Table 8-2**, used the following criteria to determine which, if any, of the initial candidates could be viable technology alternatives to OB or OD for onsite treatment:

1. Which of the explosives waste streams (and/or what percentage of all the explosives wastes) can be effectively treated with this technology?
2. What are the limitations of the technology regarding its implementability and/or short-term effectiveness (e.g., size and weight limitations to input; the need for multi-step processes; safety issues; and production of secondary hazardous waste streams)?
3. Is the technology a viable alternative to OB or OD? In this context, to be considered 'viable' by LANL, the technology must be commercially available today (from a qualified vendor), and must have a proven track record of performance in treating explosive wastes. Only proven, commercially-available alternatives should be considered. Technologies that are still in the bench- or pilot-scale or demonstration phase of development are candidates for future further assessment but, currently, are not feasible alternatives.

Through this screening process, LANL determined that five of the candidate alternative technologies could potentially treat at least some portions of LANL's explosives waste streams. There is no alternative that could eliminate OB/OD treatment for all LANL explosive waste streams. The technologies that could treat some LANL explosive waste streams are: (1) contained burn in a confined burn facility (to treat excess explosives), (2) contained burn for explosives contaminated waste, (3) contained detonation (to treat smaller amounts of excess explosives and smaller combustible debris items), (4) a flashing furnace (to treat some noncombustible debris), and (5) rotary kiln incineration (to treat machining waste and powdered explosives). A graphical representation of the screening process is included as **Figure 8-1**.

Table 8-2. Comparison of Alternative Technologies for Opening Burning/Open Detonation Waste Treatment

Summary of Technologies Potentially Applicable to LANL Hazardous Wastes

Treatment Technology	OB Waste Stream Applicability	OD Waste Stream Applicability	Waste Streams that can be Treated by Technology	Limitations	Permits Needed	Worker Safety Considerations	Human Health and Environmental Considerations	Energy Requirements	Secondary Waste Streams	Uncertainties	Relative Cost Range
Contained Burn (#1), at a Confined Facility	~7%	~50%	Excess explosives (small sized only)	Limited by the size of explosives Secondary waste streams created are scrubber waste and bag house dust	RCRA (Subpart X) Revise Title V CAA Construction Permits	Increased waste handling by workers. With undetermined or insulated explosives waste, a contained burn is an unacceptable risk to personnel. There is no controlled flame to ensure complete detonation or burn of the explosive, and typically no capability to view if the explosive has been fully treated prior to opening the chamber. Unit increases the potential for catastrophic failure (explosion) when compared to current treatment technique.	Combustion and waste degradation gases emitted from air pollution control equipment	Requires supplemental fuel Requires power for emissions collection and treatment	Secondary waste streams include scrubber waste and baghouse dust. Process effluents include emissions from scrubbing system, burn and scrubber residue, residues from quench rinse, and decontamination waters. Emissions scrubbing system must be designed to capture dioxins/furans that may be generated during the process, as the temperature is not controlled. Periodic replacement of air pollution control system components such as cloth bags and filter media.	Means of treating larger components is unknown Not clear what limits of HE energy can be safely handled.	*Capital:* + Construction of blast chambers, air pollution control equipment. Cost is very high considering the low volume of LANL energetic waste generation, and that the technology is applicable to only a small fraction of LANL energetic wastes. *O&M:* + O&M of air pollution control equipment; supplemental fuel cost; management, treatment & disposal of secondary waste streams; employee training for contained burn facility. Must include costs for existing LANL OB/OD activities, as blast chamber can handle only a small portion of LANL energetic wastes.

Table 8-2 Comparison of Alternative Technologies for Opening Burning/Open Detonation Waste Treatment (continued)

Treatment Technology	OB Waste Stream Applicability	OD Waste Stream Applicability	Waste Streams that can be Treated by Technology	Limitations	Permits Needed	Worker Safety Considerations	Human Health and Environmental Considerations	Energy Requirements	Secondary Waste Streams	Uncertainties	Relative Cost Range
Contained Burn (#2), Energetic-Contaminated Waste	<1%	<1%	Explosives-contaminated combustible debris	Limited to explosives-contaminated combustible debris	RCRA (Subpart X) Revise Title V CAA Construction Permits	Increased waste handling by workers.	Combustion and waste degradation gases emitted from air pollution control equipment	Requires fuel for ignition only Requires power for emissions collection and treatment	Secondary waste streams may include scrubber waste and bag house dust. Process effluents include emissions from scrubbing system, burn and scrubber residue, residues from quench rinse, and decontamination waters. Emissions scrubbing system must be designed to capture dioxins/furans that may be generated during the process, as the temperature is not controlled. Periodic replacement of air pollution control system components such as cloth bags and filter media. Due to absence of supplemental fuel throughout the burn, residual waste (ash) may require supplemental treatment	Limited to a very small fraction of LANL energetic wastes. Due to absence of supplemental fuel throughout the burn, residual waste (ash) may require supplemental treatment.	*Capital:* + Construction of contained burn chambers, air pollution control equipment. Cost is very high considering the low volume of LANL energetic waste generation, and that the technology is applicable to only a small fraction of LANL energetic wastes. *O&M:* + O&M of air pollution control equipment; management, treatment & disposal of secondary waste streams; employee training for contained burn facility. Must include costs for existing LANL OB/OD activities, as contained burn chamber can handle only a very small fraction of LANL energetic wastes.

Table 8-2 Comparison of Alternative Technologies for Opening Burning/Open Detonation Waste Treatment (continued)

Treatment Technology	OB Waste Stream Applicability	OD Waste Stream Applicability	Waste Streams that can be Treated by Technology	Limitations	Permits Needed	Worker Safety Considerations	Human Health and Environmental Considerations	Energy Requirements	Secondary Waste Streams	Uncertainties	Relative Cost Range
Contained Detonation	~5%	~50%	Explosives-contaminated combustible debris (smaller)	Limited to small bulk explosives and combustible debris Limited lifetime on number of detonations the chamber can treat Chamber becomes a difficult to dispose of hazardous waste	RCRA (Subpart X) Revise Title V CAA Construction Permits	Large pieces of explosives may require size reduction prior to treatment in order to meet the operating capacity of the unit. This requires more handling by the worker and subsequent safety concerns. There is a potential for catastrophic failure.	Air emissions (e.g., CO_2, H_2O and N_2) from detonation chamber. Metal fragments (contained near unit).	Electricity; may require supplemental fuel Requires power for emissions collection and treatment	The secondary waste stream consists of ash and fragments. Process effluents include metal fragments, pulverized gravel, air pollution control unit residue, major burn emissions including CO, CO_2, H_2O, NO_x, N_2; and secondary combustion products due to residence time. Limited lifetime of chamber with replacement required and disposal of used chamber	Limited to a fraction of LANL energetic wastes.	*Capital:* + Construction of contained burn chambers, air pollution control equipment Cost is exorbitant considering the low volume of LANL energetic waste generation, and that the technology is applicable to only a small fraction of LANL energetic wastes *O&M:* + O&M of air pollution control equipment; management, treatment & disposal of secondary waste streams; employee training for contained detonation facility. Must include costs for existing LANL OB/OD activities, as contained detonation chamber can handle only a small portion of LANL energetic wastes.

Table 8-2 Comparison of Alternative Technologies for Opening Burning/Open Detonation Waste Treatment (continued)

Treatment Technology	OB Waste Stream Applicability	OD Waste Stream Applicability	Waste Streams that can be Treated by Technology	Limitations	Permits Needed	Worker Safety Considerations	Human Health and Environmental Considerations	Energy Requirements	Secondary Waste Streams	Uncertainties	Relative Cost Range
Contaminated Waste Processor	<1%	None	Explosives-contaminated combustible debris	Limited to explosives-contaminated combustible debris and residues, which comprise an exceptionally small fraction of the LANL OB/OD waste stream	RCRA (Subpart X) Revise Title V CAA Revise CWA NPDES for cooling and wastewater Construction Permits	Increased waste handling by workers. Specific training for operators and explosives safety personnel would be required and would have to be conducted within a secure area. Training on treatment techniques for limited waste streams would also be necessary. Confinement of explosives within a treatment unit could additionally lead to a build-up of residual pressure from breakdown products within the unit—a potential explosion hazard.	Emissions from combustion of fuel and waste	Fuel for combustion Power for operation of emissions controls and wastewater treatment	Secondary waste streams include ash, baghouse particulate and scrubber residues. Process effluents are emissions from scrubbing system, burn and scrubber residue, residues from quench rinse, and decontamination waters.	Proven technology for only certain waste types	*Capital:* ++ Construction of CWP and air pollution control equipment. Cost is exorbitant considering the low volume of LANL energetic waste generation, and that the technology is applicable to only a very small fraction of LANL energetic wastes *O&M:* ++ Operation of CWP and air pollution control equipment; fuel for CWP; employee training for CWP. Must include costs for existing LANL OB/OD activities, as CWP can only handle a very small fraction of LANL energetic wastes.

Table 8-2 Comparison of Alternative Technologies for Opening Burning/Open Detonation Waste Treatment (continued)

Treatment Technology	OB Waste Stream Applicability	OD Waste Stream Applicability	Waste Streams that can be Treated by Technology	Limitations	Permits Needed	Worker Safety Considerations	Human Health and Environmental Considerations	Energy Requirements	Secondary Waste Streams	Uncertainties	Relative Cost Range
Flashing furnace	~3%	None	Explosives-contaminated non-combustible debris	Limited to explosives-contaminated noncombustible debris, typically metal, which is a very small fraction of the LANL OB waste stream	RCRA (Subpart O) Revise Title V CAA Construction Permits	If the unit is mobile, precautions will have to be in place to ensure that fuel can be located at each specific location within the explosives area. Increased waste handling by workers. Trained personnel would be required to conduct treatment activities.	Emissions from fuel combustion and waste flashing – CO, CO_2, H_2O, NO_2, N_2.	Requires fuel to heat flash furnace	The secondary waste streams include explosives contaminated non-combustible debris. Expected emissions are CO, CO_2, H_2O, NO_x N_2, and little to no secondary combustion products due to short residence. Residual ash is not expected.	Limited to a very small fraction of LAL energetic wastes – i.e., explosives-contaminated noncombustible debris, typically metal.	*Capital:* ++ Construction of flash furnace facility and air pollution control equipment. Cost is exorbitant considering the low volume of LANL energetic waste generation, and that the technology is applicable to only a small fraction of LANL energetic wastes. *O&M:* ++ Operation of flash furnace and air pollution control equipment; fuel for flash furnace; employee training for flash furnace. Must include costs for existing LANL OB/OD activities, as CWP can only handle a very small fraction of LANL energetic wastes. Must include costs for existing LANL OB/OD activities, as flashing furnace can only treat a portion of LANL energetic wastes.

Table 8-2 Comparison of Alternative Technologies for Opening Burning/Open Detonation Waste Treatment (continued)

Treatment Technology	OB Waste Stream Applicability	OD Waste Stream Applicability	Waste Streams that can be Treated by Technology	Limitations	Permits Needed	Worker Safety Considerations	Human Health and Environmental Considerations	Energy Requirements	Secondary Waste Streams	Uncertainties	Relative Cost Range
Incineration, Fluidized Bed	~70%	<1%	Explosives machining waste (powdered only)	Applicable to explosives machining waste (powdered only) Limited to treating powders, liquids and slurries Cannot treat most bulk explosives or noncombustible debris	RCRA (Subpart O) Revise Title V CAA CWA NPDES (may generate cooling water and wastewater requiring treatment before discharge) Construction Permits	Increased waste handling by workers. Specific training for operators and explosives safety personnel would be required and would have to be conducted within a secure area. Training on treatment techniques for limited waste streams would also be necessary. Confinement of explosives within a treatment unit could additionally lead to a build-up of residual pressure from breakdown products within the unit—a potential explosion hazard.	Emissions from heat (combustion) source	Energy source (e.g., fuel combustion, electricity) required to heat fluidized bed Power for operation of emissions controls and wastewater treatment	Secondary waste streams include ash and scrubber residues; periodic replacement of fluidized bed media.	Limited to a fraction of LANL energetic wastes.	*Capital:* ++ Construction of fluidized bed incinerator facility and air pollution control equipment Cost is exorbitant considering the low volume of LANL energetic waste generation, and that the technology is applicable to only a fraction of LANL energetic wastes *O&M:* ++ Operation of fluidized bed incinerator and air pollution control equipment; fuel for incinerator; treatment & disposal of secondary waste streams; employee training for fluidized bed incinerator facility. Must include costs for existing LANL OB/OD activities, as fluidized bed incinerator can only treat a portion of LANL energetic wastes.

Table 8-2 Comparison of Alternative Technologies for Opening Burning/Open Detonation Waste Treatment (continued)

Treatment Technology	OB Waste Stream Applicability	OD Waste Stream Applicability	Waste Streams that can be Treated by Technology	Limitations	Permits Needed	Worker Safety Considerations	Human Health and Environmental Considerations	Energy Requirements	Secondary Waste Streams	Uncertainties	Relative Cost Range
Incineration, Rotary Kiln	~95%	<1%	Explosives machining waste (powdered only)	Applicable to explosives machining waste (powdered only) Limited types and amount of explosives that can be treated at one time Cannot treat most bulk explosives or noncombustible debris	RCRA (Subpart O) Revise Title V CAA CWA NPDES (may generate cooling water and wastewater requiring treatment before discharge) Construction Permits	Increased waste handling by workers. Specific training for operators and explosives safety personnel would be required and would have to be conducted within a secure area. Training on treatment techniques for limited waste streams would also be necessary. Confinement of explosives within a treatment unit could additionally lead to a build-up of residual pressure from breakdown products within the unit—a potential explosion hazard.	Emissions from combustion of fuel and waste routed through air pollution control equipment – e.g., particulate collection and scrubbing.	Kiln is typically heated via fuel combustion Power for operation of emissions controls and wastewater treatment	Secondary waste streams include ash, baghouse particulate and scrubber residues. Process effluents are emissions from scrubbing system, burn and scrubber residue, residues from quench rinse, and decontamination waters.	Proven for limited waste types	*Capital*: ++ Construction of rotary kiln incinerator facility and air pollution control equipment. Cost is exorbitant considering the low volume of LANL energetic waste generation, and that the technology is applicable to only a portion of LANL energetic wastes *O&M:* ++ Operation of rotary kiln incinerator facility and air pollution control equipment; fuel for incinerator treatment & disposal of secondary waste streams; employee training for rotary kiln incinerator. Must include costs for existing LANL OB/OD activities, as rotary kiln incinerator can only treat a portion of LANL energetic wastes.

Table 8-2 Comparison of Alternative Technologies for Opening Burning/Open Detonation Waste Treatment (continued)

Treatment Technology	OB Waste Stream Applicability	OD Waste Stream Applicability	Waste Streams that can be Treated by Technology	Limitations	Permits Needed	Worker Safety Considerations	Human Health and Environmental Considerations	Energy Requirements	Secondary Waste Streams	Uncertainties	Relative Cost Range
Incineration, Plasma Arc	~5%	~50%	Explosives-contaminated solvents (powdered only)	Applicable to explosives-contaminated solvents (powdered only) Limited to bulk explosives and solvent waste	RCRA (Subpart O) Revise Title V CAA CWA NPDES (may generate cooling water and wastewater requiring treatment before discharge) Construction Permits	Increased waste handling by workers. Specific training for operators and explosives safety personnel would be required and would have to be conducted within a secure area. Training on treatment techniques for limited waste streams would also be necessary. Confinement of explosives within a treatment unit could additionally lead to a build-up of residual pressure from breakdown products within the unit—a potential explosion hazard.	Emissions from heat (combustion) source	Energy source (e.g., fuel combustion, electricity) required to heat plasma arc furnace Power for operation of emissions controls and wastewater treatment	Secondary waste streams include ash, scrubber residue, and slag.	Limited to a small fraction of LANL energetic wastes.	*Capital:* ++ Construction of plasma incinerator facility and air pollution control equipment. Cost is exorbitant considering the low volume of LANL energetic waste generation, and that the technology is applicable to only a small fraction of LANL energetic wastes. *O&M:* ++ Operation of plasma arc incinerator facility and air pollution control equipment; fuel for incinerator treatment & disposal of secondary waste streams (e.g., slag); employee training for plasma arc facility. Must include costs for existing LANL OB/OD activities, as plasma arc incinerator can only treat a portion of LANL energetic wastes.

Table 8-2 Comparison of Alternative Technologies for Opening Burning/Open Detonation Waste Treatment (continued)

Treatment Technology	OB Waste Stream Applicability	OD Waste Stream Applicability	Waste Streams that can be Treated by Technology	Limitations	Permits Needed	Worker Safety Considerations	Human Health and Environmental Considerations	Energy Requirements	Secondary Waste Streams	Uncertainties	Relative Cost Range
Base Hydrolysis /Supercritical Water Oxidation	None	~25%	None	Limited to organic waste streams with no plastic, which comprise a small fraction of the LANL OD waste stream	RCRA (Subpart X) Revise Title V CAA, emissions from oxidation chamber and heat (combustion) source CWA NPDES (may generate cooling water and wastewater requiring treatment before discharge) Construction Permits	Increased waste handling by workers. Risks associated with handling strong base (pH>12) and high pressure equipment. Supplemental treatment – e.g., bioremediation, supercritical water extraction – may pose additional risks.	Varies depending upon supplemental treatment method – e.g., bioremediation, supercritical water extraction	Energy (fuel or electricity) required to heat aqueous base-reaction vessel Power for operation of emissions controls and wastewater treatment	Aqueous solution is hazardous and must be further treated using bio-remediation or supercritical water oxidation. Emissions from fuel combustion.		*Capital*: ++ Base hydrolysis treatment system equipment, plus supplemental treatment system equipment. Cost is exorbitant considering the low volume of LANL energetic waste generation, and that the technology is applicable to only a small fraction of LANL energetic wastes *O&M*: ++ Operation of base hydrolysis treatment facility and air pollution control equipment; chemicals; transportation to and operation of supplemental treatment system; treatment & disposal of secondary waste streams; employee training for base hydrolysis system. Must include costs for existing LANL OB/OD activities, as base hydrolysis treatment can only treat a portion of LANL energetic wastes.

Table 8-2 Comparison of Alternative Technologies for Opening Burning/Open Detonation Waste Treatment (continued)

Treatment Technology	OB Waste Stream Applicability	OD Waste Stream Applicability	Waste Streams that can be Treated by Technology	Limitations	Permits Needed	Worker Safety Considerations	Human Health and Environmental Considerations	Energy Requirements	Secondary Waste Streams	Uncertainties	Relative Cost Range
Open Burn (TA-16-388) Current Technology	100%	None	Explosives machining waste Excess explosives Explosives-contaminated combustible debris Explosives-contaminated solvent waste Explosives-contaminated noncombustible equipment/debris	Those contained in operating procedures	RCRA (Subpart X)	Specific training for operators and explosives safety personnel are required and the area must be secured. The burn is monitored remotely through cameras. Specific operating parameters are invoked for open burning to assure the safety of personnel.	Specific operating parameters are invoked for open burning to protect human health and the environment. Human health and ecological risk assessments show technology prevents releases that could adversely affect human health or the environment. Subject to final closure (clean closure).	Propane used to fuel system	Residual ash is analyzed for hazardous constituents. Expected emissions are CO, CO2, H2O, NOx N2, and little to no secondary combustion products due to short residence time.	Proven technology for over 70 years	Capital and O&M costs are lower or much lower than alternatives

Table 8-2 Comparison of Alternative Technologies for Opening Burning/Open Detonation Waste Treatment (continued)

Treatment Technology	OB Waste Stream Applicability	OD Waste Stream Applicability	Waste Streams that can be Treated by Technology	Limitations	Permits Needed	Worker Safety Considerations	Human Health and Environmental Considerations	Energy Requirements	Secondary Waste Streams	Uncertainties	Relative Cost Range
Open Detonation (TA-36-8 and TA-39-6) Current Technology	None	100%	Excess explosives Explosives-contaminated combustible debris Black power or gunpowder Detonators, initiators, mild detonating fuses, and blasting caps Shaped charges and test assemblies Projectiles and munitions larger than 0.50 caliber Other	Those contained in operating procedures	RCRA (Subpart X)	Larger detonations for explosives pieces that are greater than the capacity of a confined detonation chamber. This requires less handling for workers. Also, the explosive would not have to be size-reduced prior to treatment by OD. LANL conducts detonations from a remote location inside the control building following specific operating procedures for OD to assure the safety of human health and the environment.	Specific operating parameters are invoked for open detonation to protect human health and the environment. Human health and ecological risk assessments show technology prevents releases that could adversely affect human health or the environment. Subject to final closure (clean closure).	Explosive materials provide energy required save small initiating source	Metal fragments, CO_2, H_2O, and N_2	Proven technology for over 70 years	Capital and O&M costs are lower or much lower than alternatives

Data Sheet 8-1. Treatment Technology: Case Opening

Treatment Technology Description:	Case opening involves a variety of techniques to separate a munitions' body (projectile) from the cartridge case. The remaining energetic material removed from the case will need to be treated and/or destroyed using alternative technologies.	
Treatment Type	Pre-treatment. Removed energetic requires subsequent treatment by alternative method, e.g., OB/OD	
Waste Stream Treatment Capability	*LANL OB Waste Stream*:	No – None
	LANL OD Waste Stream:	No – None
Principal/Treatment Capability Limitations	Only used for treating thinned-and thick cased munitions. Not suitable for any OB/OD waste streams routinely generated by LANL	
Permits Required	*RCRA Part B*	Yes – Subpart X
	Revision to CAA Title V	No
	Revision to CWA – NPDES	May generate wastewater subject to treatment and/or discharge permitting
	Other	General and stormwater permits for facility construction
Safety Risk Considerations	NA – Not applicable to LANL OB/OD waste streams	
Human Health and Environmental Impact Considerations	NA – Not applicable to LANL OB/OD waste streams	
Energy Resource Demands of Operation	NA – Not applicable to LANL OB/OD waste streams	
Secondary Waste Streams Generated by Technology	NA – Not applicable to LANL OB/OD waste streams	
Operations/Treatment Capability Uncertainty	NA – Not applicable to LANL OB/OD waste streams	
Relative Cost Range:	*Capital:* NA	
	Operations and MTCE: NA	

Data Sheet 8-2. Treatment Technology: Chemical Conversion

Treatment Technology Description:	Chemical conversion involves using processes such as solvent extraction and solvolytic extraction to convert recovered explosives and propellants to other products. This technology can only treat specific types of explosives waste based upon the specific chemical makeup of the explosive.	
Treatment Type	OB, OD Alternative	
Waste Stream Treatment Capability	*LANL OB Waste Stream*:	No – None
	LANL OD Waste Stream:	No – None
Principal/Treatment Capability Limitations	Requires chemical solvents; creates a secondary waste stream Not suitable for any OB/OD waste streams routinely generated by LANL	
Permits Required	*RCRA Part B*	Yes - Subpart X
	Revision to CAA Title V	Yes, assuming chemical conversion chamber is vented
	Revision to CWA – NPDES	May generate cooling water and/or wastewater subject to treatment and/or discharge permitting
	Other	General and stormwater permits for facility construction
Safety Risk Considerations	NA – Not applicable to LANL OB/OD waste streams	
Human Health and Environmental Impact Considerations	NA – Not applicable to LANL OB/OD waste streams	
Energy Resource Demands of Operation	NA – Not applicable to LANL OB/OD waste streams	
Secondary Waste Streams Generated by Technology	NA – Not applicable to LANL OB/OD waste streams. Extraction technologies frequently create a secondary hazardous waste stream consisting of organic solvents.	
Operations/Treatment Capability Uncertainty	NA – Not applicable to LANL OB/OD waste streams	
Relative Cost Range:	*Capital:* NA	
	Operations and MTCE: NA	

Data Sheet 8-3. Treatment Technology: Co-firing in Boilers

Treatment Technology Description:	Co-firing in boilers can be utilized for explosives that can be desensitized so that they can be co-fired with traditional fuels in commercial boilers for heating. The explosive must be soluble in fuel oil #2.	
Treatment Type	OB, OD Alternative	
Waste Stream Treatment Capability	*LANL OB Waste Stream*:	No – None
	LANL OD Waste Stream:	No – None
Principal/Treatment Capability Limitations	Not suitable for any OB/OD waste streams routinely generated by LANL Limited to explosives that are soluble in Fuel Oil #2	
Permits Required	*RCRA Part B*	Yes
	Revision to CAA Title V	Yes, emissions from boiler fuel combustion
	Revision to CWA – NPDES	May generate cooling water and wastewater subject to treatment and/or discharge permitting
	Other	Modification of air permits for existing commercial boilers
Safety Risk Considerations	NA – Not applicable to LANL OB/OD waste streams	
Human Health Impact Considerations	NA – Not applicable to LANL OB/OD waste streams	
Environmental Impact Considerations	NA – Not applicable to LANL OB/OD waste streams	
Energy Resource Demands of Operation	NA – Not applicable to LANL OB/OD waste streams	
Secondary Waste Streams Generated by Technology	NA – Not applicable to LANL OB/OD waste streams	
Operations/Treatment Capability Uncertainty	NA – Not applicable to LANL OB/OD waste streams	
Relative Cost Range:	*Capital:* NA	
	Operations and MTCE: NA	

Data Sheet 8-4. Treatment Technology: Contained Burn (#1), at a Confined Facility

Treatment Technology Description:	Contained burn at a confined burn facility consists of explosives contaminated wastes that are treated in blast-reinforced chambers. In some cases additional fuel (such as kerosene) must be added to the waste stream. The combustion gases are contained and processed through air emissions control equipment. This treatment is frequently used by the military to destroy small caliber ammunition and bulk explosives. Small-scale confined burn facilities are currently in use by law enforcement agencies nationwide. The waste is ignited using a squib and allowed to burn of its own accord.	
Treatment Type	OB, OD Alternative	
Waste Stream Treatment Capability	*LANL OB Waste Stream*:	Yes – Partial (~7%)
	LANL OD Waste Stream:	Yes – Partial (~50%); would require treatment in small batches
Principal/Treatment Capability Limitations	Limited to small caliber munitions and small quantities of some excess explosives	
Permits Required	*RCRA Part B*	Yes – Subpart X
	Revision to CAA Title V	Yes
	Revision to CWA – NPDES	No
	Other	General and stormwater permits for facility construction
Safety Risk Considerations	Increased waste handling by workers. With undetermined or insulated explosives waste, a contained burn is an unacceptable risk to personnel. There is no controlled flame to ensure complete detonation or burn of the explosive, and typically no capability to view if the explosive has been fully treated prior to opening the chamber. Unit increases the potential for catastrophic failure (explosion) when compared to current treatment technique.	
Human Health and Environmental Impact Considerations	Combustion and waste degradation gases emitted from air pollution control equipment	
Energy Resource Demands of Operation	Requires supplemental fuel for contained burn chamber Requires power for operation of air emissions collection and treatment system	
Secondary Waste Streams Generated by Technology	Secondary waste streams include scrubber waste and baghouse dust. Process effluents include emissions from scrubbing system, burn and scrubber residue, residues from quench rinse, and decontamination waters. Emissions scrubbing system must	

	be designed to capture dioxins/furans that may be generated during the process, as the temperature is not controlled. Periodic replacement of air pollution control system components such as cloth bags and filter media.
Operations/Treatment Capability Uncertainty	Limited to small caliber munitions and small quantities of some excess explosives
Relative Cost Range:	*Capital:* + Construction of blast chambers, air pollution control equipment. Cost is very high considering the low volume of LANL energetic waste generation, and that the technology is applicable to only a small fraction of LANL energetic wastes.
	Operations and MTCE: + O&M of air pollution control equipment; supplemental fuel cost; management, treatment & disposal of secondary waste streams; employee training for contained burn facility. Must include costs for existing LANL OB/OD activities, as blast chamber can handle only a small portion of LANL energetic wastes.

Data Sheet 8-5. Treatment Technology: Contained Burn (#2), Energetic-Contaminated Waste

Treatment Technology Description:	Energetic-contaminated waste technology is designed for wastes contaminated with small amounts of explosive material. It is similar to contained burning, but is targeted more toward burning combustible wastes contaminated with explosives rather than ammunition or bulk explosives. It is used mostly for combustible wastes (e.g., rags, gloves, wipes, plastic, etc.) that are contaminated with small amounts of explosives. Because there is no controlled fuel supply or "controlled flame device", a contained burn unit may be permitted as a miscellaneous unit under RCRA Subpart X, rather than being permitted as an incinerator. This waste is ignited using a squib and is allowed to burn of its own accord, with the aid of added fuel (e.g. kerosene) in some cases.	
Treatment Type	OB, OD Alternative	
Waste Stream Treatment Capability	*LANL OB Waste Stream*:	Yes – Partial (<1%)
	LANL OD Waste Stream:	Yes – Partial (<1%)
Principal/Treatment Capability Limitations	Limited to explosives-contaminated combustible debris, which is an exceptionally small fraction of LANL OB/OD waste stream	
Permits Required	*RCRA Part B*	Yes – Subpart X
	Revision to CAA Title V	Yes
	Revision to CWA – NPDES	No
	Other	General and stormwater permits for facility construction
Safety Risk Considerations	Increased waste handling by workers.	
Human Health and Environmental Impact Considerations	Combustion and waste degradation gases emitted from air pollution control equipment	
Energy Resource Demands of Operation	Requires fuel for ignition only Requires power for operation of air emissions collection and treatment system	
Secondary Waste Streams Generated by Technology	Secondary waste streams may include scrubber waste and bag house dust. Process effluents include emissions from scrubbing system, burn and scrubber residue, residues from quench rinse, and decontamination waters. Emissions scrubbing system must be designed to capture dioxins/furans that may be generated during the process, as the temperature is not controlled. Periodic replacement of air pollution control system components such as cloth bags and filter media. Due to absence of supplemental fuel	

	throughout the burn, residual waste (ash) may require supplemental treatment
Operations/Treatment Capability Uncertainty	Limited to a very small fraction of LANL energetic wastes. Due to absence of supplemental fuel throughout the burn, residual waste (ash) may require supplemental treatment.
Relative Cost Range:	*Capital:* + Construction of contained burn chambers, air pollution control equipment. Cost is very high considering the low volume of LANL energetic waste generation, and that the technology is applicable to only a small fraction of LANL energetic wastes.
	Operations and MTCE: + O&M of air pollution control equipment; management, treatment & disposal of secondary waste streams; employee training for contained burn facility. Must include costs for existing LANL OB/OD activities, as contained burn chamber can handle only a very small fraction of LANL energetic wastes.

Data Sheet 8-6. Treatment Technology: Contained Detonation

Treatment Technology Description:	Contained detonation involves the detonation of explosive wastes inside a steel chamber constructed to dampen the blast. After burning reactions are suppressed to protect the integrity of the chamber. Particulates are filtered from the detonation gases. This technology is best suited for small pieces of explosives, and residuals may transform into toxic or more complex compounds than those created when treating the same waste by OB or OD.	
Treatment Type	OB, OD Alternative	
Waste Stream Treatment Capability	*LANL OB Waste Stream*:	Yes – Partial (~5%)
	LANL OD Waste Stream:	Yes – Partial (~50%)
Principal/Treatment Capability Limitations	Limited to small bulk explosives and combustible debris Limited lifetime on number of detonations the chamber can treat Chamber becomes a difficult to dispose of hazardous waste	
Permits Required	*RCRA Part B*	Yes – Subpart X
	Revision to CAA Title V	Yes
	Revision to CWA – NPDES	No
	Other	General and stormwater permits for facility construction
Safety Risk Considerations	Large pieces of explosives may require size reduction prior to treatment in order to meet the operating capacity of the unit. This requires more handling by the worker and subsequent safety concerns. There is a potential for catastrophic failure.	
Human Health and Environmental Impact Considerations	Air emissions (e.g., CO_2, H_2O and N_2) from detonation chamber. Metal fragments (contained near unit).	
Energy Resource Demands of Operation	May require supplemental fuel for detonation chamber Requires power for operation of air emissions collection and treatment system	
Secondary Waste Streams Generated by Technology	The secondary waste stream consists of ash and fragments. Process effluents include metal fragments, pulverized gravel, air pollution control unit residue, major burn emissions including CO, CO_2, H_2O, NO_x, N_2; secondary combustion products due to residence time; and limited lifetime of chamber with replacement required and disposal of used chamber	
Operations/Treatment Capability Uncertainty	Limited to a fraction of LANL energetic wastes.	
Relative Cost Range:	*Capital:* + Construction of contained burn chambers, air pollution control equipment Cost is exorbitant considering the low volume of LANL energetic waste generation, and that the	

	technology is applicable to only a small fraction of LANL energetic wastes
	Operations and MTCE: + O&M of air pollution control equipment; management, treatment & disposal of secondary waste streams; employee training for contained detonation facility. Must include costs for existing LANL OB/OD activities, as contained detonation chamber can handle only a small portion of LANL energetic wastes.

Data Sheet 8-7. Treatment Technology: Contaminated Waste Processor

<table>
<tr><td>Treatment Technology Description:</td><td colspan="2">A contaminated waste processor (CWP) consists of a car bottom furnace that treats (i.e., combusts/oxidizes) contaminated combustible waste, such as rags, gloves, wipes, fiber drums, pallets, plastic, coveralls, etc. CWPs may operate in batch or continuous feed modes.</td></tr>
<tr><td>Treatment Type</td><td colspan="2">OB Alternative</td></tr>
<tr><td rowspan="2">Waste Stream Treatment Capability</td><td>LANL OB Waste Stream:</td><td>Yes – Partial (<1%)</td></tr>
<tr><td>LANL OD Waste Stream:</td><td>No – None</td></tr>
<tr><td>Principal/Treatment Capability Limitations</td><td colspan="2">Limited to explosives-contaminated combustible debris and residues, which comprise an exceptionally small fraction of the LANL OB/OD waste stream</td></tr>
<tr><td rowspan="4">Permits Required</td><td>RCRA Part B</td><td>Subpart O</td></tr>
<tr><td>Revision to CAA Title V</td><td>Yes</td></tr>
<tr><td>Revision to CWA – NPDES</td><td>May generate cooling water and wastewater subject to treatment and/or discharge permitting</td></tr>
<tr><td>Other</td><td>General and stormwater permits for facility construction</td></tr>
<tr><td>Safety Risk Considerations</td><td colspan="2">Increased waste handling by workers. Specific training for operators and explosives safety personnel would be required and would have to be conducted within a secure area. Training on treatment techniques for limited waste streams would also be necessary. Confinement of explosives within a treatment unit could additionally lead to a build-up of residual pressure from breakdown products within the unit—a potential explosion hazard.</td></tr>
<tr><td>Human Health and Environmental Impact Considerations</td><td colspan="2">Emissions from combustion of fuel and waste</td></tr>
<tr><td>Energy Resource Demands of Operation</td><td colspan="2">CWP is typically heated via fuel combustion

Requires power for operation of air emissions collection and treatment system</td></tr>
<tr><td>Secondary Waste Streams Generated by Technology</td><td colspan="2">Secondary waste streams include ash, baghouse particulate and scrubber residues. Process effluents are emissions from scrubbing system, burn and scrubber residue, residues from quench rinse, and decontamination waters.</td></tr>
<tr><td>Operations/Treatment Capability Uncertainty</td><td colspan="2">Proven for limited waste types</td></tr>
</table>

Relative Cost Range:	*Capital:* ++ Construction of CWP and air pollution control equipment. Cost is exorbitant considering the low volume of LANL energetic waste generation, and that the technology is applicable to only a very small fraction of LANL energetic wastes
	Operations and MTCE: ++ Operation of CWP and air pollution control equipment; fuel for CWP; employee training for CWP. Must include costs for existing LANL OB/OD activities, as CWP can only handle a very small fraction of LANL energetic wastes.

Data Sheet 8-8. Treatment Technology: Cryofracture

Treatment Technology Description:	Cryofracture process used to cool ferrous munition bodies below their embrittlement temperature and allow the munitions to be fractured in a hydraulic press. This process allows access to the energetics so they can be subsequently treated by thermal destruction. This technology is suitable for size reduction prior to a thermal treatment. This treatment method has mostly been used for projectile explosives and is not suitable for explosive materials at LANL.	
Treatment Type	Pretreatment method, removed material requires treatment by OB	
Waste Stream Treatment Capability	*LANL OB Waste Stream*:	No – None
	LANL OD Waste Stream:	No – None
Principal/Treatment Capability Limitations	Energetics contained in ferrous munitions bodies. Not suitable for any OB/OD waste streams routinely generated by LANL.	
Permits Required	*RCRA Part B*	Yes – Subpart X
	Revision to CAA Title V	Yes
	Revision to CWA – NPDES	May generate cooling water and wastewater subject to treatment and/or discharge permitting
	Other	General and stormwater permits for facility construction
Safety Risk Considerations	NA – Not applicable to LANL OB/OD waste streams	
Human Health and Environmental Impact Considerations	NA – Not applicable to LANL OB/OD waste streams	
Energy Resource Demands of Operation	NA – Not applicable to LANL OB/OD waste streams	
Secondary Waste Streams Generated by Technology	NA – Not applicable to LANL OB/OD waste streams	
Operations/Treatment Capability Uncertainty	NA – Not applicable to LANL OB/OD waste streams	
Relative Cost Range:	*Capital:* NA	
	Operations and MTCE: NA	

Data Sheet 8-9. Treatment Technology: Cryogenic Cutting

<table>
<tr><td>Treatment Technology Description:</td><td colspan="2">Cryogenic cutting technology uses liquid nitrogen that is pressurized and then ejected through a small orifice at high velocities. The system includes a cryogenic fluid supply system, a pressurization system, a temperature control system, a nozzle system, a recovery system, and a manipulation system. This treatment is effective as a pre-treatment to cut through casings for the purpose of removing the casing from the explosive prior to treatment; however, a static charge can build up under certain circumstances and is a safety concern. This treatment method is not suitable for explosive materials at LANL.</td></tr>
<tr><td>Treatment Type</td><td colspan="2">Pre-treatment, removed material requires treatment by OD</td></tr>
<tr><td rowspan="2">Waste Stream Treatment Capability</td><td>LANL OB Waste Stream:</td><td>No – None</td></tr>
<tr><td>LANL OD Waste Stream:</td><td>No – None</td></tr>
<tr><td>Principal/Treatment Capability Limitations</td><td colspan="2">Not applicable to any LANL OB/OD waste streams</td></tr>
<tr><td rowspan="4">Permits Required</td><td>RCRA Part B</td><td>Yes – Subpart X</td></tr>
<tr><td>Revision to CAA Title V</td><td>Yes</td></tr>
<tr><td>Revision to CWA – NPDES</td><td>May generate cooling water and wastewater subject to treatment and/or discharge</td></tr>
<tr><td>Other</td><td>General and stormwater permits for facility construction</td></tr>
<tr><td>Safety Risk Considerations</td><td colspan="2">NA – Not applicable to LANL OB/OD waste streams</td></tr>
<tr><td>Human Health and Environmental Impact Considerations</td><td colspan="2">NA – Not applicable to LANL OB/OD waste streams</td></tr>
<tr><td>Energy Resource Demands of Operation</td><td colspan="2">NA – Not applicable to LANL OB/OD waste streams</td></tr>
<tr><td>Secondary Waste Streams Generated by Technology</td><td colspan="2">NA - Not applicable to LANL OB/OD waste streams. Secondary materials spray is an additional waste stream.</td></tr>
<tr><td>Operations/Treatment Capability Uncertainty</td><td colspan="2">NA – Not applicable to LANL OB/OD waste streams</td></tr>
<tr><td rowspan="2">Relative Cost Range:</td><td colspan="2">Capital: NA</td></tr>
<tr><td colspan="2">Operations and MTCE: NA</td></tr>
</table>

Data Sheet 8-10. Treatment Technology: Flashing Furnace

Treatment Technology Description:	A flashing furnace thermally decontaminates metal parts with explosive contamination. Up to 10,000 pounds of contaminated metal can be flashed per hour. The furnace can be installed in a fixed location or can be trailer mounted for field applications. Because this technology is enclosed and has a controlled flame device, permitting of the unit may require adherence to 40 CFR 264, Subpart O (incinerator) requirements.	
Treatment Type	OB Alternative	
Waste Stream Treatment Capability	*LANL OB Waste Stream*:	Yes – Partial (~3%)
	LANL OD Waste Stream:	No – None
Principal/Treatment Capability Limitations	Limited to explosives-contaminated noncombustible debris, typically metal, which is a very small fraction of the LANL OB waste stream	
Permits Required	*RCRA Part B*	Need for Subpart X permit questioned. Maybe – Subpart O
	Revision to CAA Title V	40 CFR 264, Subpart O (incinerator) requirements
	Revision to CWA – NPDES	No
	Other	General and stormwater permits for facility construction
Safety Risk Considerations	If the unit is mobile, precautions will have to be in place to ensure that fuel can be located at each specific location within the explosives area. Increased waste handling by workers. Trained personnel would be required to conduct treatment activities.	
Human Health and Environmental Impact Considerations	Emissions from fuel combustion and waste flashing – CO, CO_2, H_2O, NO_2, N_2.	
Energy Resource Demands of Operation	Requires fuel to heat flash furnace Requires power for operation of air emissions collection and treatment system	
Secondary Waste Streams Generated by Technology	The secondary waste streams include explosives contaminated non-combustible debris. Expected emissions are CO, CO_2, H_2O, NO_x N_2, and little to no secondary combustion products due to short residence. Residual ash is not expected.	
Operations/Treatment Capability Uncertainty	Limited to a very small fraction of LAL energetic wastes – i.e., explosives-contaminated noncombustible debris, typically metal.	

Relative Cost Range:	*Capital:* ++ Construction of flash furnace facility and air pollution control equipment. Cost is exorbitant considering the low volume of LANL energetic waste generation, and that the technology is applicable to only a small fraction of LANL energetic wastes.
	Operations and MTCE: ++ Operation of flash furnace and air pollution control equipment; fuel for flash furnace; employee training for flash furnace. Must include costs for existing LANL OB/OD activities, as CWP can only handle a very small fraction of LANL energetic wastes. Must include costs for existing LANL OB/OD activities, as flashing furnace can only treat a portion of LANL energetic wastes.

Data Sheet 8-11. Treatment Technology: Incinerator, Fluidized Bed

Treatment Technology Description:	A fluidized bed incineration is an enclosed incinerator that utilizes the injection of explosives waste into a turbulent bed of hot sand, created by forced air. Emissions are filtered prior to release to the environment. This process is limited to liquids, slurries, and powders with low organic content. The powders must be homogeneous in size.	
Treatment Type	OB, OD Alternative	
Waste Stream Treatment Capability	*LANL OB Waste Stream*:	Yes – Partial (~70%)
	LANL OD Waste Stream:	Yes – Partial (<1%)
Principal/Treatment Capability Limitations	Applicable to explosives machining waste (powdered only) Limited to treating powders, liquids and slurries Cannot treat most bulk explosives or noncombustible debris	
Permits Required	*RCRA Part B*	Yes – Subpart O
	Revision to CAA Title V	Yes
	Revision to CWA – NPDES	May generate cooling water and wastewater subject to treatment and/or discharge permitting
	Other	General and stormwater permits for facility construction
Safety Risk Considerations	Increased waste handling by workers. Specific training for operators and explosives safety personnel would be required and would have to be conducted within a secure area. Training on treatment techniques for limited waste streams would also be necessary. Confinement of explosives within a treatment unit could additionally lead to a build-up of residual pressure from breakdown products within the unit—a potential explosion hazard.	
Human Health and Environmental Impact Considerations	Emissions from heat (combustion) source Requires power for operation of air emissions collection and treatment system	
Energy Resource Demands of Operation	Energy source (e.g., fuel combustion, electricity) required to heat fluidized bed	
Secondary Waste Streams Generated by Technology	Secondary waste streams include ash and scrubber residues; periodic replacement of fluidized bed media.	
Operations/Treatment Capability Uncertainty	Limited to a fraction of LANL energetic wastes.	
Relative Cost Range:	*Capital:* ++ Construction of fluidized bed incinerator facility and air pollution control equipment Cost is exorbitant	

	considering the low volume of LANL energetic waste generation, and that the technology is applicable to only a fraction of LANL energetic wastes
	Operations and MTCE: ++ Operation of fluidized bed incinerator and air pollution control equipment; fuel for incinerator; treatment & disposal of secondary waste streams; employee training for fluidized bed incinerator facility. Must include costs for existing LANL OB/OD activities, as fluidized bed incinerator can only treat a portion of LANL energetic wastes.

Data Sheet 8-12. Treatment Technology: Incinerator, Plasma Arc

<table>
<tr><td>Treatment Technology Description:</td><td colspan="2">A plasma arc incineration uses molten slag (i.e., soil with iron fluxing agent) which destroys organic compounds. The technology encapsulates inorganic toxic solid wastes in the molten slag and when hardened is disposed. Emissions are filtered prior to release to the atmosphere. This is an enclosed alternative to incineration that can be utilized for explosive wastes that are high in organic compounds (e.g., paint, solvents).</td></tr>
<tr><td>Treatment Type</td><td colspan="2">OB, OD Alternative</td></tr>
<tr><td rowspan="2">Waste Stream Treatment Capability</td><td>LANL OB Waste Stream:</td><td>Yes – Partial (~5%)</td></tr>
<tr><td>LANL OD Waste Stream:</td><td>Yes – Partial (~50%)</td></tr>
<tr><td>Principal/Treatment Capability Limitations</td><td colspan="2">Applicable to explosives-contaminated solvents (powdered only)

Limited to bulk explosives and solvent waste</td></tr>
<tr><td rowspan="4">Permits Required</td><td>RCRA Part B</td><td>Yes – Subpart O</td></tr>
<tr><td>Revision to CAA Title V</td><td>Yes</td></tr>
<tr><td>Revision to CWA – NPDES</td><td>May generate cooling water and wastewater subject to treatment and/or discharge</td></tr>
<tr><td>Other</td><td>General and stormwater permits for facility construction</td></tr>
<tr><td>Safety Risk Considerations</td><td colspan="2">Increased waste handling by workers. Specific training for operators and explosives safety personnel would be required and would have to be conducted within a secure area. Training on treatment techniques for limited waste streams would also be necessary. Confinement of explosives within a treatment unit could additionally lead to a build-up of residual pressure from breakdown products within the unit—a potential explosion hazard.</td></tr>
<tr><td>Human Health and Environmental Impact Considerations</td><td colspan="2">Emissions from heat (combustion) source</td></tr>
<tr><td>Energy Resource Demands of Operation</td><td colspan="2">Energy source (e.g., fuel combustion, electricity) required to heat plasma arc furnace

Requires power for operation of air emissions collection and treatment system</td></tr>
<tr><td>Secondary Waste Streams Generated by Technology</td><td colspan="2">Secondary waste streams include ash, scrubber residue, and slag.</td></tr>
<tr><td>Operations/Treatment Capability Uncertainty</td><td colspan="2">Limited to a small fraction of LANL energetic wastes.</td></tr>
</table>

Relative Cost Range:	*Capital:* ++ Construction of plasma incinerator facility and air pollution control equipment. Cost is exorbitant considering the low volume of LANL energetic waste generation, and that the technology is applicable to only a small fraction of LANL energetic wastes.
	Operations and MTCE: ++ Operation of plasma arc incinerator facility and air pollution control equipment; fuel for incinerator treatment & disposal of secondary waste streams (e.g., slag); employee training for plasma arc facility. Must include costs for existing LANL OB/OD activities, as plasma arc incinerator can only treat a portion of LANL energetic wastes.

Data Sheet 8-13. Treatment Technology: Incinerator, Rotary Kiln

Treatment Technology Description:	A rotary kiln incineration is an enclosed incinerator treatment technology. The rotary kiln slowly moves waste from one end to the other and waste detonates or combusts within the heated chamber; therefore, only small amounts of explosive waste can be treated at one time. Emissions are treated (i.e., filtered and/or neutralized) prior to release to the atmosphere. Small explosive items with casings (<40 grams energetic material) can also be treated with this technology. Uniform explosive waste streams are treated most efficiently.	
Treatment Type	OB, OD Alternative	
Waste Stream Treatment Capability	*LANL OB Waste Stream*:	Yes – Partial (~95%)
	LANL OD Waste Stream:	Yes – Partial (<1%)
Principal/Treatment Capability Limitations	Applicable to explosives machining waste (powdered only) Limited types and amount of explosives that can be treated at one time Cannot treat most bulk explosives or noncombustible debris	
Permits Required	*RCRA Part B*	Yes – Subpart O
	Revision to CAA Title V	Yes
	Revision to CWA – NPDES	May generate cooling water and wastewater subject to treatment and/or discharge permitting
	Other	General and stormwater permits for facility construction
Safety Risk Considerations	Increased waste handling by workers. Specific training for operators and explosives safety personnel would be required and would have to be conducted within a secure area. Training on treatment techniques for limited waste streams would also be necessary. Confinement of explosives within a treatment unit could additionally lead to a build-up of residual pressure from breakdown products within the unit—a potential explosion hazard.	
Human Health and Environmental Impact Considerations	Emissions from combustion of fuel and waste routed through air pollution control equipment – e.g., particulate collection and scrubbing.	
Energy Resource Demands of Operation	Kiln is typically heated via fuel combustion Requires power for operation of air emissions collection and treatment system	

Secondary Waste Streams Generated by Technology	Secondary waste streams include ash, baghouse particulate and scrubber residues. Process effluents are emissions from scrubbing system, burn and scrubber residue, residues from quench rinse, and decontamination waters.
Operations/Treatment Capability Uncertainty	Proven for limited waste types
Relative Cost Range:	*Capital:* ++ Construction of rotary kiln incinerator facility and air pollution control equipment. Cost is exorbitant considering the low volume of LANL energetic waste generation, and that the technology is applicable to only a portion of LANL energetic wastes
	Operations and MTCE: ++ Operation of rotary kiln incinerator facility and air pollution control equipment; fuel for incinerator treatment & disposal of secondary waste streams; employee training for rotary kiln incinerator. Must include costs for existing LANL OB/OD activities, as rotary kiln incinerator can only treat a portion of LANL energetic wastes.

Data Sheet 8-14. Treatment Technology: Hydromilling

Treatment Technology Description:	Hydromilling of explosive waste uses high pressure water jets to "cut" through the material. This is a pre-treatment technology that is not conducive for experimental explosive waste streams.	
Treatment Type	Pre-treatment; removed material requires treatment by OD	
Waste Stream Treatment Capability	*LANL OB Waste Stream*:	No – None
	LANL OD Waste Stream:	No - None
Principal/Treatment Capability Limitations	Not suitable for any OB/OD waste streams routinely generated by LANL	
Permits Required	*RCRA Part B*	Yes – Subpart X
	Revision to CAA Title V	Yes
	Revision to CWA – NPDES	May generate cooling water and wastewater subject to treatment and/or discharge permitting
	Other	General and stormwater permits for facility construction
Safety Risk Considerations	NA – Not applicable to LANL OB/OD waste streams	
Human Health and Environmental Impact Considerations	NA – Not applicable to LANL OB/OD waste streams	
Energy Resource Demands of Operation	NA – Not applicable to LANL OB/OD waste streams	
Secondary Waste Streams Generated by Technology	A secondary hazardous waste stream of water and explosives is created by this process.	
Operations/Treatment Capability Uncertainty	NA – Not applicable to LANL OB/OD waste streams	
Relative Cost Range:	*Capital:* NA	
	Operations and MTCE: NA	

Data Sheet 8-15. Treatment Technology: Liquid Ammonia Extraction

Treatment Technology Description:	Liquid ammonia extraction uses propellant, explosive fuel and oxidizer ingredients to extract, separate, and recover the explosive using liquid ammonia. This treatment method can treat explosive wastes that have a plastic binder associated with the waste in a limited capacity.	
Treatment Type	OD Alternative	
Waste Stream Treatment Capability	*LANL OB Waste Stream*:	No – None
	LANL OD Waste Stream:	No – None
Principal/Treatment Capability Limitations	Used only for treatment of explosive wastes that have a plastic binder. Not suitable for any OB/OD waste streams routinely generated by LANL.	
Permits Required	*RCRA Part B*	Yes – Subpart X
	Revision to CAA Title V	Yes
	Revision to CWA – NPDES	May generate cooling water and wastewater subject to treatment and/or discharge permitting
	Other	General and stormwater permits for facility construction
Human Health and Environmental Impact Considerations	NA – Not applicable to LANL OB/OD waste streams	
Environmental Impact Considerations	NA – Not applicable to LANL OB/OD waste streams	
Energy Resource Demands of Operation	NA – Not applicable to LANL OB/OD waste streams	
Secondary Waste Streams Generated by Technology	NA – Not applicable to LANL OB/OD waste streams	
Operations/Treatment Capability Uncertainty	NA – Not applicable to LANL OB/OD waste streams	
Relative Cost Range:	*Capital:* NA	
	Operations and MTCE: NA	

Data Sheet 8-16. Treatment Technology: Open Burning

Treatment Technology Description:	Open burn of explosives waste destroys waste by self-sustained combustion after being ignited or by controlled burning using supplemental fuel in an open environment. This technology best serves waste generated during machining of explosives, excess explosive powders and pieces, explosive contaminated combustible wastes, laboratory samples of experimental explosives, and large pieces of equipment that must be flashed prior to shipment offsite for recycle or disposal.	
Treatment Type	OB	
Waste Stream Treatment Capability	*LANL OB Waste Stream*:	Yes – All
	LANL OD Waste Stream:	No – None
Principal/Treatment Capability Limitations	Applicable to combustible wastes and small quantities of explosive wastes	
Permits Required	*RCRA Part B*	Yes – Subpart X
	Revision to CAA Title V	No
	Revision to CWA – NPDES	No
	Other	
Safety Risk Considerations	Specific training for operators and explosives safety personnel are required and the area must be secured. The burn is monitored remotely through cameras. Specific operating parameters are invoked for open burning to assure the safety of personnel and protect human health and the environment.	
Human Health and Environmental Impact Considerations	Residual ash is contained within the lined burn area, collected, and analyzed for hazardous constituents; generally disposed as non-hazardous. Secondary OB treatment provided if necessary. Air emissions include CO, CO_2, H_2O, NO & N_2; little or no secondary combustion products due to short residence time. OD units subject to LANL environmental monitoring programs	
Energy Resource Demands of Operation	Heat generated by oxidation of combustible wastes and supplemental fuel (propane)	
Secondary Waste Streams Generated by Technology	Residual ash is analyzed for hazardous constituents. Expected emissions are CO, CO_2, H_2O, NO_2, N_2, and little to no secondary combustion products due to short residence time.	
Operations/Treatment Capability Uncertainty	Proven technology	
Relative Cost Range:	*Capital:* No change. OB is baseline.	
	Operations and MTCE: No change. OB is baseline.	

Data Sheet 8-17. Treatment Technology: Open Detonation

Treatment Technology Description:	Open detonation involves the detonation of explosive wastes in an open air environment. This technology is best suited for small or large pieces of explosives. OD is especially appropriate for aged explosive material with difficult to predict properties because OD requires a minimum of moving and handling.	
Treatment Type	OD	
Waste Stream Treatment Capability	*LANL OB Waste Stream*:	No – None
	LANL OD Waste Stream:	Yes – All
Principal/Treatment Capability Limitations	Applicable to explosive wastes; not suitable for combustible waste	
Permits Required	*RCRA Part B*	Yes – Subpart X
	Revision to CAA Title V	No
	Revision to CWA – NPDES	No
	Other	
Safety Risk Considerations	Larger detonations for explosives pieces that are greater than the capacity of a confined detonation chamber. This requires less handling for workers. Also, the explosive would not have to be size-reduced prior to treatment by OD. LANL conducts detonations from a remote location inside the control building following specific operating procedures for OD to assure the safety of human health and the environment.	
Human Health and Environmental Impact Considerations	CO_2, H_2O, and N_2 emissions. OD units subject to LANL environmental monitoring programs.	
Energy Resource Demands of Operation	Energy provided by waste explosives being treated; supplemental fuel is not required	
Secondary Waste Streams Generated by Technology	Process effluents include metal fragments, CO_2, H_2O, and N_2.	
Operations/Treatment Capability Uncertainty	Proven technology	
Relative Cost Range:	*Capital:* No change. OB is baseline.	Total
	Operations and MTCE: No change. OB is baseline.	/year

Data Sheet 8-18. Treatment Technology: Oxidation, Cerium-catalyzed

Treatment Technology Description:	Cerium-catalyzed electrochemical oxidation operates at atmospheric pressure and can convert organic hazardous waste materials into carbon dioxide and water. This technology is used to treat organic pumpable fluids.	
Treatment Type	OB Alternative	
Waste Stream Treatment Capability	*LANL OB Waste Stream*:	No – None
	LANL OD Waste Stream:	No – None
Principal/Treatment Capability Limitations	Applicability limited to pumpable organic fluids. Not applicable to LANL OB/OD waste streams.	
Permits Required	*RCRA Part B*	Yes – Subpart X
	Revision to CAA Title V	Yes; produces oxidation emissions.
	Revision to CWA – NPDES	May generate cooling water and wastewater subject to treatment and/or discharge permitting
	Other	General and stormwater permits for facility construction
Safety Risk Considerations	NA – Not applicable to LANL OB/OD waste streams	
Human Health and Environmental Impact Considerations	NA – Not applicable to LANL OB/OD waste streams	
Energy Resource Demands of Operation	NA – Not applicable to LANL OB/OD waste streams	
Secondary Waste Streams Generated by Technology	NA – Not applicable to LANL OB/OD waste streams Cesium catalyst requires periodic replacement; spent catalyst subject to offsite treatment/disposal.	
Operations/Treatment Capability Uncertainty	NA – Not applicable to LANL OB/OD waste streams	
Relative Cost Range:	*Capital:* NA	Total
	Operations and MTCE: NA	/year

Data Sheet 8-19. Treatment Technology: Oxidation, Base Hydrolysis

<table>
<tr><td>Treatment Technology Description:</td><td colspan="2">Base hydrolysis oxidation heats waste to mild temperatures (90 to 150 ˚C) and usually elevated pressures (200 pounds per square in. gauge) with a strong base (pH>12). The explosive waste is converted to water-soluble, non-energetic products. The resulting solution is hazardous and must be further treated using bio-remediation or supercritical water oxidation.</td></tr>
<tr><td>Treatment Type</td><td colspan="2">Pre-treatment OD Alternative; additional treatment of resulting solution is required</td></tr>
<tr><td rowspan="2">Waste Stream Treatment Capability</td><td>LANL OB Waste Stream:</td><td>No – None</td></tr>
<tr><td>LANL OD Waste Stream:</td><td>Yes – Partial (~25%)</td></tr>
<tr><td>Principal/Treatment Capability Limitations</td><td colspan="2">Limited to organic waste streams with no plastic, which comprise a small fraction of the LANL OD waste stream</td></tr>
<tr><td rowspan="4">Permits Required</td><td>RCRA Part B</td><td>Yes – Subpart X</td></tr>
<tr><td>Revision to CAA Title V</td><td>Yes, emissions from oxidation chamber and heat (combustion) source</td></tr>
<tr><td>Revision to CWA – NPDES</td><td>Yes, generates cooling water and/or wastewater subject to treatment and/or discharge permitting</td></tr>
<tr><td>Other</td><td>Supplemental treatment – e.g., bioremediation, supercritical water extraction – likely requires additional permitting; general and stormwater permits for facility construction</td></tr>
<tr><td>Safety Risk Considerations</td><td colspan="2">Increased waste handling by workers. Risks associated with handling strong base (pH>12) and high pressure equipment. Supplemental treatment – e.g., bioremediation, supercritical water extraction – may pose additional risks.</td></tr>
<tr><td>Human Health and Environmental Impact Considerations</td><td colspan="2">Varies depending upon supplemental treatment method – e.g., bioremediation, supercritical water extraction</td></tr>
<tr><td>Energy Resource Demands of Operation</td><td colspan="2">Energy (fuel or electricity) required to heat aqueous base-reaction vessel</td></tr>
<tr><td>Secondary Waste Streams Generated by Technology</td><td colspan="2">Aqueous solution is hazardous and must be further treated using bio-remediation or supercritical water oxidation. Emissions from fuel combustion.</td></tr>
<tr><td>Operations/Treatment Capability Uncertainty</td><td colspan="2"></td></tr>
</table>

Relative Cost Range:	*Capital:* ++ Base hydrolysis treatment system equipment, plus supplemental treatment system equipment. Cost is exorbitant considering the low volume of LANL energetic waste generation, and that the technology is applicable to only a small fraction of LANL energetic wastes
	Operations and MTCE: ++ Operation of base hydrolysis treatment facility and air pollution control equipment; chemicals; transportation to and operation of supplemental treatment system; treatment & disposal of secondary waste streams; employee training for base hydrolysis system. Must include costs for existing LANL OB/OD activities, as base hydrolysis treatment can only treat a portion of LANL energetic wastes.

8.3 Focused Evaluation of Potential Alternative Technologies

Based on the initial screening provide in **Table 8-2**, LANL determined that there is no single alternative OB or OD technology that is capable of treating the breadth of explosives contaminated waste streams that exist at LANL. However, an evaluation was conducted to determine if a combination of alternative treatment technologies could replace OB and OD for wastes that must be treated onsite. The evaluation entails a comparison of OB and OD to the four remaining alternative technologies identified in **Table 8-2** using rigorous evaluation criteria. These evaluation criteria include:

- The percentage of LANL's OB or OD hazardous energetic waste stream each technology is capable of treating;
- Industry proven technology including relative costs;
- Public acceptance of the technology;
- Potential secondary hazardous waste streams created from the treatment technology, reliability and maintenance of treatment equipment;
- Personnel safety; and
- Whether the technology meets RCRA regulatory guidelines including human health and the environment.

In order for a technology to replace OB and/or OD, the alternative technology would need to meet each criteria in a similar manner as OB or OD. The results of the focused evaluation are included in **Table 8-3**. Based on this evaluation, there is no combination of the four alternative treatment technologies that would be capable of treating all the LANL explosives waste streams currently treated by flashing and OD. Therefore, regardless of whether these alternative technologies were used, LANL still requires permitted Flash Pad and OD Units.

8.4 Summary of Open Burn/Open Detonation Onsite Treatment

Based on the evaluation of alternative OB and OD technologies, there is no way to eliminate the need for permitted Flash Pad and OD units at LANL at this time. The implementation of alternative technologies would not alleviate the explosive waste treatment requirements that flashing and OD provide. Based on the LANL waste management practices, LANL will continue to minimize explosives wastes or transport to offsite treatment facilities when available; however, for wastes streams that cannot meet these requirements, onsite treatment through flashing or OD is the best available option based on site-specific safety, security requirements, effectiveness, public safety, and feasibility.

Table 8-3 Focused Comparison of Applicable Waste Treatment Technologies to Open Burning/Open Detonation

Criteria	Open Burning (OB)*	Open detonation (OD)*	Contained Burn Facility	Incineration, Rotary Kiln	Flashing Furnace	Contained detonation
Waste Streams Treated	All	Explosives contaminated combustible debris	Excess explosives (small sized only)	Explosives machining waste (powdered only)	Explosives contaminated non-combustible debris	Explosives contaminated combustible debris (smaller)
Proven Technology	Yes	Yes- Most waste streams that can be open detonated are treated with this method rather than open burning.	Yes- Although larger explosive pieces, machining waste, liquids or noncombustible debris cannot be treated and may require a burn study to evaluate treatment of LANL waste streams.	Yes- Although cannot treat most sizes of explosives or noncombustible debris, and technology is not proven with undetermined or insulted explosives.	Yes- Although can only treat one explosives waste stream generated at LANL.	Yes – Although the size and quantity of the waste is limited per treatment. Larger pieces of explosives and odd-sized equipment cannot be treated in a contained detonation unit as fragments or the pressure from a large explosion will damage the chamber.

Table 8-3 Focused Comparison of Applicable Waste Treatment Technologies to Open Burning/Open Detonation (continued)

Criteria	Open Burning (OB)*	Open detonation (OD)*	Contained Burn Facility	Incineration, Rotary Kiln	Flashing Furnace	Contained detonation
Public Acceptance	Limited- Public opposition has been voiced concerning open burning.	Limited- Public concerns about contamination and opposition to noise have been voiced.	Limited- Previous public opposition to operation of incinerators. Support of confined burn facilities during open burning permit process.	Limited- Historic public opposition has led to the closure of formerly permitted facilities	Unknown	Unknown
Process effluents	Residual ash is analyzed for hazardous constituents. Expected emissions are CO, CO_2, H_2O, NO_x N_2, and little to no secondary combustion products due to short residence time.	Metal fragments, CO_2, H_2O, and N_2.	Emissions from scrubbing system, burn and scrubber residue, residues from quench rinse, and decontamination waters. Emissions scrubbing system must be designed to capture dioxins/furans that may be generated during the process, as the temperature is not controlled.	Emissions from scrubbing system, burn and scrubber residue, residues from quench rinse, and decontamination waters.	Expected emissions are CO, CO_2, H_2O, NO_x N_2, and little to no secondary combustion products due to short residence. Residual ash is not expected.	Metal fragments, pulverized gravel, air pollution control unit residue, major burn emissions including CO, CO_2, H_2O, NO_x N_2; secondary combustion products due to residence time; and limited lifetime of chamber with replacement required and disposal of used chamber

Table 8-3 Focused Comparison of Applicable Waste Treatment Technologies to Open Burning/Open Detonation (continued)

Criteria	Open Burning (OB)*	Open detonation (OD)*	Contained Burn Facility	Incineration, Rotary Kiln	Flashing Furnace	Contained detonation
Reliability and Maintainability	Very reliable and maintenance is minimal. Maintenance of burn trays, propane burners, and electronic matches are minimal.	Very reliable with experienced technicians. Requires minimal maintenance of pit area and run-on run-off controls.	Maintenance for the unit would require replacement of filters and periodic assessment of containment structure for damage.	The reliability and maintenance requirements are unknown at this time for LANL variable and unique explosive waste streams.	The reliability and maintenance requirements are unknown at this time for LANL variable and unique explosive waste streams.	Smaller units have proven reliable. Larger units (100 pounds) experienced leaking seals, weld failures and weak points. Fragments may damage chamber and increase maintenance.

Table 8-3 Focused Comparison of Applicable Waste Treatment Technologies to Open Burning/Open Detonation (continued)

Personnel Safety	Specific training for operators and explosives safety personnel are required and the area must be secured. The burn is monitored remotely through cameras. Specific operating parameters are invoked for open burning to assure the safety of personnel and protect human health and the environment.	Larger detonations for explosives pieces that are greater than the capacity of a confined detonation chamber. This requires less handling for workers. Also, the explosive would not have to be size-reduced prior to treatment by OD. LANL conducts detonations from a remote location inside the control building following specific operating procedures for OD to assure the safety of human health and the environment.	With undetermined or insulted explosives waste, a contained burn is an unacceptable risk to personnel. There is no controlled flame to ensure complete detonation or burn of the explosive or a capability to view if the explosive has been fully treated prior to opening the chamber. Unit increases the potential for catastrophic failure (explosion) when compared to current treatment technique.	Specific training for operators and explosives safety personnel would be required and would have to be conducted within a secure area. Training on treatment techniques for limited waste streams would also be necessary. Confinement of explosives within a treatment unit could additionally lead to a build-up of residual pressure from breakdown products within the unit—a potential explosion hazard.	If the unit is mobile, precautions will have to be in place to ensure that fuel can be located at each specific location within the explosives area. Trained personnel would be required to conduct treatment activities.	Large pieces of explosives may require size reduction prior to treatment in order to meet the operating capacity of the unit. This requires more handling by the worker and subsequent safety concerns. Potential for catastrophic failure

Table 8-3 Focused Comparison of Applicable Waste Treatment Technologies to Open Burning/Open Detonation (continued)

Criteria	Open Burning (OB)*	Open detonation (OD)*	Contained Burn Facility	Incineration, Rotary Kiln	Flashing Furnace	Contained detonation
Meet regulatory guidelines	Yes with applicable RCRA Hazardous waste permits for the facility.	Yes with applicable RCRA Hazardous waste permits for the facility.	Yes with applicable RCRA Hazardous waste permits for the facility.	Yes with applicable RCRA Hazardous waste permits for the facility.	RCRA hazardous waste permit is not required for some states. New Mexico may require Subpart X (Miscellaneous Unit) Permit.	Yes with applicable RCRA Hazardous waste permits for the facility.

*OB/OD serve as the baseline for comparison with a "0" rating for each criterion, "−" indicates that the alternative technology performs less effectively than OB/OD, "+" indicates that the technology performs better than OB/OD, and "0" indicates the technology is about the same as OB/OD in terms of each criterion.

**Relative Costs – based on findings of the NAS, there is a paucity of sufficient data to perform quantitative analysis and draw general conclusions regarding the relative life cycle costs of OB/OD and the alternative treatment technologies; however, technologies such as those comprising Contained Burn/Contained Detonation (CB/CD) are expected to have higher capital and operating costs (which may vary widely) than the relatively low-tech OB/OD because of the need to procure and install equipment, site, design, construct the facility, pay for utilities, maintenance, and personnel. This cost differential would be even greater were automation used to minimize the handling of munitions. Conversely, the closure and cleanup of alternative technology facilities would likely be less expensive than OB/OD, as potential contamination of the surrounding environment during OB/OD operations may require extensive mitigation during closure. In the specific case at LANL, it should be noted that there is a baseline condition from the history of the units, as well as the updates that have been made to waste processes over the years. The addition of treatment technologies would require investments in closure and cleanup beyond cost estimates based exclusively on the new technology chosen. Additionally, closures for units currently in use at LANL may be delayed due to the duel use nature of the unit.

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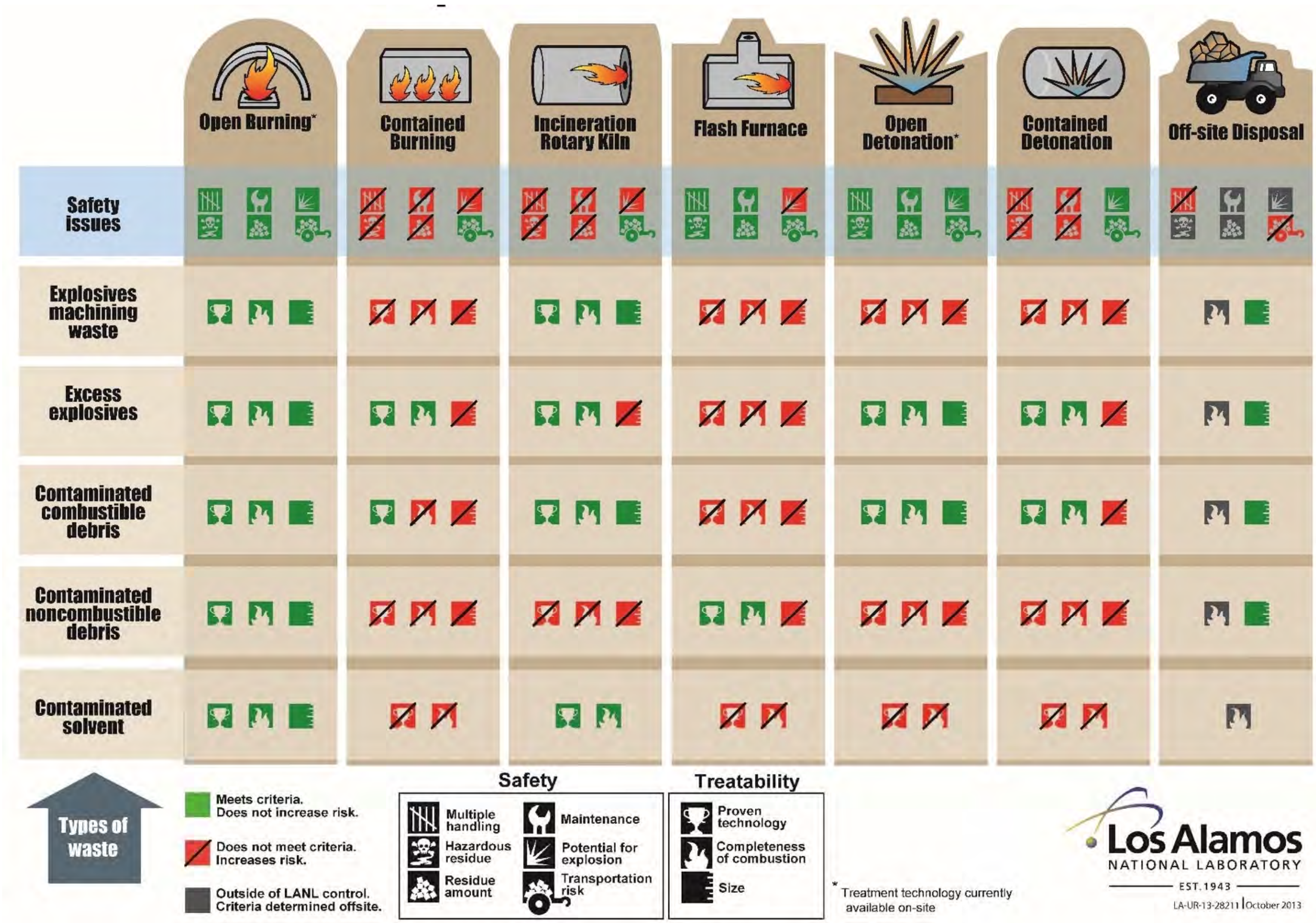

Figure 8-1 Explosives Waste Treatment Alternatives

9.0 Conclusions

In Section 6.0 of this Assessment, DOE/Triad described aggressive waste minimization efforts, operational practice changes, and process efficiencies which have significantly decreased the overall volume of explosives waste generated at LANL by roughly 80% during routine operations. These efforts are effective and are continuing, but they cannot eliminate the need for continued onsite Flash Pad and OD treatment in the foreseeable future.

For over seventy years, flashing and OD have been shown to be effective treatment technologies for explosives waste streams at LANL that cannot be minimized or transported offsite for treatment. These waste streams include the explosive waste streams listed in Table 5-1. Risk-screening assessments of the effect of past OB and OD operations at the current and past waste treatment Units demonstrate that there is no unacceptable risk to either human health or ecological receptors from past operations. These risk-screening assessments can be found in the following supplements to the Permit Renewal Application:

- Supplement 4-7, *Open Detonation Unit at Technical Area 36 Human Health and Ecological Risk-Screening Assessments*
- Supplement 4-8, *Open Detonation Unit at Technical Area 39 Human Health and Ecological Risk-Screening Assessments*

In Sections 7.0 and 8.0, it was determined that there are no technically viable offsite alternatives to flashing or OD that can address every explosives waste generated at LANL and that OB and OD would still be required. In addition, there are explosives waste streams generated at LANL that cannot be safely transported or securely disposed at offsite facilities. All explosives waste streams that have not been previously shipped offsite would have to be tested, categorized, and assigned proper shipping names and an EX-ID No. in accordance with the requirements set forth in 49 CFR § 173.56 by the DOT Associate Administrator before being shipped offsite. In order to complete this process, additional onsite storage will be required. The potential for degradation of explosives during the extended storage period would result in unnecessary additional risk to workers and the environment. The potential need to stockpile explosive contaminated waste in order to meet minimum treatment quantity requirements for transporting waste to offsite treatment facilities, likewise would result in unnecessary additional risk to workers and the environment. In addition, explosives that present export complications in accordance with 22 CFR §§ 120-130 cannot be shipped offsite for treatment and all explosives contaminated noncombustible debris that cannot be steam cleaned, must undergo treatment per Section 18 of the DOE Explosives Safety Standard (DOE, 2019) prior to leaving the firing site.

In Section 8.0, it was also determined that there is no alternative single treatment technology that can treat onsite all of the explosives waste streams generated at LANL that are currently treated onsite by flashing and/or OD; therefore, multiple treatment technologies would have to be acquired, constructed, permitted, and operated onsite in order to accomplish the same waste treatment effort, thereby increasing the overall footprint of the waste treatment areas. These other treatment technologies are an incinerator (to treat machining waste, explosives-contaminated combustible debris and explosives-contaminated solvent waste), and a flashing furnace (to treat noncombustible debris). All three thermal treatment units would require RCRA permits and still involve the burning or detonation of explosive wastes.

Therefore, for all of these reasons, and those previously submitted to the New Mexico Environment Department, continued OB and OD treatment is the only feasible alternative for LANL explosives contaminated waste based on site-specific safety considerations, transportation hazard potential and prohibitions, offsite treatment options, and the feasibility of alternative technologies. While LANL will continue to seek methods to reduce the need for treatment of explosives contaminated waste and ship such wastes offsite to the extent practicable, continued OB and OD treatment at levels maintained in recent years is most protective of worker and public safety.

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Attachment 10

Revised Supplement 4-2,
Open Detonation Unit
Groundwater Monitoring and Surface Drainage Information

Table 4.2-1. Pertinent Groundwater Data At or Above Regulatory Standards for Monitoring the TA-36-8 OD Unit, 2000 - 2019

Location	Analyte	# of Analyses	# of Detects	% Detects	Detects versus Nondetects	Minimum Report Result	Maximum Report Result	Action Limit	Units	Action Limit Type	# of Exceedances	First Sample Date	Last Sample Date	Date(s) of Exceedances
Alluvial														
WCO-1r	Iron	4	4	100.0	4/0	113	1560	1000	µg/L	NM GW STD	1	9/20/2010	8/16/2019	3/15/2019
Regional														
R-19 S3	Gross alpha	15	1	6.7	1/14	16.5	16.5	15	pCi/L	EPA MCL	1	9/26/2000	4/14/2015	4/14/2015
R-19 S3	Iron	45	6	13.3	6/39	32.3	1100	1000	µg/L	NM GW STD	1	9/26/2000	4/14/2015	9/26/2000
R-19 S3	Radium-226	7	3	42.9	3/4	0.462	10.4	5	pCi/L	NM GW STD	1	4/9/2001	9/14/2009	4/9/2001, 7/10/2001, 6/14/2004
R-20 S1	Nitrate-Nitrite as Nitrogen	30	16	53.3	16/14	0.0587	748	10	mg/L	EPA MCL	1	3/11/2004	10/23/2019	8/3/2010
R-20 S1	Radium-226	8	4	50.0	4/4	0.578	32.1	5	pCi/L	NM GW STD	3	3/15/2004	10/23/2019	3/15/2004, 5/11/2004, 9/20/2004
R-20 S2	Dioxane[1,4-]	35	1	2.9	1/34	61.4	61.4	4.59	µg/L	NMED A1 TAP SCRN LVL	1	7/19/2005	10/17/2019	9/18/2008
R-20 S2	Manganese	48	48	100.0	48/0	38.5	388	200	µg/L	NM GW STD	10	3/10/2004	10/17/2019	3/10/2004 (2), 5/5/2004 (2), 9/3/2004, 9/7/2004, 11/8/2004(2), 7/19/2005 (2)
R-20 S2	Perchlorate	32	21	65.6	21/11	0.0923	32.5	13.8	µg/L	NMED A1 TAP SCRN LVL	1	3/10/2004	10/17/2019	11/8/2004
R-20 S2	Radium-226	9	5	55.6	5/4	0.559	62.2	5	pCi/L	NM GW STD	3	3/10/2004	10/17/2019	3/10/2004, 5/5/2004, 11/8/2004
R-23	Acetone	54	8	14.8	8/46	1.35	21100	14100	µg/L	NMED A1 TAP SCRN LVL	2	9/24/2002	10/23/2019	9/24/2002 (2)
R-23	Benzo(a)anthracene	39	1	2.6	1/38	0.255	0.255	0.12	µg/L	NMED A1 TAP SCRN LVL	1	9/24/2002	10/23/2019	7/22/2011
R-23	Bis(2-ethylhexyl)phthalate	38	5	13.2	5/33	0.769	7.6	6	µg/L	EPA MCL	1	9/24/2002	10/23/2019	12/17/2003
R-23	Manganese	62	33	53.2	33/29	2.5	604	200	µg/L	NM GW STD	2	12/17/2003	10/23/2019	12/17/2003, 9/3/2009
R-23	Radium-226	14	5	35.7	5/9	0.524	13.9	5	pCi/L	NM GW STD	3	9/24/2002	10/23/2019	10/17/2002, 12/17/2003, 3/23/2004
R-27	Indeno(1,2,3-cd)pyrene	17	1	5.9	1/16	0.4	0.4	0.343	µg/L	NMED A1 TAP SCRN LVL	1	7/1/2006	2/8/2019	9/14/2010
R-31 S3	Iron	7	7	100.0	7/0	250	5190	1000	µg/L	NM GW STD	6	12/16/2000	5/21/2007	8/19/2005 (2), 11/30/2006 (2), 5/21/2007 (2)
R-31 S3	Manganese	7	7	100.0	7/0	257	3500	200	µg/L	NM GW STD	7	12/16/2000	5/21/2007	8/19/2005 (2), 11/30/2006 (2), 5/21/2007 (2), 12/16/2000
R-32 S1	Bis(2-ethylhexyl)phthalate	34	5	14.7	5/29	2.37	6	6	µg/L	EPA MCL	1	3/1/2004	10/15/2019	6/9/2008
R-32 S1	Radium-226	11	1	9.1	1/10	21.4	21.4	5	pCi/L	NM GW STD	1	3/1/2004	10/15/2019	3/1/2004
R-39	Bis(2-ethylhexyl)phthalate	21	4	19.0	4/17	7.04	9.8	6	µg/L	EPA MCL	4	2/19/2009	10/23/2019	10/26/2016, 10/25/2017, 10/24/2018, 10/23/2019
R-49 S1	Dibenz(a,h)anthracene	20	1	5.0	1/19	0.0515	0.0515	0.0343	µg/L	NMED A1 TAP SCRN LVL	1	6/23/2009	10/29/2019	10/22/2015
R-54 S1	Bis(2-ethylhexyl)phthalate	8	1	12.5	1/7	11.2	11.2	6	µg/L	EPA MCL	1	2/15/2010	11/2/2011	2/15/2010
R-54 S1	Iron	16	16	100.0	16/0	101	4600	1000	µg/L	NM GW STD	9	2/15/2010	11/2/2011	2/15/2010, 7/27/2010 (2), 10/13/2010 (2), 7/12/2011 (2), 1/14/2011 (2)
R-54 S1	Manganese	16	16	100.0	16/0	42.1	306	200	µg/L	NM GW STD	8	2/15/2010	11/2/2011	7/27/2010 (2), 10/13/2010 (2), 7/12/2011 (2), 1/14/2011 (2)

EPA TAP SCRN LVL = U.S. Environmental Protection Agency screening level for tap water.
NMED A1 TAP SCRN LVL = New Mexico Environment Department screening level for tap water.
NM GW STD = New Mexico groundwater standard.
(2) = number of samples

Table 4.2-2. Pertinent Groundwater Data At or Above Regulatory Standards for Monitoring the TA-39-6 OD Unit, 2000-2019

Location	Analyte	# of analyses	# of Detects	% Detects	Detects versus Nondetects	Minimum Report Result	Maximum Report Result	Action Limit	Units	Action Limit Type	# of Exceedances	First Sample Date	Last Sample Date	Date(s) of Exceedances
Regional														
R-31 S3	Iron	7	7	100.0	7/0	250	5190	1000	µg/L	NM GW STD	7	12/16/2000	5/21/2007	12/16/2000, 8/19/2005 (2), 11/30/2006 (2), 5/21/2007 (2)
R-31 S3	Manganese	7	7	100.0	7/0	257	3500	200	µg/L	NM GW STD	7	12/16/2000	5/21/2007	12/16/2000, 8/19/2005 (2), 11/30/2006 (2), 5/21/2007 (2)
Spring 8A	Dichlorobenzidine[3,3'-]	11	1	9.1	1/10	9.6	9.6	1.25	µg/L	NMED A1 TAP SCRN LVL	1	9/26/2000	10/12/2017	10/7/2003

EPA TAP SCRN LVL = U.S. Environmental Protection Agency screening level for tap water.
NMED A1 TAP SCRN LVL = New Mexico Environment Department screening level for tap water.
NM GW STD = New Mexico groundwater standard.
(2) = number of samples

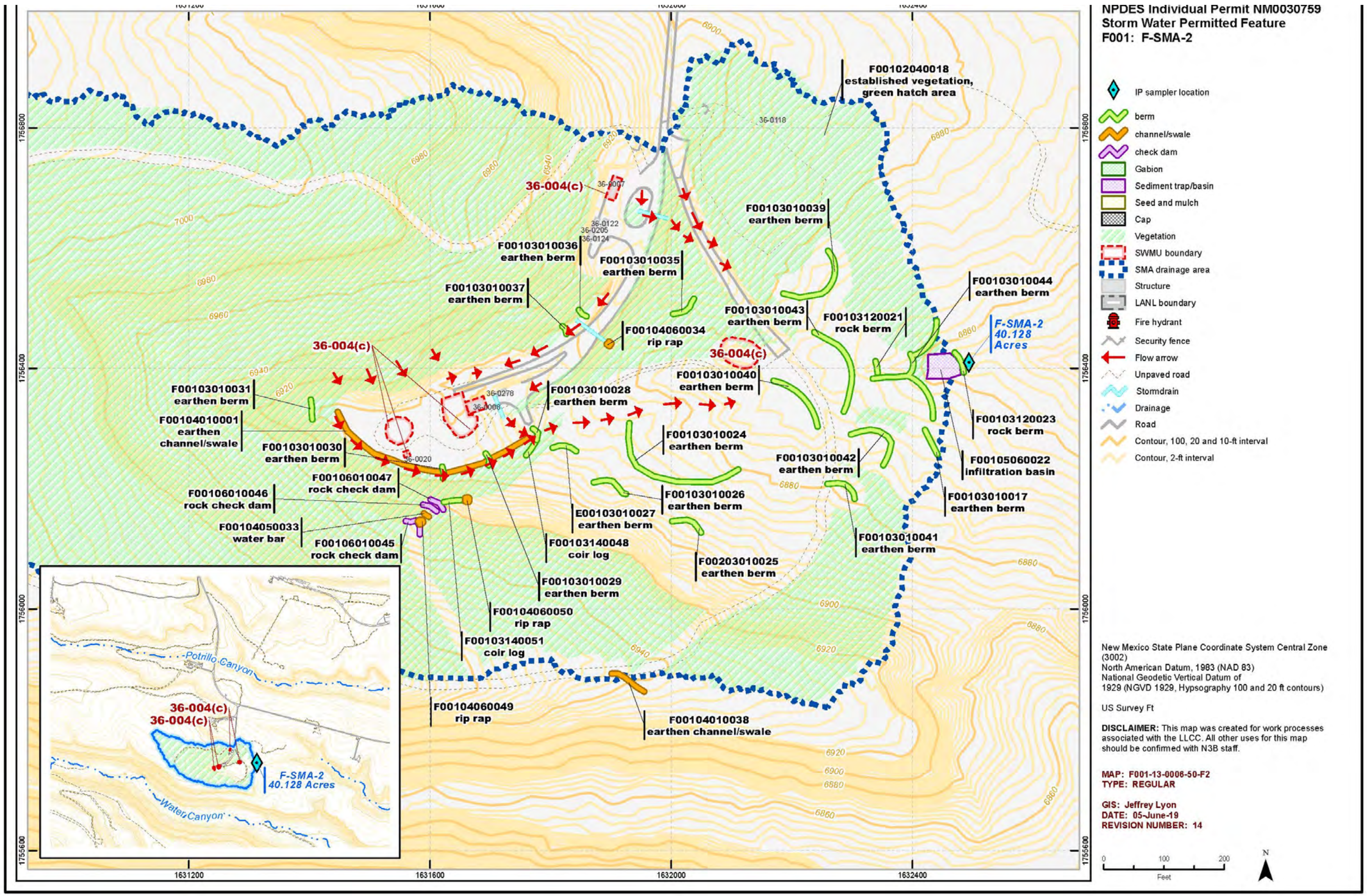

Figure 4.2-1. Drainage Control Features Near the TA-36-8 OD Unit.

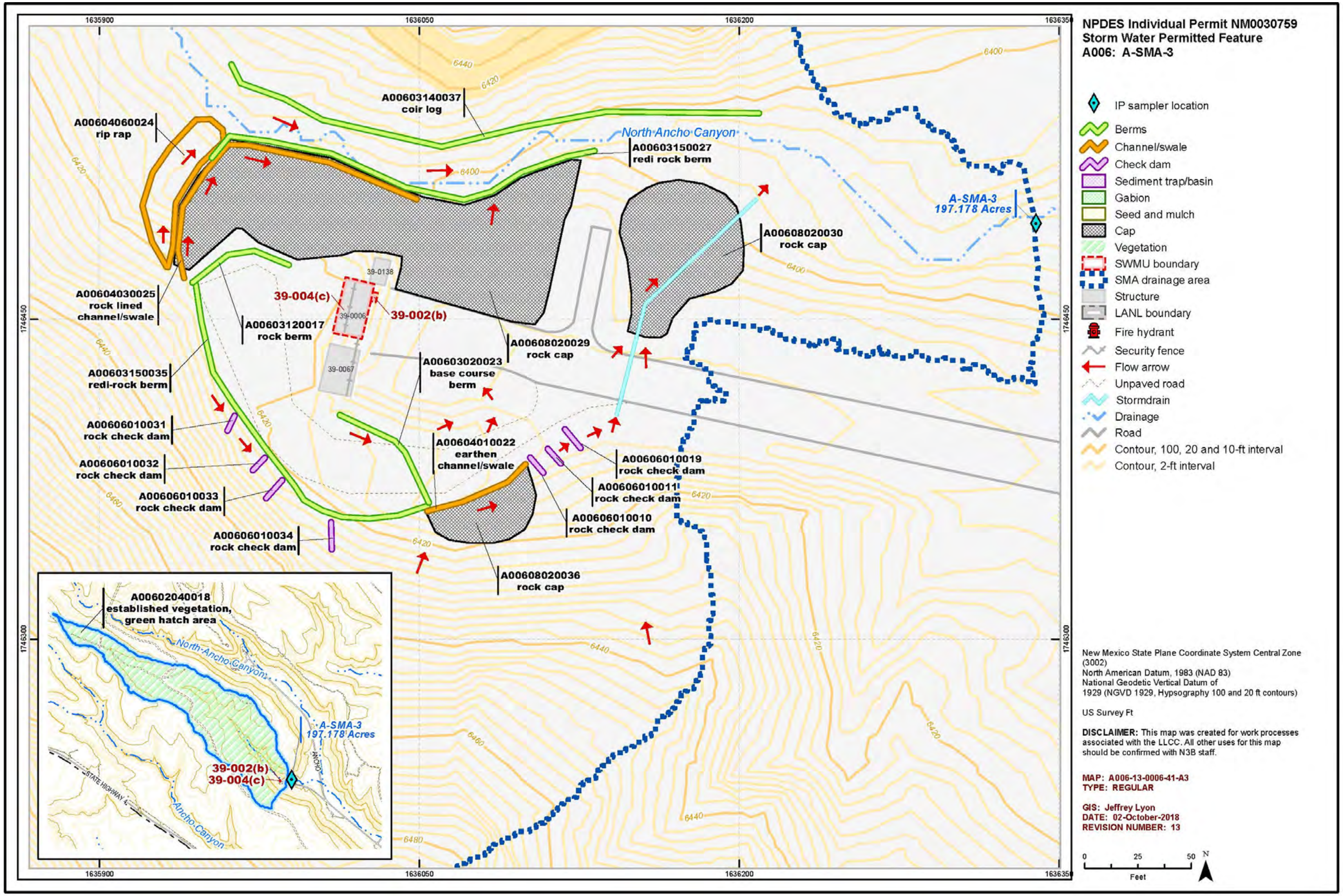

Figure 4.2-2. Drainage Control Features Near the TA-39-6 OD Unit.

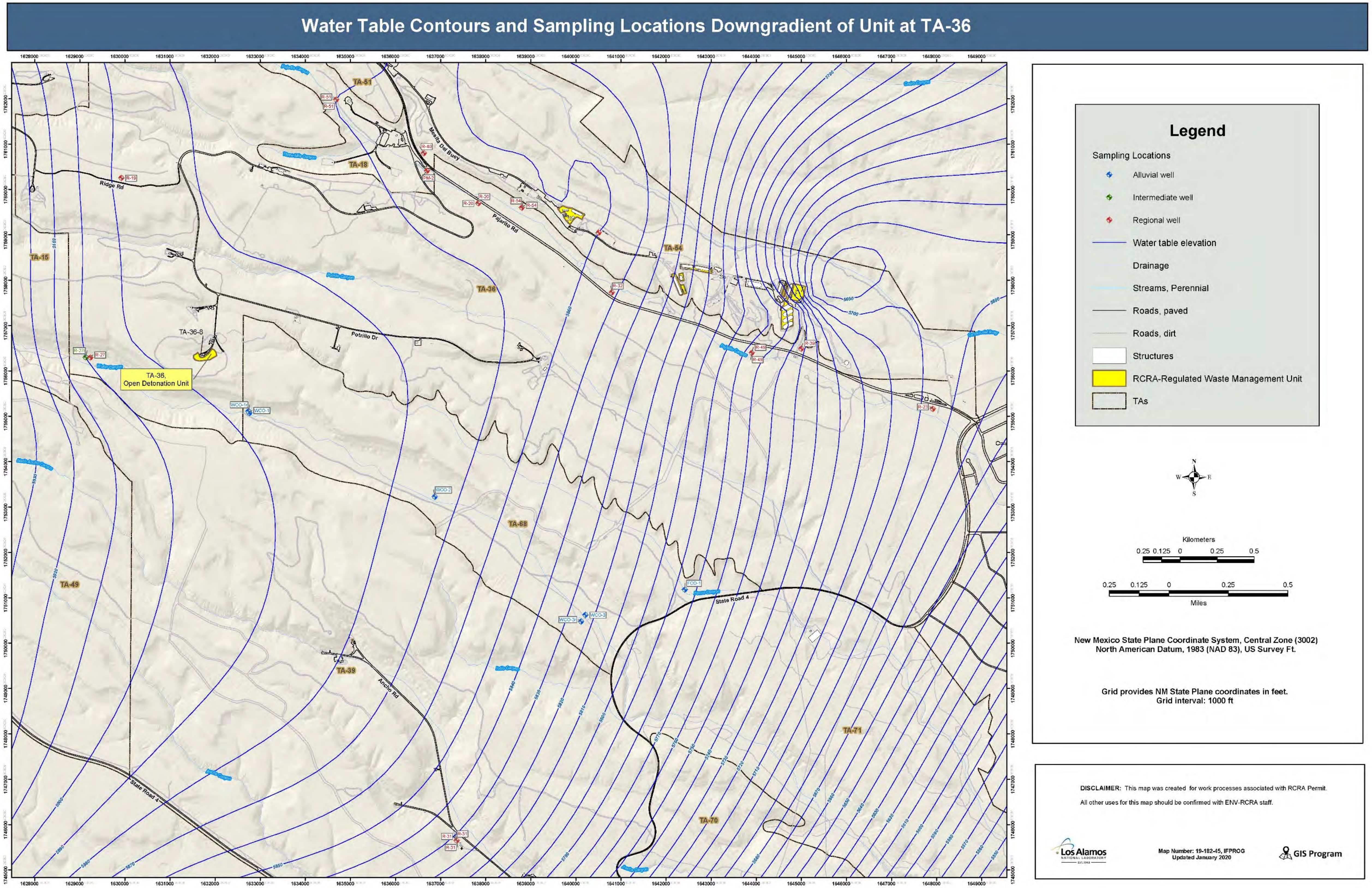

Figure 4.2-3. Water Table Contours and Sampling Locations Downgradient of Unit at Technical Area 36

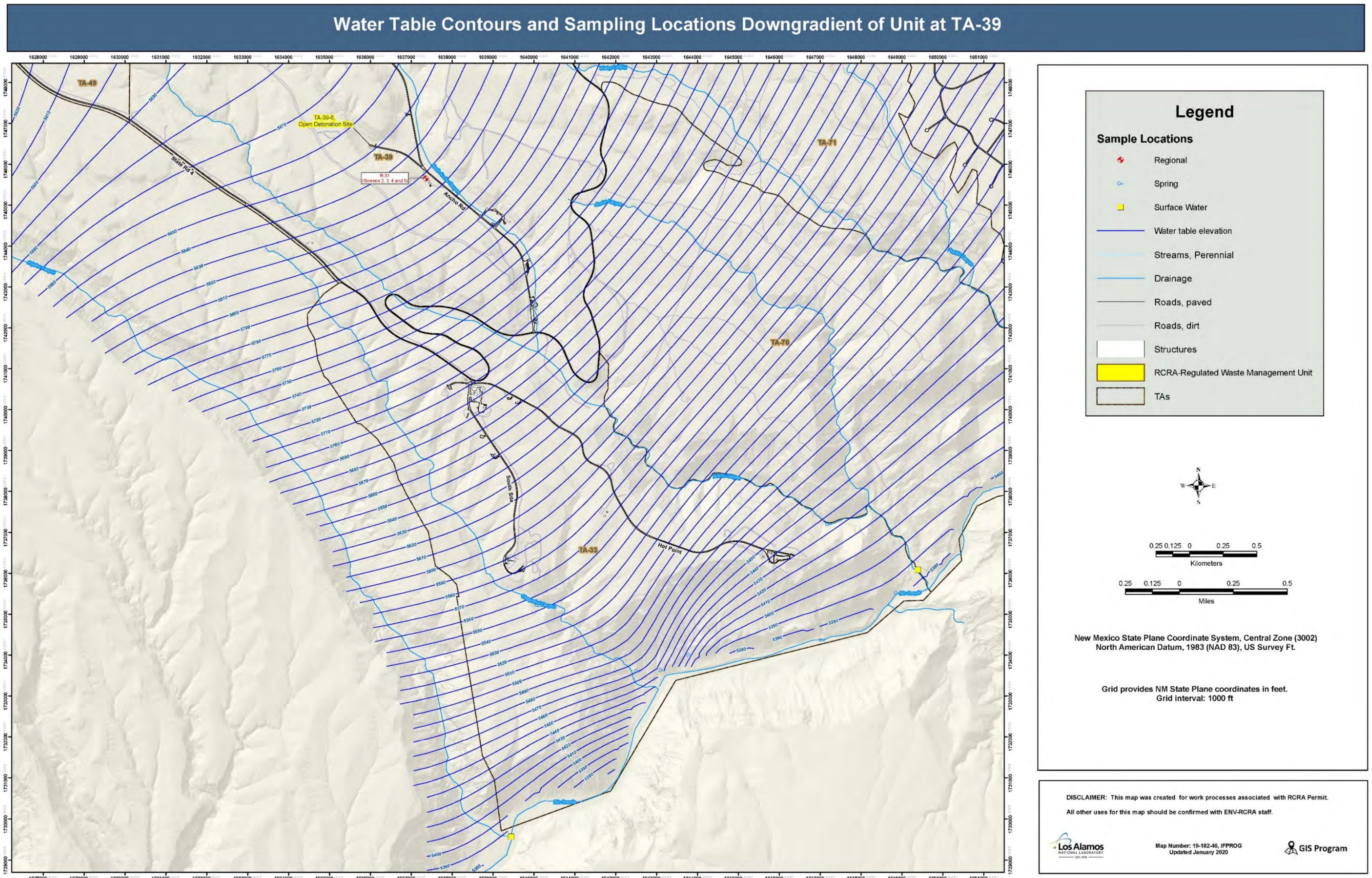

Figure 4.2-4. Water Table Contours and Sampling Locations Downgradient of Unit at Technical Area 39

Attachment 11

Revised Supplement 4-5,
Soil Sampling Results Summary Report for the Open Detonation Unit at Technical Area 36-8

TA-36-8 Open Detonation Unit

This summary report includes discussion of the analytical results associated with soil sampling conducted at the Technical Area 36, Building 8 (TA-36-8) open detonation unit on September 19, 2018. Fifteen soil samples were collected from pre-selected locations (Figure 1) based on a defined area where deposition of particulates from air to soil, including predominant downwind locations, and areas of potential storm water runoff, is most likely to occur. Soil samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total metals, dioxins/furans, perchlorates, and high explosives, gross alpha and beta and isotopic plutonium. Soil samples were collected as grab samples from a depth of 0 to 2 inches below the ground surface.

In 2010 and early 2011, soil data were previously collected to determine the baseline soil constituent of concern concentrations at the unit after more than 50 years of use. A summary of the soil analytical results for the sample collection events is included in Attachment D of the *Los Alamos National Laboratory Permit Modification Request for Open Detonation Units at Technical Areas 36 and 39 (TA-36-8 & TA-39-6), Revision 0* (Los Alamos National Laboratory [LANL], 2011). Soil samples were analyzed for high explosives, metals, dioxins/furans, SVOCs, VOCs, polychlorinated biphenyls (PCBs), perchlorates, and radiological constituents (gross alpha, gross beta, and isotopic uranium). Those analytical results indicate that the average soil constituent concentrations in and around the TA-36-8 open detonation unit were less than the New Mexico Environment Department (NMED) Residential Soil Screening Levels (RSSLs) (NMED, 2019).

PCB soil data was collected in 2010 and 2011, because the soil monitoring conducted at that time was designed to be a baseline data set to begin an assumed soil monitoring program at the detonation unit. Constituents chosen for the 2018 sampling effort were based on the likelihood that current operational activities may contribute to deposition of the constituents.

PCB waste is not treated or used in association with the current operational activities at either of the units; therefore, PCBs should not be added to the soil surface since initial detection. At the time of closure of the units, PCBs should be evaluated based on the sites historic use.

The results of the 2018 soil sampling event, discussed in detail below, indicate that current active operations at the unit also do not pose an unnecessary risk to human health based on the soil sample analytical results. Any potential contamination at the site is believed to be primarily limited to the surface (i.e., the first few inches in depth) of the site.

Laboratory Analysis and Reporting

The soil samples collected in 2018 were analyzed at a qualified offsite laboratory. The LANL Sample Management Office qualifies contract laboratories and ensures these laboratories adhere to U.S. Environmental Protection Agency (EPA) quality assurance and quality control (QA/QC) requirements. All sampling and analyses were conducted in accordance with QA/QC procedures defined by the latest revision of SW-846 (EPA 1986) or other NMED-approved procedures. Field sampling procedures and laboratory analyses are evaluated through the use of QA/QC samples to assess the overall quality of the data produced. The field QC samples included trip blanks, field blanks, field duplicates, and equipment rinsate blanks. Field QC samples were given a unique sample identification number and submitted to the analytical laboratory as blind samples. Laboratory QC samples include calibrations, blanks, duplicates, and spike samples. QC sample results are included in the analytical results received from the laboratory so the results can be applied to the associated samples.

Samples were analyzed for the following constituents using the methods indicated in the parentheses:

- High explosives (SW-846-8330B)
- Metals (SW-846-6020, SW-846-6010C, and SW-846-7471A)
- Dioxins/Furans (SW-846-8290A)
- SVOCs (SW-846-8270D)
- VOCs (SW-846-8260B)
- Perchlorates (SW-846-6850)
- Gross alpha and beta (EPA Method 900)
- Isotopic plutonium (HASL-300:ISOPU)

Complete analytical results for this sampling are included in Table 1, *TA-36-8 Analytical Data Summary*. Data are reported with qualifiers that denote the following analytical situations:

- For Dioxins/Furans
  - U – Compound analyzed for, but not detected, reported quantity equals the contract required quantitation limit (CRQL)
  - J - Estimated value; the analyte is present, but at a concentration below the CRQL
  - B – Analyte detected in associated blank
  - K – Estimated Maximum Possible Concentration
  - NQ – No qualification
- For Metals and Isotopic Plutonium
  - U – reading was less than the method detection limit (MDL); reported value equals the CRQL
  - J – The reported value was obtained from a reading less than the CRQL but greater than or equal to the MDL
    - J+ – percent recovery is over the qualification standard
    - J- – percent recovery is below the qualification standard
  - B – Analyte detected in associated blank
  - NQ – No qualification
- For VOCs and SVOCs
  - U – Compound analyzed for, but not detected; reported value equals the CRQL
  - J – Estimated value; the analyte is present, but at a concentration below the CRQL
    - J+ – percent recovery is over the qualification standard
    - J- – percent recovery is below the qualification standard
  - B – Analyte detected in associated blank

- <u>For Explosives</u>
  - U – Compound analyzed for, but not detected; reported value equals the CRQL
  - J – Estimated value; the analyte is present, but at a concentration below the CRQL
    - J+ – percent recovery is over the qualification standard
    - J- – percent recovery is below the qualification standard
  - B – Analyte detected in associated blank
  - NQ – No qualification

Soil samples collected in 2018 were intended to be analyzed for isotopic uranium, but were analyzed for isotopic plutonium instead, which is not a constituent that should be present at the site. A miscommunication on the chain of custody forms for the sample suites led to analysis for isotopic plutonium and as expected, there was no plutonium detected at the site. However, previously collected data regarding isotopic uranium (the applicable constituent) concentration information, were included in the earlier 2011 sampling report (LANL 2011). The isotopic uranium data were also evaluated within the 2013 revised risk assessment included as Permit Application Supplement 4-9, *Revision of 2011 Open Detonation Risk Assessment*.

Summary of Results

Compiled data were compared to NMED RSSLs. It is important to note that very few constituents, when compared to the constituents that the soil was tested for, were detected. The compounds detected within the soil are presented below as well as other information about the analytical data that provide a more in depth discussion regarding the results.

Organic constituents detected within the soils at the TA-36-8 open detonation unit include:
- 2 of the 62 VOCs analyzed;
- 17 of the 69 SVOCs analyzed;
- 3 of the 20 explosives compounds analyzed; and
- 16 of the 25 dioxin or furan compounds analyzed.

All of the VOCs and SVOCs that were detected at the unit were detected below applicable NMED RSSLs. However, when a constituent concentration is reported as a CRQL which is greater than the screening level, it appears that the constituent is detected above the NMED RSSL. This is the case for n-nitrosodimethylamine within this dataset. It is not detected in any of the samples analyzed and is included within the 'U' qualifier. However, because the reported results are the same as the CRQL, and the CRQL is greater than the NMED RSSL, n- nitrosodimethylamine appears to be detected at a concentration higher than the NMED RSSLs. The method utilized by the analytical laboratory for the SVOC analysis can detect the presence of nitrosamines; however, it is not the most sensitive method and therefore, the detection limit is higher than the soil screening level.

The presence of n-nitrosodimethylamine due to operations at the TA-36-8 open detonation is not likely and a more focused analytical validation was deemed not necessary. N-nitrosodimethylamine is produced by industry only in small amounts for research. It was used to make rocket fuel, but this use was stopped after unusually high levels of the chemical were found in air, water, and soil samples collected near a rocket fuel manufacturing plant. It is currently used in some cosmetic and toiletry products and in cleansers. N-nitrosodimethylamine is unintentionally formed during various manufacturing processes and in air, water, and soil from reactions involving alkylamines. It is also found in some foods and may be formed in the body. When released to the air, it is broken down by sunlight in a matter of minutes. When released to soil, it may evaporate into air or could sink down into deeper soil. It is unlikely that n-nitrosodimethylamine was deposited by past or current activities at the TA-36-8 open detonation unit as rocket fuel was never manufactured at LANL.

The three explosives compounds (HMX, RDX, and TATB) detected within the soil at the TA-36-8 open detonation unit were all found at concentrations below NMED RSSLs.

EPA has established 50 parts per trillion (ppt) Toxic Equivalency Quantity (TEQ) as being an acceptable limit for residential contamination for dioxins and furans. The TEQ system was developed for the purpose of comparing the relative risk of exposure in areas of contamination that vary widely in the composition and level of most toxic dioxins and furans. Each of the 17 highly toxic dioxins/furans are assigned a Toxic Equivalency Factor (TEF) based on a particular chemical's toxicity relative to 2,3,7,8-tetrachlorodibenzodioxin (TCDD), with the toxicity of TCDD being equal to 1.0. The concentration of each dioxin/furan is multiplied by its respective TEF and the results are summed. The summed results give the TEQ of the sample and it is this value that is compared to the 50 ppt screening level. This analysis is conducted as part of the health and ecological risk assessment included with this application and is included within Permit Application Supplement 4-7, *Technical Area 36 - Open Burn/Open Detonation (OB/OD) Area - Technical Area 36-8 Open Detonation Unit Human Health and Ecological Risk- Screening Assessments*.

Perchlorate was detected at 11 of the 15 soil sample locations. All detections were below NMED RSSLs.

Twenty-two (22) of the 23 analyzed metals were detected in the sampled soil at the TA-36-8 open detonation unit. Most of the detected metal concentrations are below the established background levels for Los Alamos National Laboratory. Eight of the metals detected are present at concentrations above background values.

- Cadmium (1 location)
- Chromium (1 location)
- Copper (13 locations)
- Lead (1 location)
- Mercury (1 location)
- Silver (2 locations)
- Thallium (1 location)
- Zinc (1 location)

The single detection of thallium is also above the NMED RSSL at that location. Human health and ecological risks associated with these detections are included in Permit Application Supplement 4-7, *Technical Area 36 - Open Burn/Open Detonation (OB/OD) Area - Technical Area 36-8 Open Detonation Unit Human Health and Ecological Risk- Screening Assessments*.

Conclusion

Soil sampling and analysis results indicate that the average soil constituent concentration in and around the TA-36-8 open detonation unit are generally less than the NMED RSSLs. Metal constituent concentrations greater than the screening levels (see Table 1) are indicated for a single soil sample when compared directly to the NMED RSSLs. The analytical results for high explosives, perchlorates, VOCs, SVOCs and dioxins/furans did not indicate the presence of any constituents greater than the selected screening levels. Detected metals at 13 soil sample locations were measured above established background values.

References

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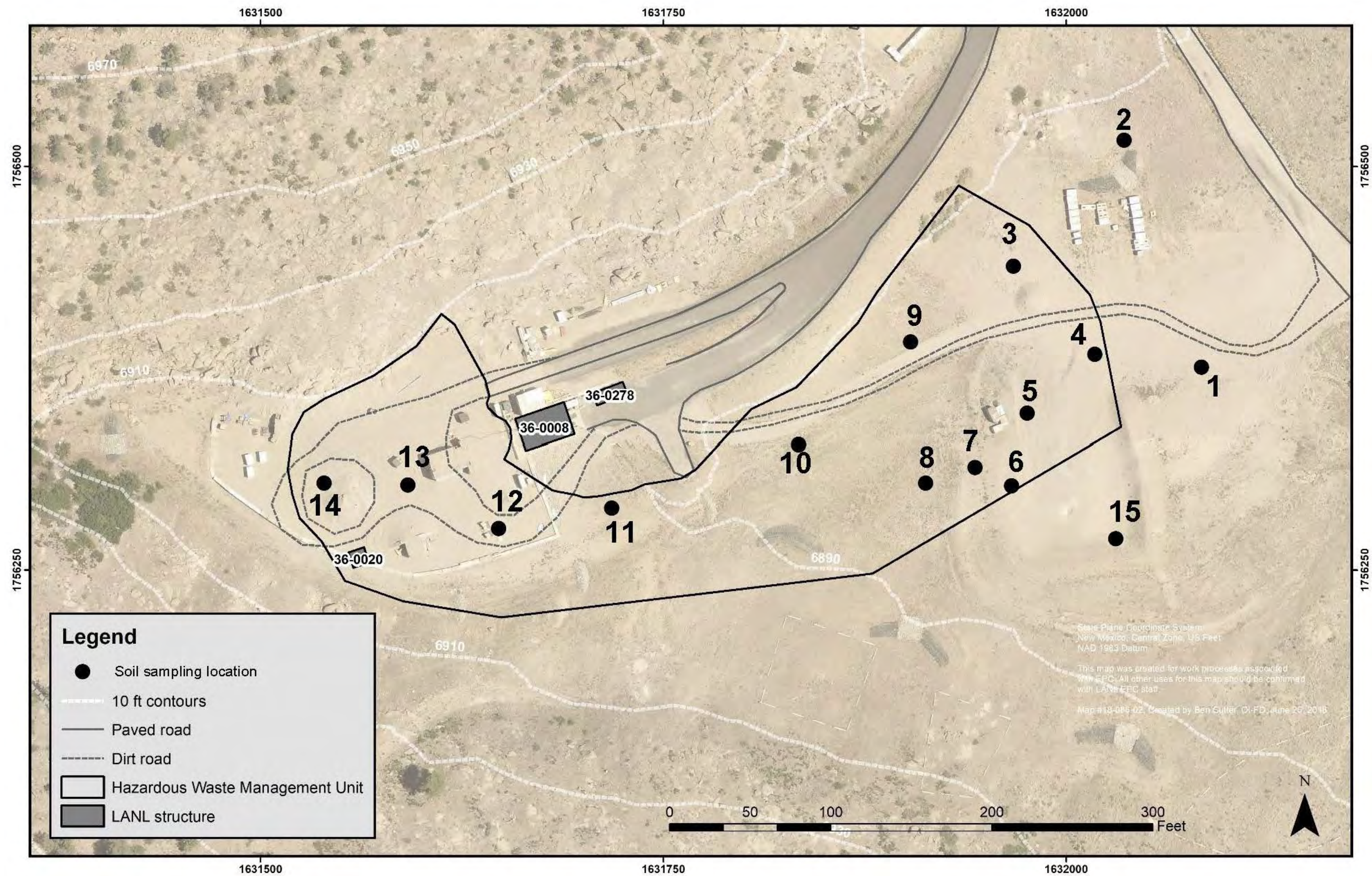

Figure 1. TA-36-8 Soil Sample Locations

Table 1. TA-36-8 2018 Analytical Data Summary

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**8.40E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	**Heptachlorodibenzodioxins (Total)**	**1.22E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Heptachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Hexachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Hexachlorodibenzofuran[1,2,3,4,7,8-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Hexachlorodibenzofuran[1,2,3,6,7,8-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Hexachlorodibenzofuran[1,2,3,7,8,9-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Hexachlorodibenzofuran[2,3,4,6,7,8-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**5.61E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	9.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Pentachlorodibenzodioxin[1,2,3,7,8-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Pentachlorodibenzofuran[1,2,3,7,8-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Pentachlorodibenzofuran[2,3,4,7,8-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Tetrachlorodibenzodioxin[2,3,7,8-]	9.99E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
1	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	**Tetrachlorodibenzofuran[2,3,7,8-]**	**1.10E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1	**Tetrachlorodibenzofurans (Totals)**	**1.10E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	**Aluminum**	**2.35E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
1	Antimony	3.14E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
1	**Arsenic**	**8.44E-01**	mg/kg	**Y**	J	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
1	**Barium**	**2.64E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
1	**Beryllium**	**2.09E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
1	Cadmium	9.52E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
1	**Calcium**	**4.49E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
1	**Chromium**	**7.38E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
1	**Cobalt**	**3.32E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
1	**Copper**	**1.22E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	FALSE
1	**Iron**	**9.51E+03**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
1	**Lead**	**4.17E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
1	**Magnesium**	**2.58E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
1	**Manganese**	**1.43E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
1	Mercury	3.64E-03	mg/kg	N	U	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
1	**Nickel**	**5.29E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
1	**Potassium**	**4.03E+02**	mg/kg	**Y**	J+	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
1	**Selenium**	**4.78E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
1	**Silver**	**2.95E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
1	**Sodium**	**4.14E+01**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
1	Thallium	1.35E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
1	**Vanadium**	**2.13E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
1	**Zinc**	**2.01E+01**	mg/kg	**Y**	NQ	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
1	2,4-Diamino-6-nitrotoluene	4.98E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	2,6-Diamino-4-nitrotoluene	6.57E-01	mg/kg	N	U	N/Ap	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1	3,5-Dinitroaniline	2.99E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Amino-2,6-dinitrotoluene[4-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Amino-4,6-dinitrotoluene[2-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dinitrobenzene[1,3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dinitrotoluene[2,4-]	1.49E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
1	Dinitrotoluene[2,6-]	1.49E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
1	HMX	1.49E-01	mg/kg	N	U	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
1	Nitrobenzene	1.49E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
1	Nitrotoluene[2-]	1.49E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
1	Nitrotoluene[3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
1	Nitrotoluene[4-]	1.49E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
1	PETN	2.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	**RDX**	**2.27E-01**	mg/kg	**Y**	J	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
1	**TATB**	**1.27E+01**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Tetryl	1.49E-01	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
1	Trinitrobenzene[1,3,5-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Trinitrotoluene[2,4,6-]	1.49E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
1	Tris (o-cresyl) phosphate	2.99E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Perchlorate	4.98E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
1	**Gross alpha**	**1.24E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	**Gross beta**	**2.14E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Plutonium-238	1.36E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
1	Plutonium-239/240	-1.09E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
1	Acenaphthene	1.00E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
1	Acenaphthylene	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1	Aniline	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Anthracene	1.00E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
1	Azobenzene	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Benzo(a)anthracene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
1	Benzo(a)pyrene	1.00E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
1	Benzo(b)fluoranthene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
1	Benzo(g,h,i)perylene	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Benzo(k)fluoranthene	1.00E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
1	Benzoic Acid	1.67E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Benzyl Alcohol	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Bis(2-chloroethoxy)methane	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Bis(2-chloroethyl)ether	1.00E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
1	Bis(2-ethylhexyl)phthalate	1.00E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
1	Bromophenyl-phenylether[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Butylbenzylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Chloroaniline[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Chloronaphthalene[2-]	1.00E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
1	Chlorophenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
1	Chlorophenyl-phenyl[4-] Ether	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Chrysene	1.00E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
1	Dibenz(a,h)anthracene	1.00E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
1	Dibenzofuran	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dichlorobenzene[1,2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
1	Dichlorobenzene[1,3-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dichlorobenzene[1,4-]	1.00E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1	Dichlorobenzidine[3,3'-]	1.00E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
1	Dichlorophenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
1	Diethylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
1	Dimethyl Phthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
1	Dimethylphenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
1	Di-n-butylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
1	Dinitro-2-methylphenol[4,6-]	1.00E-01	mg/kg	N	U	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE
1	Dinitrophenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
1	Dinitrotoluene[2,4-]	1.00E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
1	Dinitrotoluene[2,6-]	1.00E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
1	Di-n-octylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Diphenylamine	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Fluoranthene	1.00E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
1	Fluorene	1.00E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
1	Hexachlorobenzene	1.00E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
1	Hexachlorobutadiene	1.00E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
1	Hexachlorocyclopentadiene	1.00E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
1	Hexachloroethane	1.00E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
1	Indeno(1,2,3-cd)pyrene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
1	Isophorone	1.00E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
1	Methylnaphthalene[2-]	1.00E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
1	Methylphenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Methylphenol[3-,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Naphthalene	1.00E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
1	Nitroaniline[2-]	1.10E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Nitroaniline[3-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1	Nitroaniline[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Nitrobenzene	1.00E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
1	Nitrophenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Nitrophenol[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Nitrosodimethylamine[N-]	1.00E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
1	Nitroso-di-n-propylamine[N-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Oxybis(1-chloropropane)[2,2'-]	1.00E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
1	Pentachlorophenol	1.00E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
1	Phenanthrene	1.00E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
1	Phenol	1.00E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
1	Pyrene	1.00E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
1	Pyridine	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Trichlorobenzene[1,2,4-]	1.00E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
1	Trichlorophenol[2,4,5-]	1.00E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
1	Trichlorophenol[2,4,6-]	1.00E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
1	Acetone	1.55E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
1	Benzene	3.10E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
1	Bromobenzene	3.10E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Bromochloromethane	3.10E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Bromodichloromethane	3.10E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
1	Bromoform	3.10E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
1	Bromomethane	3.10E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
1	Butanone[2-]	1.55E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
1	Butylbenzene[n-]	3.10E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Butylbenzene[sec-]	3.10E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Butylbenzene[tert-]	3.10E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1	Carbon Disulfide	1.55E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
1	Carbon Tetrachloride	3.10E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
1	Chlorobenzene	3.10E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
1	Chlorodibromomethane	3.10E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
1	Chloroethane	3.10E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
1	Chloroform	3.10E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
1	Chloromethane	3.10E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
1	Chlorotoluene[2-]	3.10E-04	mg/kg	N	U	N/A	FALSE	1.56E+03	FALSE	N/A	FALSE
1	Chlorotoluene[4-]	3.10E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dibromo-3-Chloropropane[1,2-]	4.66E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
1	Dibromoethane[1,2-]	3.10E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
1	Dibromomethane	3.10E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
1	Dichlorobenzene[1,2-]	3.10E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
1	Dichlorobenzene[1,3-]	3.10E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dichlorobenzene[1,4-]	3.10E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
1	Dichlorodifluoromethane	3.10E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
1	Dichloroethane[1,1-]	3.10E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
1	Dichloroethane[1,2-]	3.10E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
1	Dichloroethene[1,1-]	3.10E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
1	Dichloroethene[cis-1,2-]	3.10E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
1	Dichloroethene[trans-1,2-]	3.10E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
1	Dichloropropane[1,2-]	3.10E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
1	Dichloropropane[1,3-]	3.10E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dichloropropane[2,2-]	3.10E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dichloropropene[1,1-]	3.10E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dichloropropene[cis-1,3-]	3.10E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1	Dichloropropene[trans-1,3-]	3.10E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Ethylbenzene	3.10E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
1	Hexanone[2-]	1.55E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Iodomethane	1.55E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Isopropylbenzene	3.10E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
1	Isopropyltoluene[4-]	3.10E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Methyl-2-pentanone[4-]	1.55E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
1	Methylene Chloride	1.55E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
1	Propylbenzene[1-]	3.10E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Styrene	3.10E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
1	Temperature	5.70E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Temperature	4.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Tetrachloroethane[1,1,1,2-]	3.10E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
1	Tetrachloroethane[1,1,2,2-]	3.10E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
1	Tetrachloroethene	3.10E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
1	Toluene	3.10E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.55E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
1	Trichloroethane[1,1,1-]	3.10E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
1	Trichloroethane[1,1,2-]	3.10E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
1	Trichloroethene	3.10E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
1	Trichlorofluoromethane	3.10E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
1	Trichloropropane[1,2,3-]	3.10E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
1	Trimethylbenzene[1,2,4-]	3.10E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Trimethylbenzene[1,3,5-]	3.10E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Vinyl Chloride	3.10E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
1	Xylene[1,2-]	3.10E-04	mg/kg	N	U	N/A	FALSE	8.05E+02	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1	Xylene[1,3-]+Xylene[1,4-]	6.21E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
2	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**3.68E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Heptachlorodibenzodioxins (Total)**	**1.11E-05**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Heptachlorodibenzofuran[1,2,3,4,6,7,8-]**	**8.20E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Heptachlorodibenzofurans (Total)**	**8.20E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Hexachlorodibenzodioxins (Total)**	**5.77E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**3.41E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]**	**2.54E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Pentachlorodibenzofuran[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Pentachlorodibenzofuran[2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Tetrachlorodibenzodioxin[2,3,7,8-]	9.95E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
2	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Tetrachlorodibenzofuran[2,3,7,8-]**	**1.31E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
2	Tetrachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
2	**Aluminum**	**3.75E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
2	Antimony	3.24E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
2	**Arsenic**	**1.43E+00**	mg/kg	**Y**	NQ	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
2	**Barium**	**7.34E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
2	**Beryllium**	**4.55E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
2	Cadmium	9.81E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
2	**Calcium**	**2.76E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
2	**Chromium**	**5.37E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
2	**Cobalt**	**3.06E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
2	**Copper**	**1.48E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
2	**Iron**	**1.09E+04**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
2	**Lead**	**1.26E+01**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
2	**Magnesium**	**1.09E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
2	**Manganese**	**2.99E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
2	**Mercury**	**5.52E-03**	mg/kg	**Y**	J	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
2	**Nickel**	**4.17E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
2	**Potassium**	**7.96E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
2	**Selenium**	**8.41E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
2	**Silver**	**1.25E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
2	**Sodium**	**5.06E+01**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
2	Thallium	1.36E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
2	**Vanadium**	**1.37E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
2	**Zinc**	**4.22E+01**	mg/kg	**Y**	NQ	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
2	2,4-Diamino-6-nitrotoluene	4.95E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	2,6-Diamino-4-nitrotoluene	6.53E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	3,5-Dinitroaniline	2.97E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
2	Amino-2,6-dinitrotoluene[4-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Amino-4,6-dinitrotoluene[2-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dinitrobenzene[1,3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dinitrotoluene[2,4-]	1.49E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
2	Dinitrotoluene[2,6-]	1.49E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
2	HMX	1.49E-01	mg/kg	N	U	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
2	Nitrobenzene	1.49E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
2	Nitrotoluene[2-]	1.49E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
2	Nitrotoluene[3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
2	Nitrotoluene[4-]	1.49E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
2	PETN	2.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	RDX	1.49E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
2	**TATB**	**1.40E+01**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Tetryl	1.49E-01	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
2	Trinitrobenzene[1,3,5-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Trinitrotoluene[2,4,6-]	1.49E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
2	Tris (o-cresyl) phosphate	2.97E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Perchlorate	5.04E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
2	**Gross alpha**	**1.69E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Gross beta**	**3.27E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Plutonium-238	1.16E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
2	Plutonium-239/240	7.22E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
2	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
2	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
2	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Benzo(a)anthracene**	**1.58E-02**	mg/kg	**Y**	J	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
2	**Benzo(a)pyrene**	**1.34E-02**	mg/kg	**Y**	J	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
2	**Benzo(b)fluoranthene**	**1.61E-02**	mg/kg	**Y**	J	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
2	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
2	**Benzoic Acid**	**4.58E-01**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Benzyl Alcohol	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
2	Bis(2-ethylhexyl)phthalate	1.01E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
2	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
2	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
2	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Chrysene**	**1.38E-02**	mg/kg	**Y**	J	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
2	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
2	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
2	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
2	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
2	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
2	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
2	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
2	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
2	Di-n-butylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
2	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE
2	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
2	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
2	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
2	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Fluoranthene**	**2.58E-02**	mg/kg	**Y**	J	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
2	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
2	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
2	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
2	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
2	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
2	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
2	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
2	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
2	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
2	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
2	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
2	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
2	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
2	**Phenanthrene**	**1.54E-02**	mg/kg	**Y**	J	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
2	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
2	**Pyrene**	**2.58E-02**	mg/kg	**Y**	J	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
2	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
2	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
2	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
2	Acetone	1.62E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
2	Benzene	3.23E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
2	Bromobenzene	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Bromochloromethane	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Bromodichloromethane	3.23E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
2	Bromoform	3.23E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
2	Bromomethane	3.23E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
2	Butanone[2-]	1.62E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
2	Butylbenzene[n-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Butylbenzene[sec-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Butylbenzene[tert-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Carbon Disulfide	1.62E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
2	Carbon Tetrachloride	3.23E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
2	Chlorobenzene	3.23E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
2	Chlorodibromomethane	3.23E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
2	Chloroethane	3.23E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
2	Chloroform	3.23E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
2	Chloromethane	3.23E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
2	Chlorotoluene[2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	1.56E+03	FALSE	N/A	FALSE
2	Chlorotoluene[4-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dibromo-3-Chloropropane[1,2-]	4.85E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
2	Dibromoethane[1,2-]	3.23E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
2	Dibromomethane	3.23E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
2	Dichlorobenzene[1,2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
2	Dichlorobenzene[1,3-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dichlorobenzene[1,4-]	3.23E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
2	Dichlorodifluoromethane	3.23E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
2	Dichloroethane[1,1-]	3.23E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
2	Dichloroethane[1,2-]	3.23E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
2	Dichloroethene[1,1-]	3.23E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
2	Dichloroethene[cis-1,2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
2	Dichloroethene[trans-1,2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
2	Dichloropropane[1,2-]	3.23E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
2	Dichloropropane[1,3-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dichloropropane[2,2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dichloropropene[1,1-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dichloropropene[cis-1,3-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dichloropropene[trans-1,3-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Ethylbenzene	3.23E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
2	Hexanone[2-]	1.62E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Iodomethane	1.62E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Isopropylbenzene	3.23E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
2	Isopropyltoluene[4-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Methyl-2-pentanone[4-]	1.62E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
2	Methylene Chloride	1.62E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
2	Propylbenzene[1-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Styrene	3.23E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
2	Temperature	5.70E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Temperature	4.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Tetrachloroethane[1,1,1,2-]	3.23E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
2	Tetrachloroethane[1,1,2,2-]	3.23E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
2	Tetrachloroethene	3.23E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
2	**Toluene**	**2.23E-03**	mg/kg	**Y**	NQ	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
2	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.62E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
2	Trichloroethane[1,1,1-]	3.23E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
2	Trichloroethane[1,1,2-]	3.23E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
2	Trichloroethene	3.23E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
2	Trichlorofluoromethane	3.23E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
2	Trichloropropane[1,2,3-]	3.23E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
2	Trimethylbenzene[1,2,4-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Trimethylbenzene[1,3,5-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Vinyl Chloride	3.23E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
2	Xylene[1,2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	8.07E+02	FALSE	N/A	FALSE
2	Xylene[1,3-]+Xylene[1,4-]	6.47E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
3	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**7.96E-06**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
3	**Heptachlorodibenzodioxins (Total)**	**3.17E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	**Heptachlorodibenzofuran[1,2,3,4,6,7,8-]**	**1.49E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	5.03E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	**Heptachlorodibenzofurans (Total)**	**5.35E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	5.03E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	5.03E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	5.03E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	**Hexachlorodibenzodioxins (Total)**	**2.86E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Hexachlorodibenzofuran[1,2,3,4,7,8-]	5.03E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Hexachlorodibenzofuran[1,2,3,6,7,8-]	5.03E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Hexachlorodibenzofuran[1,2,3,7,8,9-]	5.03E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Hexachlorodibenzofuran[2,3,4,6,7,8-]	5.03E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**7.74E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	**Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]**	**5.55E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Pentachlorodibenzodioxin[1,2,3,7,8-]	5.03E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Pentachlorodibenzofuran[1,2,3,7,8-]	5.03E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Pentachlorodibenzofuran[2,3,4,7,8-]	5.03E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Tetrachlorodibenzodioxin[2,3,7,8-]	1.01E-07	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
3	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	**Tetrachlorodibenzofuran[2,3,7,8-]**	**2.27E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
3	**Tetrachlorodibenzofurans (Totals)**	**2.27E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	**Aluminum**	**2.95E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
3	Antimony	4.32E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
3	**Arsenic**	**1.95E+00**	mg/kg	**Y**	NQ	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
3	**Barium**	**1.15E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
3	**Beryllium**	**3.50E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
3	Cadmium	9.18E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
3	**Calcium**	**3.50E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
3	**Chromium**	**4.92E+01**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	TRUE
3	**Cobalt**	**4.12E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
3	**Copper**	**5.97E+02**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
3	**Iron**	**1.02E+04**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
3	**Lead**	**3.52E+01**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	TRUE
3	**Magnesium**	**1.45E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
3	**Manganese**	**1.94E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
3	Mercury	3.43E-03	mg/kg	N	U	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
3	**Nickel**	**7.70E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
3	**Potassium**	**8.10E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
3	**Selenium**	**6.31E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
3	**Silver**	**4.94E-01**	mg/kg	**Y**	NQ	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
3	**Sodium**	**6.05E+01**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
3	Thallium	1.41E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
3	**Vanadium**	**2.07E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
3	**Zinc**	**4.84E+01**	mg/kg	**Y**	NQ	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
3	2,4-Diamino-6-nitrotoluene	4.93E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	2,6-Diamino-4-nitrotoluene	6.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	3,5-Dinitroaniline	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Amino-2,6-dinitrotoluene[4-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Amino-4,6-dinitrotoluene[2-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
3	Dinitrobenzene[1,3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dinitrotoluene[2,4-]	1.48E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
3	Dinitrotoluene[2,6-]	1.48E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
3	**HMX**	**1.45E+00**	mg/kg	**Y**	NQ	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
3	Nitrobenzene	1.48E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
3	Nitrotoluene[2-]	1.48E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
3	Nitrotoluene[3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
3	Nitrotoluene[4-]	1.48E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
3	PETN	2.46E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	RDX	1.48E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
3	**TATB**	**2.22E+01**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Tetryl	1.48E-01	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
3	Trinitrobenzene[1,3,5-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Trinitrotoluene[2,4,6-]	1.48E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
3	Tris (o-cresyl) phosphate	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	**Perchlorate**	**7.69E-04**	mg/kg	**Y**	J-	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
3	**Gross alpha**	**1.24E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	**Gross beta**	**2.56E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Plutonium-238	-5.73E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
3	Plutonium-239/240	-1.00E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
3	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
3	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
3	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
3	Benzo(a)anthracene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
3	Benzo(a)pyrene	1.01E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
3	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
3	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
3	**Benzoic Acid**	**4.97E-01**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	**Benzyl Alcohol**	**1.46E-01**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
3	Bis(2-ethylhexyl)phthalate	1.01E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
3	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
3	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
3	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Chrysene	1.01E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
3	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
3	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
3	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
3	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
3	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
3	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
3	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
3	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
3	Di-n-butylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
3	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE
3	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
3	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
3	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
3	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Fluoranthene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
3	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
3	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
3	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
3	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
3	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
3	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
3	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
3	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
3	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
3	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
3	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
3	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
3	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
3	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
3	Phenanthrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
3	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
3	Pyrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
3	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
3	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
3	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
3	Acetone	1.59E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
3	Benzene	3.17E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
3	Bromobenzene	3.17E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Bromochloromethane	3.17E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Bromodichloromethane	3.17E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
3	Bromoform	3.17E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
3	Bromomethane	3.17E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
3	Butanone[2-]	1.59E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
3	Butylbenzene[n-]	3.17E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Butylbenzene[sec-]	3.17E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Butylbenzene[tert-]	3.17E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Carbon Disulfide	1.59E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
3	Carbon Tetrachloride	3.17E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
3	Chlorobenzene	3.17E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
3	Chlorodibromomethane	3.17E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
3	Chloroethane	3.17E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
3	Chloroform	3.17E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
3	Chloromethane	3.17E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
3	Chlorotoluene[2-]	3.17E-04	mg/kg	N	U	N/A	FALSE	1.56E+03	FALSE	N/A	FALSE
3	Chlorotoluene[4-]	3.17E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dibromo-3-Chloropropane[1,2-]	4.75E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
3	Dibromoethane[1,2-]	3.17E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
3	Dibromomethane	3.17E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
3	Dichlorobenzene[1,2-]	3.17E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
3	Dichlorobenzene[1,3-]	3.17E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dichlorobenzene[1,4-]	3.17E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
3	Dichlorodifluoromethane	3.17E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
3	Dichloroethane[1,1-]	3.17E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
3	Dichloroethane[1,2-]	3.17E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
3	Dichloroethene[1,1-]	3.17E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
3	Dichloroethene[cis-1,2-]	3.17E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
3	Dichloroethene[trans-1,2-]	3.17E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
3	Dichloropropane[1,2-]	3.17E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
3	Dichloropropane[1,3-]	3.17E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dichloropropane[2,2-]	3.17E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dichloropropene[1,1-]	3.17E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dichloropropene[cis-1,3-]	3.17E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dichloropropene[trans-1,3-]	3.17E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Ethylbenzene	3.17E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
3	Hexanone[2-]	1.59E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
3	Iodomethane	1.59E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Isopropylbenzene	3.17E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
3	Isopropyltoluene[4-]	3.17E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Methyl-2-pentanone[4-]	1.59E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
3	**Methylene Chloride**	**4.16E-03**	mg/kg	**Y**	J	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
3	Propylbenzene[1-]	3.17E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Styrene	3.17E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
3	Temperature	5.70E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Temperature	4.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Tetrachloroethane[1,1,1,2-]	3.17E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
3	Tetrachloroethane[1,1,2,2-]	3.17E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
3	Tetrachloroethene	3.17E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
3	Toluene	3.17E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
3	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.59E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
3	Trichloroethane[1,1,1-]	3.17E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
3	Trichloroethane[1,1,2-]	3.17E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
3	Trichloroethene	3.17E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
3	Trichlorofluoromethane	3.17E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
3	Trichloropropane[1,2,3-]	3.17E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
3	Trimethylbenzene[1,2,4-]	3.17E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Trimethylbenzene[1,3,5-]	3.17E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Vinyl Chloride	3.17E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
3	Xylene[1,2-]	3.17E-04	mg/kg	N	U	N/A	FALSE	8.08E+02	FALSE	N/A	FALSE
3	Xylene[1,3-]+Xylene[1,4-]	6.34E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
4	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**1.74E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	**Heptachlorodibenzodioxins (Total)**	**6.18E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
4	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	**Heptachlorodibenzofurans (Total)**	**5.37E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Hexachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**1.40E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	9.94E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Pentachlorodibenzofuran[1,2,3,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Pentachlorodibenzofuran[2,3,4,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Tetrachlorodibenzodioxin[2,3,7,8-]	9.94E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
4	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	**Tetrachlorodibenzofuran[2,3,7,8-]**	**1.79E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
4	**Tetrachlorodibenzofurans (Totals)**	**3.36E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	**Aluminum**	**2.30E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
4	Antimony	3.16E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
4	**Arsenic**	**1.30E+00**	mg/kg	**Y**	NQ	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
4	**Barium**	**2.58E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
4	**Beryllium**	**2.47E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
4	Cadmium	9.58E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
4	**Calcium**	**3.29E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
4	**Chromium**	**6.17E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
4	**Cobalt**	**2.83E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
4	**Copper**	**1.29E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	FALSE
4	**Iron**	**7.68E+03**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
4	**Lead**	**4.13E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
4	**Magnesium**	**1.39E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
4	**Manganese**	**1.19E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
4	Mercury	3.66E-03	mg/kg	N	U	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
4	**Nickel**	**6.65E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
4	**Potassium**	**4.45E+02**	mg/kg	**Y**	J+	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
4	**Selenium**	**5.59E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
4	**Silver**	**1.81E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
4	**Sodium**	**4.73E+01**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
4	Thallium	1.36E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
4	**Vanadium**	**1.49E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
4	**Zinc**	**1.85E+01**	mg/kg	**Y**	NQ	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
4	2,4-Diamino-6-nitrotoluene	4.98E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	2,6-Diamino-4-nitrotoluene	6.57E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	3,5-Dinitroaniline	2.99E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Amino-2,6-dinitrotoluene[4-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Amino-4,6-dinitrotoluene[2-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dinitrobenzene[1,3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
4	Dinitrotoluene[2,4-]	1.49E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
4	Dinitrotoluene[2,6-]	1.49E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
4	**HMX**	**1.58E-01**	mg/kg	**Y**	J	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
4	Nitrobenzene	1.49E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
4	Nitrotoluene[2-]	1.49E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
4	Nitrotoluene[3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
4	Nitrotoluene[4-]	1.49E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
4	PETN	2.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	**RDX**	**6.08E-01**	mg/kg	**Y**	NQ	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
4	**TATB**	**1.48E+01**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Tetryl	1.49E-01	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
4	Trinitrobenzene[1,3,5-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Trinitrotoluene[2,4,6-]	1.49E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
4	Tris (o-cresyl) phosphate	2.99E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	**Perchlorate**	**1.31E-03**	mg/kg	**Y**	J-	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
4	**Gross alpha**	**9.87E+00**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	**Gross beta**	**2.25E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Plutonium-238	-2.04E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
4	Plutonium-239/240	-1.02E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
4	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
4	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
4	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Benzo(a)anthracene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
4	Benzo(a)pyrene	1.01E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
4	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
4	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
4	Benzoic Acid	1.69E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Benzyl Alcohol	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
4	Bis(2-ethylhexyl)phthalate	1.01E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
4	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Chloro-3-methylphenol[4-]	1.35E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
4	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
4	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Chrysene	1.01E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
4	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
4	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
4	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
4	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
4	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
4	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
4	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
4	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
4	Di-n-butylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
4	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE
4	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
4	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
4	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
4	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Fluoranthene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
4	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
4	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
4	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
4	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
4	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
4	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
4	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
4	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
4	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
4	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
4	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
4	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
4	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
4	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
4	Phenanthrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
4	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
4	Pyrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
4	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
4	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
4	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
4	Acetone	1.65E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
4	Benzene	3.30E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
4	Bromobenzene	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Bromochloromethane	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Bromodichloromethane	3.30E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
4	Bromoform	3.30E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
4	Bromomethane	3.30E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
4	Butanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
4	Butylbenzene[n-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Butylbenzene[sec-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Butylbenzene[tert-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Carbon Disulfide	1.65E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
4	Carbon Tetrachloride	3.30E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
4	Chlorobenzene	3.30E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
4	Chlorodibromomethane	3.30E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
4	Chloroethane	3.30E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
4	Chloroform	3.30E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
4	Chloromethane	3.30E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
4	Chlorotoluene[2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	1.56E+03	FALSE	N/A	FALSE
4	Chlorotoluene[4-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dibromo-3-Chloropropane[1,2-]	4.96E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
4	Dibromoethane[1,2-]	3.30E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
4	Dibromomethane	3.30E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
4	Dichlorobenzene[1,2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
4	Dichlorobenzene[1,3-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dichlorobenzene[1,4-]	3.30E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
4	Dichlorodifluoromethane	3.30E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
4	Dichloroethane[1,1-]	3.30E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
4	Dichloroethane[1,2-]	3.30E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
4	Dichloroethene[1,1-]	3.30E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
4	Dichloroethene[cis-1,2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
4	Dichloroethene[trans-1,2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
4	Dichloropropane[1,2-]	3.30E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
4	Dichloropropane[1,3-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dichloropropane[2,2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dichloropropene[1,1-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dichloropropene[cis-1,3-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dichloropropene[trans-1,3-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Ethylbenzene	3.30E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
4	Hexanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Iodomethane	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
4	Isopropylbenzene	3.30E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
4	Isopropyltoluene[4-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Methyl-2-pentanone[4-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
4	Methylene Chloride	1.65E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
4	Propylbenzene[1-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Styrene	3.30E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
4	Temperature	5.70E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Temperature	4.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Tetrachloroethane[1,1,1,2-]	3.30E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
4	Tetrachloroethane[1,1,2,2-]	3.30E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
4	Tetrachloroethene	3.30E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
4	Toluene	3.30E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
4	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
4	Trichloroethane[1,1,1-]	3.30E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
4	Trichloroethane[1,1,2-]	3.30E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
4	Trichloroethene	3.30E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
4	Trichlorofluoromethane	3.30E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
4	Trichloropropane[1,2,3-]	3.30E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
4	Trimethylbenzene[1,2,4-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Trimethylbenzene[1,3,5-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Vinyl Chloride	3.30E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
4	Xylene[1,2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	8.09E+02	FALSE	N/A	FALSE
4	Xylene[1,3-]+Xylene[1,4-]	6.61E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
5	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**8.19E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	**Heptachlorodibenzodioxins (Total)**	**2.69E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
5	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Heptachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Hexachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Hexachlorodibenzofuran[1,2,3,4,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Hexachlorodibenzofuran[1,2,3,6,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Hexachlorodibenzofuran[1,2,3,7,8,9-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Hexachlorodibenzofuran[2,3,4,6,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**8.29E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	1.00E-06	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Pentachlorodibenzodioxin[1,2,3,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Pentachlorodibenzofuran[1,2,3,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Pentachlorodibenzofuran[2,3,4,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Tetrachlorodibenzodioxin[2,3,7,8-]	1.00E-07	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
5	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Tetrachlorodibenzofuran[2,3,7,8-]	2.36E-07	mg/kg	N	U	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
5	**Tetrachlorodibenzofurans (Totals)**	**2.36E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	**Aluminum**	**3.16E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
5	Antimony	3.17E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
5	**Arsenic**	**1.17E+00**	mg/kg	**Y**	NQ	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
5	**Barium**	**4.28E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
5	**Beryllium**	**2.68E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
5	Cadmium	9.60E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
5	**Calcium**	**4.04E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
5	**Chromium**	**1.01E+01**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
5	**Cobalt**	**4.49E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
5	**Copper**	**4.48E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
5	**Iron**	**1.29E+04**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
5	**Lead**	**6.52E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
5	**Magnesium**	**1.74E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
5	**Manganese**	**1.90E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
5	Mercury	3.66E-03	mg/kg	N	U	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
5	**Nickel**	**6.93E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
5	**Potassium**	**6.12E+02**	mg/kg	**Y**	J+	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
5	**Selenium**	**5.13E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
5	**Silver**	**4.14E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
5	**Sodium**	**9.85E+01**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
5	Thallium	1.37E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
5	**Vanadium**	**2.90E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	N/A	FALSE
5	**Zinc**	**2.58E+01**	mg/kg	**Y**	NQ	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
5	2,4-Diamino-6-nitrotoluene	4.93E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	2,6-Diamino-4-nitrotoluene	6.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	3,5-Dinitroaniline	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Amino-2,6-dinitrotoluene[4-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Amino-4,6-dinitrotoluene[2-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dinitrobenzene[1,3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dinitrotoluene[2,4-]	1.48E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
5	Dinitrotoluene[2,6-]	1.48E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
5	**HMX**	**3.79E-01**	mg/kg	**Y**	J	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
5	Nitrobenzene	1.48E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
5	Nitrotoluene[2-]	1.48E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
5	Nitrotoluene[3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
5	Nitrotoluene[4-]	1.48E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
5	PETN	2.46E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	**RDX**	**4.23E-01**	mg/kg	**Y**	J	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
5	**TATB**	**1.38E+01**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Tetryl	1.48E-01	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
5	Trinitrobenzene[1,3,5-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Trinitrotoluene[2,4,6-]	1.48E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
5	Tris (o-cresyl) phosphate	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	**Perchlorate**	**1.32E-02**	mg/kg	**Y**	J-	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
5	**Gross alpha**	**1.38E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	**Gross beta**	**2.36E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Plutonium-238	-1.27E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
5	Plutonium-239/240	-8.49E-10	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
5	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
5	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
5	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Benzo(a)anthracene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
5	Benzo(a)pyrene	1.01E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
5	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
5	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
5	Benzoic Acid	1.68E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Benzyl Alcohol	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
5	Bis(2-ethylhexyl)phthalate	1.01E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
5	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Chloro-3-methylphenol[4-]	1.35E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
5	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
5	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Chrysene	1.01E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
5	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
5	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
5	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
5	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
5	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
5	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
5	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
5	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
5	Di-n-butylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
5	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE
5	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
5	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
5	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
5	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Fluoranthene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
5	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
5	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
5	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
5	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
5	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
5	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
5	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
5	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
5	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
5	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
5	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
5	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
5	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
5	Phenanthrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
5	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
5	Pyrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
5	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
5	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
5	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
5	Acetone	1.69E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
5	Benzene	3.37E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
5	Bromobenzene	3.37E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Bromochloromethane	3.37E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Bromodichloromethane	3.37E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
5	Bromoform	3.37E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
5	Bromomethane	3.37E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
5	Butanone[2-]	1.69E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
5	Butylbenzene[n-]	3.37E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Butylbenzene[sec-]	3.37E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Butylbenzene[tert-]	3.37E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Carbon Disulfide	1.69E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
5	Carbon Tetrachloride	3.37E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
5	Chlorobenzene	3.37E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
5	Chlorodibromomethane	3.37E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
5	Chloroethane	3.37E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
5	Chloroform	3.37E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
5	Chloromethane	3.37E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
5	Chlorotoluene[2-]	3.37E-04	mg/kg	N	U	N/A	FALSE	1.56E+03	FALSE	N/A	FALSE
5	Chlorotoluene[4-]	3.37E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dibromo-3-Chloropropane[1,2-]	5.06E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
5	Dibromoethane[1,2-]	3.37E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
5	Dibromomethane	3.37E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
5	Dichlorobenzene[1,2-]	3.37E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
5	Dichlorobenzene[1,3-]	3.37E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dichlorobenzene[1,4-]	3.37E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
5	Dichlorodifluoromethane	3.37E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
5	Dichloroethane[1,1-]	3.37E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
5	Dichloroethane[1,2-]	3.37E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
5	Dichloroethene[1,1-]	3.37E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
5	Dichloroethene[cis-1,2-]	3.37E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
5	Dichloroethene[trans-1,2-]	3.37E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
5	Dichloropropane[1,2-]	3.37E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
5	Dichloropropane[1,3-]	3.37E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dichloropropane[2,2-]	3.37E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dichloropropene[1,1-]	3.37E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dichloropropene[cis-1,3-]	3.37E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dichloropropene[trans-1,3-]	3.37E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Ethylbenzene	3.37E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
5	Hexanone[2-]	1.69E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Iodomethane	1.69E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Isopropylbenzene	3.37E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
5	Isopropyltoluene[4-]	3.37E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Methyl-2-pentanone[4-]	1.69E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
5	Methylene Chloride	1.69E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
5	Propylbenzene[1-]	3.37E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Styrene	3.37E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
5	Temperature	5.70E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Temperature	4.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Tetrachloroethane[1,1,1,2-]	3.37E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
5	Tetrachloroethane[1,1,2,2-]	3.37E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
5	Tetrachloroethene	3.37E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
5	Toluene	3.37E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
5	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.69E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
5	Trichloroethane[1,1,1-]	3.37E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
5	Trichloroethane[1,1,2-]	3.37E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
5	Trichloroethene	3.37E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
5	Trichlorofluoromethane	3.37E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
5	Trichloropropane[1,2,3-]	3.37E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
5	Trimethylbenzene[1,2,4-]	3.37E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Trimethylbenzene[1,3,5-]	3.37E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Vinyl Chloride	3.37E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
5	Xylene[1,2-]	3.37E-04	mg/kg	N	U	N/A	FALSE	8.20E+02	FALSE	N/A	FALSE
5	Xylene[1,3-]+Xylene[1,4-]	6.75E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
6	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**1.06E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	**Heptachlorodibenzodioxins (Total)**	**4.75E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
6	Heptachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Hexachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**1.02E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	9.94E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Pentachlorodibenzofuran[1,2,3,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Pentachlorodibenzofuran[2,3,4,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Tetrachlorodibenzodioxin[2,3,7,8-]	9.94E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
6	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	**Tetrachlorodibenzofuran[2,3,7,8-]**	**1.87E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
6	Tetrachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	**Aluminum**	**3.06E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
6	Antimony	3.15E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
6	**Arsenic**	**1.29E+00**	mg/kg	**Y**	NQ	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
6	**Barium**	**4.59E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
6	**Beryllium**	**3.82E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
6	Cadmium	9.56E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
6	**Calcium**	**2.15E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
6	**Chromium**	**6.90E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
6	**Cobalt**	**8.44E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
6	**Copper**	**6.72E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
6	**Iron**	**8.05E+03**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
6	**Lead**	**5.42E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
6	**Magnesium**	**1.09E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
6	**Manganese**	**1.46E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
6	Mercury	3.68E-03	mg/kg	N	U	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
6	**Nickel**	**7.27E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
6	**Potassium**	**6.54E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
6	**Selenium**	**5.57E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
6	**Silver**	**3.31E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
6	**Sodium**	**5.90E+01**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
6	Thallium	1.29E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
6	**Vanadium**	**1.66E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
6	**Zinc**	**2.08E+01**	mg/kg	**Y**	NQ	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
6	2,4-Diamino-6-nitrotoluene	4.93E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	2,6-Diamino-4-nitrotoluene	6.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	3,5-Dinitroaniline	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Amino-2,6-dinitrotoluene[4-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Amino-4,6-dinitrotoluene[2-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dinitrobenzene[1,3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dinitrotoluene[2,4-]	1.48E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
6	Dinitrotoluene[2,6-]	1.48E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
6	**HMX**	**2.10E+00**	mg/kg	**Y**	NQ	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
6	Nitrobenzene	1.48E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
6	Nitrotoluene[2-]	1.48E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
6	Nitrotoluene[3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
6	Nitrotoluene[4-]	1.48E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
6	PETN	2.46E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	**RDX**	**2.57E+00**	mg/kg	**Y**	NQ	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
6	**TATB**	**1.01E+01**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Tetryl	1.48E-01	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
6	Trinitrobenzene[1,3,5-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Trinitrotoluene[2,4,6-]	1.48E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
6	Tris (o-cresyl) phosphate	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	**Perchlorate**	**6.37E-03**	mg/kg	**Y**	J-	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
6	**Gross alpha**	**1.49E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	**Gross beta**	**2.86E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Plutonium-238	-7.06E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
6	Plutonium-239/240	-7.06E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
6	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
6	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
6	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Benzo(a)anthracene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
6	Benzo(a)pyrene	1.01E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
6	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
6	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
6	Benzoic Acid	1.68E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	**Benzyl Alcohol**	**3.11E-01**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
6	Bis(2-ethylhexyl)phthalate	1.01E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
6	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
6	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
6	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Chrysene	1.01E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
6	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
6	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
6	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
6	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
6	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
6	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
6	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
6	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
6	Di-n-butylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
6	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE
6	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
6	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
6	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
6	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Fluoranthene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
6	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
6	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
6	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
6	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
6	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
6	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
6	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
6	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
6	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	**Naphthalene**	**1.51E-02**	mg/kg	**Y**	J	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
6	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
6	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
6	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
6	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
6	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
6	Phenanthrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
6	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
6	Pyrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
6	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
6	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
6	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
6	Acetone	1.65E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
6	Benzene	3.29E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
6	Bromobenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Bromochloromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Bromodichloromethane	3.29E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
6	Bromoform	3.29E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
6	Bromomethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
6	Butanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
6	Butylbenzene[n-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Butylbenzene[sec-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Butylbenzene[tert-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Carbon Disulfide	1.65E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
6	Carbon Tetrachloride	3.29E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
6	Chlorobenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
6	Chlorodibromomethane	3.29E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
6	Chloroethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
6	Chloroform	3.29E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
6	Chloromethane	3.29E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
6	Chlorotoluene[2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	1.56E+03	FALSE	N/A	FALSE
6	Chlorotoluene[4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dibromo-3-Chloropropane[1,2-]	4.94E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
6	Dibromoethane[1,2-]	3.29E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
6	Dibromomethane	3.29E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
6	Dichlorobenzene[1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
6	Dichlorobenzene[1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dichlorobenzene[1,4-]	3.29E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
6	Dichlorodifluoromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
6	Dichloroethane[1,1-]	3.29E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
6	Dichloroethane[1,2-]	3.29E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
6	Dichloroethene[1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
6	Dichloroethene[cis-1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
6	Dichloroethene[trans-1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
6	Dichloropropane[1,2-]	3.29E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
6	Dichloropropane[1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dichloropropane[2,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dichloropropene[1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dichloropropene[cis-1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dichloropropene[trans-1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Ethylbenzene	3.29E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
6	Hexanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Iodomethane	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Isopropylbenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
6	Isopropyltoluene[4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
6	Methyl-2-pentanone[4-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
6	Methylene Chloride	1.65E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
6	Propylbenzene[1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Styrene	3.29E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
6	Temperature	5.70E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Temperature	4.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Tetrachloroethane[1,1,1,2-]	3.29E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
6	Tetrachloroethane[1,1,2,2-]	3.29E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
6	Tetrachloroethene	3.29E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
6	**Toluene**	**3.95E-04**	mg/kg	**Y**	J	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
6	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
6	Trichloroethane[1,1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
6	Trichloroethane[1,1,2-]	3.29E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
6	Trichloroethene	3.29E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
6	Trichlorofluoromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
6	Trichloropropane[1,2,3-]	3.29E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
6	Trimethylbenzene[1,2,4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Trimethylbenzene[1,3,5-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Vinyl Chloride	3.29E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
6	Xylene[1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	8.10E+02	FALSE	N/A	FALSE
6	Xylene[1,3-]+Xylene[1,4-]	6.59E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
7	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**1.11E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	**Heptachlorodibenzodioxins (Total)**	**2.68E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Heptachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
7	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Hexachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**1.01E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	9.95E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Pentachlorodibenzofuran[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Pentachlorodibenzofuran[2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Tetrachlorodibenzodioxin[2,3,7,8-]	9.95E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
7	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	**Tetrachlorodibenzofuran[2,3,7,8-]**	**1.71E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
7	**Tetrachlorodibenzofurans (Totals)**	**1.71E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	**Aluminum**	**3.76E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
7	Antimony	3.08E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
7	**Arsenic**	**1.44E+00**	mg/kg	**Y**	NQ	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
7	**Barium**	**5.99E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
7	**Beryllium**	**4.53E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
7	Cadmium	9.32E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
7	**Calcium**	**2.24E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
7	**Chromium**	**6.86E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
7	**Cobalt**	**3.27E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
7	**Copper**	**9.02E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
7	**Iron**	**8.42E+03**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
7	**Lead**	**6.49E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
7	**Magnesium**	**1.28E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
7	**Manganese**	**1.74E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
7	**Mercury**	**4.76E-03**	mg/kg	**Y**	J	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
7	**Nickel**	**7.98E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
7	**Potassium**	**9.29E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
7	**Selenium**	**6.10E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
7	**Silver**	**2.19E+00**	mg/kg	**Y**	NQ	N/A	FALSE	3.91E+02	FALSE	1.00E+00	TRUE
7	**Sodium**	**5.98E+01**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
7	Thallium	1.41E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
7	**Vanadium**	**1.64E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
7	**Zinc**	**2.53E+01**	mg/kg	**Y**	NQ	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
7	2,4-Diamino-6-nitrotoluene	4.95E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	2,6-Diamino-4-nitrotoluene	6.53E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	3,5-Dinitroaniline	2.97E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Amino-2,6-dinitrotoluene[4-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Amino-4,6-dinitrotoluene[2-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dinitrobenzene[1,3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dinitrotoluene[2,4-]	1.49E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
7	Dinitrotoluene[2,6-]	1.49E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
7	**HMX**	**9.78E-01**	mg/kg	**Y**	NQ	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
7	Nitrobenzene	1.49E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
7	Nitrotoluene[2-]	1.49E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
7	Nitrotoluene[3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
7	Nitrotoluene[4-]	1.49E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
7	PETN	2.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	**RDX**	**2.49E+00**	mg/kg	**Y**	NQ	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
7	**TATB**	**1.13E+01**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Tetryl	1.49E-01	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
7	Trinitrobenzene[1,3,5-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Trinitrotoluene[2,4,6-]	1.49E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
7	Tris (o-cresyl) phosphate	2.97E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	**Perchlorate**	**2.01E-02**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
7	**Gross alpha**	**1.62E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	**Gross beta**	**2.49E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Plutonium-238	-2.62E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
7	Plutonium-239/240	-6.55E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
7	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
7	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
7	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Benzo(a)anthracene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
7	Benzo(a)pyrene	1.01E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
7	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
7	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
7	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
7	Benzoic Acid	1.68E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Benzyl Alcohol	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
7	**Bis(2-ethylhexyl)phthalate**	**2.52E-01**	mg/kg	**Y**	NQ	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
7	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
7	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
7	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Chrysene	1.01E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
7	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
7	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
7	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
7	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
7	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
7	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
7	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
7	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
7	Di-n-butylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
7	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
7	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
7	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
7	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
7	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Fluoranthene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
7	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
7	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
7	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
7	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
7	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
7	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
7	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
7	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
7	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
7	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
7	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
7	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
7	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
7	Phenanthrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
7	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
7	Pyrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
7	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
7	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
7	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
7	Acetone	1.65E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
7	Benzene	3.30E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
7	Bromobenzene	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Bromochloromethane	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Bromodichloromethane	3.30E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
7	Bromoform	3.30E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
7	Bromomethane	3.30E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
7	Butanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
7	Butylbenzene[n-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Butylbenzene[sec-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Butylbenzene[tert-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Carbon Disulfide	1.65E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
7	Carbon Tetrachloride	3.30E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
7	Chlorobenzene	3.30E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
7	Chlorodibromomethane	3.30E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
7	Chloroethane	3.30E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
7	Chloroform	3.30E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
7	Chloromethane	3.30E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
7	Chlorotoluene[2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	1.56E+03	FALSE	N/A	FALSE
7	Chlorotoluene[4-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dibromo-3-Chloropropane[1,2-]	4.95E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
7	Dibromoethane[1,2-]	3.30E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
7	Dibromomethane	3.30E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
7	Dichlorobenzene[1,2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
7	Dichlorobenzene[1,3-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dichlorobenzene[1,4-]	3.30E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
7	Dichlorodifluoromethane	3.30E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
7	Dichloroethane[1,1-]	3.30E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
7	Dichloroethane[1,2-]	3.30E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
7	Dichloroethene[1,1-]	3.30E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
7	Dichloroethene[cis-1,2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
7	Dichloroethene[trans-1,2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
7	Dichloropropane[1,2-]	3.30E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
7	Dichloropropane[1,3-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dichloropropane[2,2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dichloropropene[1,1-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dichloropropene[cis-1,3-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dichloropropene[trans-1,3-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Ethylbenzene	3.30E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
7	Hexanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Iodomethane	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Isopropylbenzene	3.30E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
7	Isopropyltoluene[4-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Methyl-2-pentanone[4-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
7	**Methylene Chloride**	**3.51E-03**	mg/kg	**Y**	J	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
7	Propylbenzene[1-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Styrene	3.30E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
7	Temperature	5.70E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Temperature	4.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Tetrachloroethane[1,1,1,2-]	3.30E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
7	Tetrachloroethane[1,1,2,2-]	3.30E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
7	Tetrachloroethene	3.30E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
7	Toluene	3.30E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
7	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
7	Trichloroethane[1,1,1-]	3.30E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
7	Trichloroethane[1,1,2-]	3.30E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
7	Trichloroethene	3.30E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
7	Trichlorofluoromethane	3.30E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
7	Trichloropropane[1,2,3-]	3.30E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
7	Trimethylbenzene[1,2,4-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Trimethylbenzene[1,3,5-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Vinyl Chloride	3.30E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
7	Xylene[1,2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	8.11E+02	FALSE	N/A	FALSE
7	Xylene[1,3-]+Xylene[1,4-]	6.61E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
8	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**4.67E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	**Heptachlorodibenzodioxins (Total)**	**3.56E-05**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	**Heptachlorodibenzofurans (Total)**	**8.79E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
8	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	**Hexachlorodibenzodioxins (Total)**	**1.46E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**4.30E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	**Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]**	**1.33E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Pentachlorodibenzofuran[1,2,3,7,8-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Pentachlorodibenzofuran[2,3,4,7,8-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Tetrachlorodibenzodioxin[2,3,7,8-]	9.99E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
8	**Tetrachlorodibenzodioxins (Total)**	**2.42E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	**Tetrachlorodibenzofuran[2,3,7,8-]**	**1.44E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
8	**Tetrachlorodibenzofurans (Totals)**	**3.04E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	**Aluminum**	**4.14E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
8	Antimony	3.18E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
8	**Arsenic**	**1.63E+00**	mg/kg	**Y**	NQ	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
8	**Barium**	**8.20E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
8	**Beryllium**	**5.30E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
8	Cadmium	9.64E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
8	**Calcium**	**2.62E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
8	**Chromium**	**6.67E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
8	**Cobalt**	**3.74E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
8	**Copper**	**3.72E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
8	**Iron**	**9.21E+03**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
8	**Lead**	**8.26E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
8	**Magnesium**	**1.27E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
8	**Manganese**	**2.05E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
8	Mercury	3.96E-03	mg/kg	N	U	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
8	**Nickel**	**6.45E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
8	**Potassium**	**1.26E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
8	**Selenium**	**7.73E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
8	**Silver**	**2.57E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
8	**Sodium**	**5.09E+01**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
8	Thallium	1.37E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
8	**Vanadium**	**1.69E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
8	**Zinc**	**2.89E+01**	mg/kg	**Y**	NQ	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
8	2,4-Diamino-6-nitrotoluene	4.93E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	2,6-Diamino-4-nitrotoluene	6.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	3,5-Dinitroaniline	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Amino-2,6-dinitrotoluene[4-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Amino-4,6-dinitrotoluene[2-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dinitrobenzene[1,3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dinitrotoluene[2,4-]	1.48E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
8	Dinitrotoluene[2,6-]	1.48E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
8	**HMX**	**5.91E-01**	mg/kg	**Y**	NQ	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
8	Nitrobenzene	1.48E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
8	Nitrotoluene[2-]	1.48E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
8	Nitrotoluene[3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
8	Nitrotoluene[4-]	1.48E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
8	PETN	2.46E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	**RDX**	**4.76E+00**	mg/kg	**Y**	NQ	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
8	**TATB**	**1.62E+01**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Tetryl	1.48E-01	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
8	Trinitrobenzene[1,3,5-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Trinitrotoluene[2,4,6-]	1.48E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
8	Tris (o-cresyl) phosphate	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	**Perchlorate**	**2.96E-02**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
8	**Gross alpha**	**1.50E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	**Gross beta**	**2.98E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Plutonium-238	-3.05E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
8	Plutonium-239/240	-1.52E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
8	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
8	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
8	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Benzo(a)anthracene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
8	Benzo(a)pyrene	1.01E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
8	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
8	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
8	Benzoic Acid	1.68E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Benzyl Alcohol	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
8	Bis(2-ethylhexyl)phthalate	1.01E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
8	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Chloro-3-methylphenol[4-]	1.35E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
8	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
8	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Chrysene	1.01E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
8	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
8	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
8	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
8	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
8	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
8	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
8	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
8	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
8	Di-n-butylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
8	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE
8	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
8	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
8	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
8	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Fluoranthene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
8	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
8	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
8	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
8	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
8	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
8	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
8	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
8	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
8	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
8	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
8	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
8	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
8	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
8	Phenanthrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
8	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
8	Pyrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
8	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
8	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
8	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
8	Acetone	1.62E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
8	Benzene	3.23E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
8	Bromobenzene	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Bromochloromethane	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Bromodichloromethane	3.23E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
8	Bromoform	3.23E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
8	Bromomethane	3.23E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
8	Butanone[2-]	1.62E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
8	Butylbenzene[n-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Butylbenzene[sec-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Butylbenzene[tert-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Carbon Disulfide	1.62E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
8	Carbon Tetrachloride	3.23E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
8	Chlorobenzene	3.23E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
8	Chlorodibromomethane	3.23E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
8	Chloroethane	3.23E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
8	Chloroform	3.23E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
8	Chloromethane	3.23E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
8	Chlorotoluene[2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	1.56E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
8	Chlorotoluene[4-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dibromo-3-Chloropropane[1,2-]	4.85E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
8	Dibromoethane[1,2-]	3.23E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
8	Dibromomethane	3.23E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
8	Dichlorobenzene[1,2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
8	Dichlorobenzene[1,3-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dichlorobenzene[1,4-]	3.23E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
8	Dichlorodifluoromethane	3.23E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
8	Dichloroethane[1,1-]	3.23E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
8	Dichloroethane[1,2-]	3.23E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
8	Dichloroethene[1,1-]	3.23E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
8	Dichloroethene[cis-1,2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
8	Dichloroethene[trans-1,2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
8	Dichloropropane[1,2-]	3.23E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
8	Dichloropropane[1,3-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dichloropropane[2,2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dichloropropene[1,1-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dichloropropene[cis-1,3-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dichloropropene[trans-1,3-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Ethylbenzene	3.23E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
8	Hexanone[2-]	1.62E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Iodomethane	1.62E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Isopropylbenzene	3.23E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
8	Isopropyltoluene[4-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Methyl-2-pentanone[4-]	1.62E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
8	**Methylene Chloride**	**4.70E-03**	mg/kg	**Y**	J	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
8	Propylbenzene[1-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Styrene	3.23E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
8	Temperature	5.70E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Temperature	4.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Tetrachloroethane[1,1,1,2-]	3.23E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
8	Tetrachloroethane[1,1,2,2-]	3.23E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
8	Tetrachloroethene	3.23E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
8	**Toluene**	**5.63E-04**	mg/kg	**Y**	J	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
8	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.62E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
8	Trichloroethane[1,1,1-]	3.23E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
8	Trichloroethane[1,1,2-]	3.23E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
8	Trichloroethene	3.23E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
8	Trichlorofluoromethane	3.23E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
8	Trichloropropane[1,2,3-]	3.23E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
8	Trimethylbenzene[1,2,4-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Trimethylbenzene[1,3,5-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Vinyl Chloride	3.23E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
8	Xylene[1,2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	8.12E+02	FALSE	N/A	FALSE
8	Xylene[1,3-]+Xylene[1,4-]	6.48E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
9	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**2.20E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Heptachlorodibenzodioxins (Total)**	**1.75E-04**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Heptachlorodibenzofuran[1,2,3,4,6,7,8-]**	**3.44E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Heptachlorodibenzofurans (Total)**	**1.36E-05**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Hexachlorodibenzodioxin[1,2,3,6,7,8-]**	**6.27E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
9	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Hexachlorodibenzodioxins (Total)**	**9.82E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Hexachlorodibenzofurans (Total)**	**3.52E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**1.82E-04**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]**	**1.01E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Pentachlorodibenzofuran[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Pentachlorodibenzofuran[2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Tetrachlorodibenzodioxin[2,3,7,8-]	9.96E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
9	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Tetrachlorodibenzofuran[2,3,7,8-]	1.73E-07	mg/kg	N	U	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
9	**Tetrachlorodibenzofurans (Totals)**	**1.55E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Aluminum**	**2.69E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
9	Antimony	3.25E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
9	**Arsenic**	**1.08E+00**	mg/kg	**Y**	NQ	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
9	**Barium**	**7.05E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
9	**Beryllium**	**3.68E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
9	Cadmium	9.84E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
9	**Calcium**	**1.68E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
9	**Chromium**	**3.82E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
9	**Cobalt**	**2.28E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
9	**Copper**	**1.70E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
9	**Iron**	**6.94E+03**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
9	**Lead**	**9.73E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
9	**Magnesium**	**8.53E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
9	**Manganese**	**2.10E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
9	Mercury	3.53E-03	mg/kg	N	U	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
9	**Nickel**	**3.35E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
9	**Potassium**	**9.28E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
9	**Selenium**	**6.57E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
9	**Silver**	**1.58E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
9	**Sodium**	**4.22E+01**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
9	Thallium	1.35E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
9	**Vanadium**	**9.50E+00**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
9	**Zinc**	**3.69E+01**	mg/kg	**Y**	NQ	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
9	2,4-Diamino-6-nitrotoluene	4.93E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	2,6-Diamino-4-nitrotoluene	6.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	3,5-Dinitroaniline	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Amino-2,6-dinitrotoluene[4-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Amino-4,6-dinitrotoluene[2-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dinitrobenzene[1,3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dinitrotoluene[2,4-]	1.48E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
9	Dinitrotoluene[2,6-]	1.48E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
9	HMX	1.48E-01	mg/kg	N	U	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
9	Nitrobenzene	1.48E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
9	Nitrotoluene[2-]	1.48E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
9	Nitrotoluene[3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
9	Nitrotoluene[4-]	1.48E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
9	PETN	2.46E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	RDX	1.48E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
9	**TATB**	**7.06E+00**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Tetryl	1.48E-01	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
9	Trinitrobenzene[1,3,5-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Trinitrotoluene[2,4,6-]	1.48E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
9	Tris (o-cresyl) phosphate	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Perchlorate**	**3.21E-03**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
9	**Gross alpha**	**2.10E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Gross beta**	**9.72E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Plutonium-238	1.32E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
9	Plutonium-239/240	-1.32E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
9	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
9	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
9	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Benzo(a)anthracene**	**1.98E-02**	mg/kg	**Y**	J	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
9	**Benzo(a)pyrene**	**2.18E-02**	mg/kg	**Y**	J	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
9	**Benzo(b)fluoranthene**	**3.15E-02**	mg/kg	**Y**	J	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
9	**Benzo(g,h,i)perylene**	**1.31E-02**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Benzo(k)fluoranthene**	**1.11E-02**	mg/kg	**Y**	J	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
9	Benzoic Acid	1.68E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
9	Benzyl Alcohol	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
9	**Bis(2-ethylhexyl)phthalate**	**1.16E+00**	mg/kg	**Y**	NQ	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
9	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
9	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
9	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Chrysene**	**1.88E-02**	mg/kg	**Y**	J	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
9	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
9	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
9	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
9	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
9	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
9	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
9	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
9	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
9	Di-n-butylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
9	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE
9	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
9	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
9	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
9	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Fluoranthene**	**3.38E-02**	mg/kg	**Y**	NQ	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
9	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
9	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
9	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
9	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
9	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
9	**Indeno(1,2,3-cd)pyrene**	**1.31E-02**	mg/kg	**Y**	J	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
9	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
9	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
9	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
9	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
9	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
9	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
9	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
9	**Phenanthrene**	**1.51E-02**	mg/kg	**Y**	J	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
9	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
9	**Pyrene**	**3.12E-02**	mg/kg	**Y**	J	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
9	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
9	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
9	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
9	Acetone	1.62E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
9	Benzene	3.23E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
9	Bromobenzene	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Bromochloromethane	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Bromodichloromethane	3.23E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
9	Bromoform	3.23E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
9	Bromomethane	3.23E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
9	Butanone[2-]	1.62E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
9	Butylbenzene[n-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Butylbenzene[sec-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Butylbenzene[tert-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Carbon Disulfide	1.62E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
9	Carbon Tetrachloride	3.23E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
9	Chlorobenzene	3.23E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
9	Chlorodibromomethane	3.23E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
9	Chloroethane	3.23E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
9	Chloroform	3.23E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
9	Chloromethane	3.23E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
9	Chlorotoluene[2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	1.56E+03	FALSE	N/A	FALSE
9	Chlorotoluene[4-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
9	Dibromo-3-Chloropropane[1,2-]	4.84E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
9	Dibromoethane[1,2-]	3.23E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
9	Dibromomethane	3.23E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
9	Dichlorobenzene[1,2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
9	Dichlorobenzene[1,3-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dichlorobenzene[1,4-]	3.23E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
9	Dichlorodifluoromethane	3.23E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
9	Dichloroethane[1,1-]	3.23E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
9	Dichloroethane[1,2-]	3.23E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
9	Dichloroethene[1,1-]	3.23E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
9	Dichloroethene[cis-1,2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
9	Dichloroethene[trans-1,2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
9	Dichloropropane[1,2-]	3.23E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
9	Dichloropropane[1,3-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dichloropropane[2,2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dichloropropene[1,1-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dichloropropene[cis-1,3-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dichloropropene[trans-1,3-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Ethylbenzene	3.23E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
9	Hexanone[2-]	1.62E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Iodomethane	1.62E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Isopropylbenzene	3.23E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
9	Isopropyltoluene[4-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Methyl-2-pentanone[4-]	1.62E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
9	**Methylene Chloride**	**5.73E-03**	mg/kg	**Y**	NQ	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
9	Propylbenzene[1-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
9	Styrene	3.23E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
9	Temperature	5.70E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Temperature	4.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Tetrachloroethane[1,1,1,2-]	3.23E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
9	Tetrachloroethane[1,1,2,2-]	3.23E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
9	Tetrachloroethene	3.23E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
9	**Toluene**	**2.09E-03**	mg/kg	**Y**	NQ	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
9	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.62E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
9	Trichloroethane[1,1,1-]	3.23E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
9	Trichloroethane[1,1,2-]	3.23E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
9	Trichloroethene	3.23E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
9	Trichlorofluoromethane	3.23E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
9	Trichloropropane[1,2,3-]	3.23E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
9	Trimethylbenzene[1,2,4-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Trimethylbenzene[1,3,5-]	3.23E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Vinyl Chloride	3.23E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
9	Xylene[1,2-]	3.23E-04	mg/kg	N	U	N/A	FALSE	8.13E+02	FALSE	N/A	FALSE
9	Xylene[1,3-]+Xylene[1,4-]	6.46E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
10	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**8.35E-06**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Heptachlorodibenzodioxins (Total)**	**2.44E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Heptachlorodibenzofuran[1,2,3,4,6,7,8-]**	**1.29E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Heptachlorodibenzofurans (Total)**	**1.29E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	**Hexachlorodibenzodioxins (Total)**	**1.04E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Hexachlorodibenzofurans (Total)**	**1.36E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**6.93E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]**	**3.95E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Pentachlorodibenzofuran[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Pentachlorodibenzofuran[2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Tetrachlorodibenzodioxin[2,3,7,8-]	9.97E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
10	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Tetrachlorodibenzofuran[2,3,7,8-]	1.67E-07	mg/kg	N	U	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
10	Tetrachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Aluminum**	**3.30E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
10	Antimony	3.32E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
10	**Arsenic**	**2.28E+00**	mg/kg	**Y**	NQ	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
10	**Barium**	**4.92E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
10	**Beryllium**	**5.88E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
10	Cadmium	1.01E-01	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
10	**Calcium**	**2.35E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
10	**Chromium**	**4.43E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
10	**Cobalt**	**2.77E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	**Copper**	**8.21E+00**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	FALSE
10	**Iron**	**6.62E+03**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
10	**Lead**	**6.38E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
10	**Magnesium**	**1.12E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
10	**Manganese**	**1.51E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
10	Mercury	3.71E-03	mg/kg	N	U	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
10	**Nickel**	**8.01E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
10	**Potassium**	**6.99E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
10	**Selenium**	**9.37E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
10	**Silver**	**1.55E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
10	**Sodium**	**4.06E+01**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
10	**Thallium**	**1.58E-01**	mg/kg	**Y**	J	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
10	**Vanadium**	**1.20E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
10	**Zinc**	**1.88E+01**	mg/kg	**Y**	NQ	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
10	2,4-Diamino-6-nitrotoluene	4.93E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	2,6-Diamino-4-nitrotoluene	6.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	3,5-Dinitroaniline	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Amino-2,6-dinitrotoluene[4-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Amino-4,6-dinitrotoluene[2-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dinitrobenzene[1,3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dinitrotoluene[2,4-]	1.48E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
10	Dinitrotoluene[2,6-]	1.48E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
10	HMX	1.48E-01	mg/kg	N	U	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
10	Nitrobenzene	1.48E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
10	Nitrotoluene[2-]	1.48E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
10	Nitrotoluene[3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	Nitrotoluene[4-]	1.48E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
10	PETN	2.46E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	RDX	1.48E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
10	**TATB**	**3.93E+00**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Tetryl	1.48E-01	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
10	Trinitrobenzene[1,3,5-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Trinitrotoluene[2,4,6-]	1.48E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
10	Tris (o-cresyl) phosphate	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Perchlorate**	**1.07E-03**	mg/kg	**Y**	J-	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
10	**Gross alpha**	**1.54E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Gross beta**	**2.94E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Plutonium-238	1.05E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
10	Plutonium-239/240	9.04E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
10	Acenaphthene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
10	Acenaphthene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
10	Acenaphthylene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Acenaphthylene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Aniline	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Aniline	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Anthracene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
10	Anthracene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
10	Azobenzene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Azobenzene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Benzo(a)anthracene**	**1.04E-02**	mg/kg	**Y**	J-	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
10	**Benzo(a)anthracene**	**2.95E-02**	mg/kg	**Y**	J-	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
10	Benzo(a)pyrene	1.01E-02	mg/kg	N	UJ	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	**Benzo(a)pyrene**	**2.72E-02**	mg/kg	**Y**	J-	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
10	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	UJ	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
10	**Benzo(b)fluoranthene**	**3.25E-02**	mg/kg	**Y**	J-	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
10	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Benzo(g,h,i)perylene**	**2.21E-02**	mg/kg	**Y**	J-	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	UJ	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
10	**Benzo(k)fluoranthene**	**1.48E-02**	mg/kg	**Y**	J-	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
10	Benzoic Acid	1.68E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Benzoic Acid	1.68E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Benzyl Alcohol	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Benzyl Alcohol	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	UJ	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
10	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	UJ	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
10	Bis(2-ethylhexyl)phthalate	1.01E-02	mg/kg	N	UJ	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
10	Bis(2-ethylhexyl)phthalate	1.01E-02	mg/kg	N	UJ	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
10	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Butylbenzylphthalate	1.01E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Butylbenzylphthalate	1.01E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Chloro-3-methylphenol[4-]	1.35E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Chloroaniline[4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Chloroaniline[4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	UJ	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	UJ	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
10	Chlorophenol[2-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
10	Chlorophenol[2-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
10	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Chrysene	1.01E-02	mg/kg	N	UJ	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
10	**Chrysene**	**2.95E-02**	mg/kg	**Y**	J-	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
10	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	UJ	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
10	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	UJ	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
10	Dibenzofuran	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dibenzofuran	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
10	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
10	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	UJ	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
10	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	UJ	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
10	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	UJ	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
10	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	UJ	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
10	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
10	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
10	Diethylphthalate	1.01E-02	mg/kg	N	UJ	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
10	Diethylphthalate	1.01E-02	mg/kg	N	UJ	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
10	Dimethyl Phthalate	1.01E-02	mg/kg	N	UJ	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
10	Dimethyl Phthalate	1.01E-02	mg/kg	N	UJ	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
10	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
10	Di-n-butylphthalate	1.01E-02	mg/kg	N	UJ	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
10	**Di-n-butylphthalate**	**3.29E-02**	mg/kg	**Y**	J-	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
10	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE
10	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE
10	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
10	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
10	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	UJ	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
10	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	UJ	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
10	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	UJ	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
10	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	UJ	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
10	Di-n-octylphthalate	1.01E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Di-n-octylphthalate	1.01E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Diphenylamine	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Diphenylamine	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Fluoranthene**	**1.55E-02**	mg/kg	**Y**	J-	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
10	**Fluoranthene**	**5.33E-02**	mg/kg	**Y**	J-	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
10	Fluorene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
10	Fluorene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
10	Hexachlorobenzene	1.01E-01	mg/kg	N	UJ	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
10	Hexachlorobenzene	1.01E-01	mg/kg	N	UJ	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
10	Hexachlorobutadiene	1.01E-01	mg/kg	N	UJ	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
10	Hexachlorobutadiene	1.01E-01	mg/kg	N	UJ	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
10	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
10	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
10	Hexachloroethane	1.01E-01	mg/kg	N	UJ	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	Hexachloroethane	1.01E-01	mg/kg	N	UJ	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
10	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	UJ	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
10	**Indeno(1,2,3-cd)pyrene**	**2.05E-02**	mg/kg	**Y**	J-	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
10	Isophorone	1.01E-01	mg/kg	N	UJ	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
10	Isophorone	1.01E-01	mg/kg	N	UJ	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
10	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	UJ	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
10	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	UJ	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
10	Methylphenol[2-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Methylphenol[2-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Naphthalene	1.01E-02	mg/kg	N	UJ	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
10	Naphthalene	1.01E-02	mg/kg	N	UJ	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
10	Nitroaniline[2-]	1.11E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Nitroaniline[2-]	1.11E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Nitroaniline[3-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Nitroaniline[3-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Nitroaniline[4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Nitroaniline[4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Nitrobenzene	1.01E-01	mg/kg	N	UJ	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
10	Nitrobenzene	1.01E-01	mg/kg	N	UJ	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
10	Nitrophenol[2-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Nitrophenol[2-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Nitrophenol[4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Nitrophenol[4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	UJ	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	UJ	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
10	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	UJ	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
10	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	UJ	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
10	Pentachlorophenol	1.01E-01	mg/kg	N	UJ	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
10	Pentachlorophenol	1.01E-01	mg/kg	N	UJ	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
10	**Phenanthrene**	**1.14E-02**	mg/kg	**Y**	J-	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
10	**Phenanthrene**	**2.78E-02**	mg/kg	**Y**	J-	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
10	Phenol	1.01E-01	mg/kg	N	UJ	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
10	Phenol	1.01E-01	mg/kg	N	UJ	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
10	**Pyrene**	**1.51E-02**	mg/kg	**Y**	J-	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
10	**Pyrene**	**5.57E-02**	mg/kg	**Y**	J-	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
10	Pyridine	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Pyridine	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	UJ	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
10	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	UJ	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
10	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
10	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
10	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	UJ	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
10	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	UJ	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
10	Acetone	1.65E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
10	Benzene	3.30E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
10	Bromobenzene	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Bromochloromethane	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Bromodichloromethane	3.30E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	Bromoform	3.30E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
10	Bromomethane	3.30E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
10	Butanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
10	Butylbenzene[n-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Butylbenzene[sec-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Butylbenzene[tert-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Carbon Disulfide	1.65E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
10	Carbon Tetrachloride	3.30E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
10	Chlorobenzene	3.30E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
10	Chlorodibromomethane	3.30E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
10	Chloroethane	3.30E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
10	Chloroform	3.30E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
10	Chloromethane	3.30E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
10	Chlorotoluene[2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	1.56E+03	FALSE	N/A	FALSE
10	Chlorotoluene[4-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dibromo-3-Chloropropane[1,2-]	4.95E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
10	Dibromoethane[1,2-]	3.30E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
10	Dibromomethane	3.30E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
10	Dichlorobenzene[1,2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
10	Dichlorobenzene[1,3-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dichlorobenzene[1,4-]	3.30E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
10	Dichlorodifluoromethane	3.30E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
10	Dichloroethane[1,1-]	3.30E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
10	Dichloroethane[1,2-]	3.30E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
10	Dichloroethene[1,1-]	3.30E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
10	Dichloroethene[cis-1,2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	Dichloroethene[trans-1,2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
10	Dichloropropane[1,2-]	3.30E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
10	Dichloropropane[1,3-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dichloropropane[2,2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dichloropropene[1,1-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dichloropropene[cis-1,3-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dichloropropene[trans-1,3-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Ethylbenzene	3.30E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
10	Hexanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Iodomethane	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Isopropylbenzene	3.30E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
10	Isopropyltoluene[4-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Methyl-2-pentanone[4-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
10	Methylene Chloride	1.65E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
10	Propylbenzene[1-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Styrene	3.30E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
10	Temperature	5.70E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Temperature	4.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Tetrachloroethane[1,1,1,2-]	3.30E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
10	Tetrachloroethane[1,1,2,2-]	3.30E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
10	Tetrachloroethene	3.30E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
10	Toluene	3.30E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
10	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
10	Trichloroethane[1,1,1-]	3.30E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
10	Trichloroethane[1,1,2-]	3.30E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
10	Trichloroethene	3.30E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	Trichlorofluoromethane	3.30E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
10	Trichloropropane[1,2,3-]	3.30E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
10	Trimethylbenzene[1,2,4-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Trimethylbenzene[1,3,5-]	3.30E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Vinyl Chloride	3.30E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
10	Xylene[1,2-]	3.30E-04	mg/kg	N	U	N/A	FALSE	8.14E+02	FALSE	N/A	FALSE
10	Xylene[1,3-]+Xylene[1,4-]	6.61E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
11	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**4.84E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Heptachlorodibenzodioxins (Total)**	**1.54E-04**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Heptachlorodibenzofuran[1,2,3,4,6,7,8-]**	**4.02E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Heptachlorodibenzofurans (Total)**	**1.55E-05**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Hexachlorodibenzodioxin[1,2,3,4,7,8-]**	**5.85E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Hexachlorodibenzodioxin[1,2,3,6,7,8-]**	**1.09E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Hexachlorodibenzodioxin[1,2,3,7,8,9-]**	**1.11E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Hexachlorodibenzodioxins (Total)**	**1.73E-05**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Hexachlorodibenzofurans (Total)**	**4.93E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**3.90E-04**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]**	**1.39E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Pentachlorodibenzodioxins (Total)**	**6.85E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Pentachlorodibenzofuran[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
11	Pentachlorodibenzofuran[2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Pentachlorodibenzofurans (Totals)**	**1.17E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Tetrachlorodibenzodioxin[2,3,7,8-]	1.05E-07	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
11	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Tetrachlorodibenzofuran[2,3,7,8-]	2.19E-07	mg/kg	N	U	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
11	**Tetrachlorodibenzofurans (Totals)**	**4.42E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Aluminum**	**3.54E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
11	Antimony	3.16E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
11	**Arsenic**	**1.47E+00**	mg/kg	**Y**	NQ	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
11	**Barium**	**9.85E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
11	**Beryllium**	**4.43E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
11	Cadmium	9.57E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
11	**Calcium**	**2.05E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
11	**Chromium**	**4.93E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
11	**Cobalt**	**3.04E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
11	**Copper**	**2.10E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
11	**Iron**	**7.50E+03**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
11	**Lead**	**1.44E+01**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
11	**Magnesium**	**1.14E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
11	**Manganese**	**1.95E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
11	**Mercury**	**5.90E-03**	mg/kg	**Y**	J	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
11	**Nickel**	**4.85E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
11	**Potassium**	**1.16E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
11	**Selenium**	**5.83E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
11	**Silver**	**1.04E+00**	mg/kg	**Y**	NQ	N/A	FALSE	3.91E+02	FALSE	1.00E+00	TRUE
11	**Sodium**	**3.73E+01**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
11	Thallium	1.30E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
11	**Vanadium**	**1.23E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
11	**Zinc**	**3.66E+01**	mg/kg	**Y**	NQ	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
11	2,4-Diamino-6-nitrotoluene	4.93E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	2,6-Diamino-4-nitrotoluene	6.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	3,5-Dinitroaniline	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Amino-2,6-dinitrotoluene[4-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Amino-4,6-dinitrotoluene[2-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dinitrobenzene[1,3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dinitrotoluene[2,4-]	1.48E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
11	Dinitrotoluene[2,6-]	1.48E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
11	**HMX**	**1.26E+00**	mg/kg	**Y**	NQ	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
11	Nitrobenzene	1.48E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
11	Nitrotoluene[2-]	1.48E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
11	Nitrotoluene[3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
11	Nitrotoluene[4-]	1.48E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
11	PETN	2.46E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	RDX	1.48E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
11	**TATB**	**3.33E+00**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Tetryl	1.48E-01	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
11	Trinitrobenzene[1,3,5-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Trinitrotoluene[2,4,6-]	1.48E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
11	Tris (o-cresyl) phosphate	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Perchlorate**	**4.16E-03**	mg/kg	**Y**	J-	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
11	**Gross alpha**	**2.26E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Gross beta**	**3.84E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
11	Plutonium-238	5.70E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
11	Plutonium-239/240	1.71E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
11	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
11	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
11	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Benzo(a)anthracene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
11	Benzo(a)pyrene	1.01E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
11	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
11	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
11	Benzoic Acid	1.69E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Benzyl Alcohol**	**4.98E-01**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
11	**Bis(2-ethylhexyl)phthalate**	**9.79E-01**	mg/kg	**Y**	NQ	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
11	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Chloro-3-methylphenol[4-]	1.35E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
11	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
11	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Chrysene	1.01E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
11	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
11	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
11	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
11	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
11	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
11	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
11	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
11	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
11	**Di-n-butylphthalate**	**7.44E-01**	mg/kg	**Y**	NQ	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
11	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE
11	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
11	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
11	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
11	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Fluoranthene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
11	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
11	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
11	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
11	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
11	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
11	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
11	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
11	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
11	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
11	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
11	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
11	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
11	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
11	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
11	Phenanthrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
11	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
11	Pyrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
11	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
11	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
11	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
11	Acetone	1.65E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
11	Benzene	3.31E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
11	Bromobenzene	3.31E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Bromochloromethane	3.31E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Bromodichloromethane	3.31E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
11	Bromoform	3.31E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
11	Bromomethane	3.31E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
11	Butanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
11	Butylbenzene[n-]	3.31E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Butylbenzene[sec-]	3.31E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Butylbenzene[tert-]	3.31E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Carbon Disulfide	1.65E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
11	Carbon Tetrachloride	3.31E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
11	Chlorobenzene	3.31E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
11	Chlorodibromomethane	3.31E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
11	Chloroethane	3.31E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
11	Chloroform	3.31E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
11	Chloromethane	3.31E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
11	Chlorotoluene[2-]	3.31E-04	mg/kg	N	U	N/A	FALSE	1.56E+03	FALSE	N/A	FALSE
11	Chlorotoluene[4-]	3.31E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dibromo-3-Chloropropane[1,2-]	4.96E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
11	Dibromoethane[1,2-]	3.31E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
11	Dibromomethane	3.31E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
11	Dichlorobenzene[1,2-]	3.31E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
11	Dichlorobenzene[1,3-]	3.31E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dichlorobenzene[1,4-]	3.31E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
11	Dichlorodifluoromethane	3.31E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
11	Dichloroethane[1,1-]	3.31E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
11	Dichloroethane[1,2-]	3.31E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
11	Dichloroethene[1,1-]	3.31E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
11	Dichloroethene[cis-1,2-]	3.31E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
11	Dichloroethene[trans-1,2-]	3.31E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
11	Dichloropropane[1,2-]	3.31E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
11	Dichloropropane[1,3-]	3.31E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dichloropropane[2,2-]	3.31E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dichloropropene[1,1-]	3.31E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dichloropropene[cis-1,3-]	3.31E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dichloropropene[trans-1,3-]	3.31E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Ethylbenzene	3.31E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
11	Hexanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Iodomethane	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Isopropylbenzene	3.31E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
11	Isopropyltoluene[4-]	3.31E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Methyl-2-pentanone[4-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
11	**Methylene Chloride**	**4.68E-03**	mg/kg	**Y**	J	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
11	Propylbenzene[1-]	3.31E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Styrene	3.31E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
11	Temperature	5.70E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Temperature	4.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Tetrachloroethane[1,1,1,2-]	3.31E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
11	Tetrachloroethane[1,1,2,2-]	3.31E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
11	Tetrachloroethene	3.31E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
11	Toluene	3.31E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
11	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
11	Trichloroethane[1,1,1-]	3.31E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
11	Trichloroethane[1,1,2-]	3.31E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
11	Trichloroethene	3.31E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
11	Trichlorofluoromethane	3.31E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
11	Trichloropropane[1,2,3-]	3.31E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
11	Trimethylbenzene[1,2,4-]	3.31E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Trimethylbenzene[1,3,5-]	3.31E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Vinyl Chloride	3.31E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
11	Xylene[1,2-]	3.31E-04	mg/kg	N	U	N/A	FALSE	8.15E+02	FALSE	N/A	FALSE
11	Xylene[1,3-]+Xylene[1,4-]	6.62E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
12	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**1.13E-04**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Heptachlorodibenzodioxins (Total)**	**8.48E-04**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Heptachlorodibenzofuran[1,2,3,4,6,7,8-]**	**3.66E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Heptachlorodibenzofurans (Total)**	**1.80E-05**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Hexachlorodibenzodioxin[1,2,3,4,7,8-]**	**6.79E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Hexachlorodibenzodioxin[1,2,3,6,7,8-]**	**1.45E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Hexachlorodibenzodioxin[1,2,3,7,8,9-]**	**9.91E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Hexachlorodibenzodioxins (Total)**	**5.36E-05**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Hexachlorodibenzofurans (Total)**	**1.49E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**9.20E-04**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]**	**1.63E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Pentachlorodibenzofuran[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Pentachlorodibenzofuran[2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Pentachlorodibenzofurans (Totals)**	**7.66E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
12	Tetrachlorodibenzodioxin[2,3,7,8-]	9.95E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
12	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Tetrachlorodibenzofuran[2,3,7,8-]	1.59E-07	mg/kg	N	U	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
12	Tetrachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Aluminum**	**1.77E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
12	Antimony	3.08E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
12	**Arsenic**	**1.21E+00**	mg/kg	**Y**	NQ	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
12	**Barium**	**4.87E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
12	**Beryllium**	**2.49E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
12	**Cadmium**	**2.80E-01**	mg/kg	**Y**	J	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
12	**Calcium**	**2.12E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
12	**Chromium**	**4.66E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
12	**Cobalt**	**2.42E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
12	**Copper**	**2.54E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
12	**Iron**	**6.51E+03**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
12	**Lead**	**6.36E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
12	**Magnesium**	**1.19E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
12	**Manganese**	**1.19E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
12	**Mercury**	**7.75E-01**	mg/kg	**Y**	NQ	N/A	FALSE	2.38E+01	FALSE	1.00E-01	TRUE
12	**Nickel**	**7.38E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
12	**Potassium**	**4.31E+02**	mg/kg	**Y**	J+	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
12	**Selenium**	**5.18E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
12	**Silver**	**1.26E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
12	**Sodium**	**3.81E+01**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
12	**Thallium**	**2.22E+00**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E-01	TRUE	7.30E-01	TRUE
12	**Vanadium**	**1.36E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
12	**Zinc**	**2.16E+01**	mg/kg	**Y**	NQ	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
12	2,4-Diamino-6-nitrotoluene	5.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	2,6-Diamino-4-nitrotoluene	6.60E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	3,5-Dinitroaniline	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Amino-2,6-dinitrotoluene[4-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Amino-4,6-dinitrotoluene[2-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dinitrobenzene[1,3-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dinitrotoluene[2,4-]	1.50E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
12	Dinitrotoluene[2,6-]	1.50E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
12	**HMX**	**8.52E-01**	mg/kg	**Y**	NQ	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
12	Nitrobenzene	1.50E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
12	Nitrotoluene[2-]	1.50E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
12	Nitrotoluene[3-]	1.50E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
12	Nitrotoluene[4-]	1.50E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
12	PETN	2.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	RDX	1.50E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
12	**TATB**	**1.70E+01**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Tetryl	1.50E-01	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
12	Trinitrobenzene[1,3,5-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Trinitrotoluene[2,4,6-]	1.50E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
12	Tris (o-cresyl) phosphate	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Perchlorate	5.05E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
12	**Gross alpha**	**2.48E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Gross beta**	**3.52E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Plutonium-238	4.66E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
12	Plutonium-239/240	-1.09E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
12	Acenaphthene	1.02E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
12	Acenaphthylene	1.02E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Aniline	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Anthracene	1.02E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
12	Azobenzene	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Benzo(a)anthracene**	**1.15E-02**	mg/kg	**Y**	J	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
12	**Benzo(a)pyrene**	**1.02E-02**	mg/kg	**Y**	J	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
12	**Benzo(b)fluoranthene**	**1.87E-02**	mg/kg	**Y**	J	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
12	Benzo(g,h,i)perylene	1.02E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Benzo(k)fluoranthene	1.02E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
12	Benzoic Acid	1.70E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Benzyl Alcohol	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Bis(2-chloroethoxy)methane	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Bis(2-chloroethyl)ether	1.02E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
12	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
12	Bromophenyl-phenylether[4-]	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Butylbenzylphthalate	1.02E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Chloro-3-methylphenol[4-]	1.36E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Chloroaniline[4-]	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Chloronaphthalene[2-]	1.02E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
12	Chlorophenol[2-]	1.02E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
12	Chlorophenyl-phenyl[4-] Ether	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Chrysene	1.02E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
12	Dibenz(a,h)anthracene	1.02E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
12	Dibenzofuran	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dichlorobenzene[1,2-]	1.02E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
12	Dichlorobenzene[1,3-]	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dichlorobenzene[1,4-]	1.02E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
12	Dichlorobenzidine[3,3'-]	1.02E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
12	Dichlorophenol[2,4-]	1.02E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
12	Diethylphthalate	1.02E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
12	Dimethyl Phthalate	1.02E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
12	Dimethylphenol[2,4-]	1.02E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
12	Di-n-butylphthalate	1.02E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
12	Dinitro-2-methylphenol[4,6-]	1.02E-01	mg/kg	N	U	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE
12	Dinitrophenol[2,4-]	1.02E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
12	Dinitrotoluene[2,4-]	1.02E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
12	Dinitrotoluene[2,6-]	1.02E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
12	Di-n-octylphthalate	1.02E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Diphenylamine	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Fluoranthene	1.02E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
12	Fluorene	1.02E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
12	Hexachlorobenzene	1.02E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
12	Hexachlorobutadiene	1.02E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
12	Hexachlorocyclopentadiene	1.02E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
12	Hexachloroethane	1.02E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
12	Indeno(1,2,3-cd)pyrene	1.02E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
12	Isophorone	1.02E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
12	Methylnaphthalene[2-]	1.02E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
12	Methylphenol[2-]	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
12	Methylphenol[3-,4-]	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Naphthalene	1.02E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
12	Nitroaniline[2-]	1.12E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Nitroaniline[3-]	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Nitroaniline[4-]	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Nitrobenzene	1.02E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
12	Nitrophenol[2-]	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Nitrophenol[4-]	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Nitrosodimethylamine[N-]	1.02E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
12	Nitroso-di-n-propylamine[N-]	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Oxybis(1-chloropropane)[2,2'-]	1.02E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
12	Pentachlorophenol	1.02E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
12	Phenanthrene	1.02E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
12	Phenol	1.02E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
12	Pyrene	1.02E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
12	Pyridine	1.02E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Trichlorobenzene[1,2,4-]	1.02E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
12	Trichlorophenol[2,4,5-]	1.02E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
12	Trichlorophenol[2,4,6-]	1.02E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
12	Acetone	1.67E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
12	Benzene	3.33E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
12	Bromobenzene	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Bromochloromethane	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Bromodichloromethane	3.33E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
12	Bromoform	3.33E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
12	Bromomethane	3.33E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
12	Butanone[2-]	1.67E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
12	Butylbenzene[n-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Butylbenzene[sec-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Butylbenzene[tert-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Carbon Disulfide	1.67E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
12	Carbon Tetrachloride	3.33E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
12	Chlorobenzene	3.33E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
12	Chlorodibromomethane	3.33E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
12	Chloroethane	3.33E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
12	Chloroform	3.33E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
12	Chloromethane	3.33E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
12	Chlorotoluene[2-]	3.33E-04	mg/kg	N	U	N/A	FALSE	1.56E+03	FALSE	N/A	FALSE
12	Chlorotoluene[4-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dibromo-3-Chloropropane[1,2-]	5.00E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
12	Dibromoethane[1,2-]	3.33E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
12	Dibromomethane	3.33E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
12	Dichlorobenzene[1,2-]	3.33E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
12	Dichlorobenzene[1,3-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dichlorobenzene[1,4-]	3.33E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
12	Dichlorodifluoromethane	3.33E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
12	Dichloroethane[1,1-]	3.33E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
12	Dichloroethane[1,2-]	3.33E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
12	Dichloroethene[1,1-]	3.33E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
12	Dichloroethene[cis-1,2-]	3.33E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
12	Dichloroethene[trans-1,2-]	3.33E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
12	Dichloropropane[1,2-]	3.33E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
12	Dichloropropane[1,3-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dichloropropane[2,2-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dichloropropene[1,1-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dichloropropene[cis-1,3-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dichloropropene[trans-1,3-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Ethylbenzene	3.33E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
12	Hexanone[2-]	1.67E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Iodomethane	1.67E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Isopropylbenzene	3.33E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
12	Isopropyltoluene[4-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Methyl-2-pentanone[4-]	1.67E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
12	Methylene Chloride	1.67E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
12	Propylbenzene[1-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Styrene	3.33E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
12	Temperature	5.70E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Temperature	4.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Tetrachloroethane[1,1,1,2-]	3.33E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
12	Tetrachloroethane[1,1,2,2-]	3.33E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
12	Tetrachloroethene	3.33E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
12	Toluene	3.33E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
12	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.67E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
12	Trichloroethane[1,1,1-]	3.33E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
12	Trichloroethane[1,1,2-]	3.33E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
12	Trichloroethene	3.33E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
12	Trichlorofluoromethane	3.33E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
12	Trichloropropane[1,2,3-]	3.33E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
12	Trimethylbenzene[1,2,4-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Trimethylbenzene[1,3,5-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Vinyl Chloride	3.33E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
12	Xylene[1,2-]	3.33E-04	mg/kg	N	U	N/A	FALSE	8.16E+02	FALSE	N/A	FALSE
12	Xylene[1,3-]+Xylene[1,4-]	6.67E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
13	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**4.70E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	**Heptachlorodibenzodioxins (Total)**	**1.52E-04**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	**Heptachlorodibenzofuran[1,2,3,4,6,7,8-]**	**2.48E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	**Heptachlorodibenzofurans (Total)**	**1.03E-05**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	**Hexachlorodibenzodioxin[1,2,3,6,7,8-]**	**8.22E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	**Hexachlorodibenzodioxin[1,2,3,7,8,9-]**	**6.55E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	**Hexachlorodibenzodioxins (Total)**	**1.08E-05**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	**Hexachlorodibenzofurans (Total)**	**3.10E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**3.40E-04**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	**Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]**	**8.97E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Pentachlorodibenzofuran[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Pentachlorodibenzofuran[2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	**Pentachlorodibenzofurans (Totals)**	**6.71E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
13	Tetrachlorodibenzodioxin[2,3,7,8-]	9.95E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
13	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Tetrachlorodibenzofuran[2,3,7,8-]	2.51E-07	mg/kg	N	U	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
13	**Tetrachlorodibenzofurans (Totals)**	**2.51E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	**Aluminum**	**1.90E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
13	Antimony	3.09E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
13	**Arsenic**	**1.45E+00**	mg/kg	**Y**	NQ	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
13	**Barium**	**6.22E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
13	**Beryllium**	**2.08E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
13	**Cadmium**	**4.67E-01**	mg/kg	**Y**	J	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	TRUE
13	**Calcium**	**3.43E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
13	**Chromium**	**6.10E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
13	**Cobalt**	**2.90E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
13	**Copper**	**2.79E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
13	**Iron**	**7.73E+03**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
13	**Lead**	**6.96E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
13	**Magnesium**	**1.48E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
13	**Manganese**	**1.19E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
13	**Mercury**	**4.67E-02**	mg/kg	**Y**	NQ	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
13	**Nickel**	**5.52E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
13	**Potassium**	**3.58E+02**	mg/kg	**Y**	J+	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
13	**Selenium**	**5.48E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
13	**Silver**	**2.00E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
13	**Sodium**	**6.60E+01**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
13	**Thallium**	**2.82E-01**	mg/kg	**Y**	J	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
13	**Vanadium**	**1.69E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
13	**Zinc**	**2.41E+01**	mg/kg	**Y**	NQ	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
13	2,4-Diamino-6-nitrotoluene	5.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	2,6-Diamino-4-nitrotoluene	6.60E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	3,5-Dinitroaniline	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Amino-2,6-dinitrotoluene[4-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Amino-4,6-dinitrotoluene[2-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Dinitrobenzene[1,3-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Dinitrotoluene[2,4-]	1.50E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
13	Dinitrotoluene[2,6-]	1.50E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
13	**HMX**	**3.87E+00**	mg/kg	**Y**	NQ	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
13	Nitrobenzene	1.50E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
13	Nitrotoluene[2-]	1.50E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
13	Nitrotoluene[3-]	1.50E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
13	Nitrotoluene[4-]	1.50E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
13	PETN	2.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	**RDX**	**1.96E-01**	mg/kg	**Y**	J	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
13	**TATB**	**1.42E+01**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Tetryl	1.50E-01	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
13	Trinitrobenzene[1,3,5-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Trinitrotoluene[2,4,6-]	1.50E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
13	Tris (o-cresyl) phosphate	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	**Perchlorate**	**5.72E-04**	mg/kg	**Y**	J-	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
13	**Gross alpha**	**1.94E+01**	pCi/g	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	**Gross beta**	**3.32E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Plutonium-238	4.61E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
13	Plutonium-239/240	7.67E-10	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
13	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
13	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
13	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Benzo(a)anthracene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
13	Benzo(a)pyrene	1.01E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
13	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
13	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
13	Benzoic Acid	1.68E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Benzyl Alcohol	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
13	**Bis(2-ethylhexyl)phthalate**	**1.91E-01**	mg/kg	**Y**	NQ	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
13	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
13	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
13	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Chrysene	1.01E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
13	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
13	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
13	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
13	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
13	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
13	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
13	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
13	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
13	Di-n-butylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
13	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE
13	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
13	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
13	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
13	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Fluoranthene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
13	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
13	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
13	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
13	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
13	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
13	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
13	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
13	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
13	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
13	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
13	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
13	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
13	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
13	Phenanthrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
13	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
13	Pyrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
13	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
13	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
13	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
13	Acetone	1.65E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
13	Benzene	3.29E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
13	Bromobenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Bromochloromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Bromodichloromethane	3.29E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
13	Bromoform	3.29E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
13	Bromomethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
13	Butanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
13	Butylbenzene[n-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
13	Butylbenzene[sec-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Butylbenzene[tert-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Carbon Disulfide	1.65E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
13	Carbon Tetrachloride	3.29E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
13	Chlorobenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
13	Chlorodibromomethane	3.29E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
13	Chloroethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
13	Chloroform	3.29E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
13	Chloromethane	3.29E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
13	Chlorotoluene[2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	1.56E+03	FALSE	N/A	FALSE
13	Chlorotoluene[4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Dibromo-3-Chloropropane[1,2-]	4.94E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
13	Dibromoethane[1,2-]	3.29E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
13	Dibromomethane	3.29E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
13	Dichlorobenzene[1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
13	Dichlorobenzene[1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Dichlorobenzene[1,4-]	3.29E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
13	Dichlorodifluoromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
13	Dichloroethane[1,1-]	3.29E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
13	Dichloroethane[1,2-]	3.29E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
13	Dichloroethene[1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
13	Dichloroethene[cis-1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
13	Dichloroethene[trans-1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
13	Dichloropropane[1,2-]	3.29E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
13	Dichloropropane[1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Dichloropropane[2,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
13	Dichloropropene[1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Dichloropropene[cis-1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Dichloropropene[trans-1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Ethylbenzene	3.29E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
13	Hexanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Iodomethane	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Isopropylbenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
13	Isopropyltoluene[4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Methyl-2-pentanone[4-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
13	Methylene Chloride	1.65E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
13	Propylbenzene[1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Styrene	3.29E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
13	Temperature	5.70E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Temperature	4.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Tetrachloroethane[1,1,1,2-]	3.29E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
13	Tetrachloroethane[1,1,2,2-]	3.29E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
13	Tetrachloroethene	3.29E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
13	Toluene	3.29E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
13	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
13	Trichloroethane[1,1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
13	Trichloroethane[1,1,2-]	3.29E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
13	Trichloroethene	3.29E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
13	Trichlorofluoromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
13	Trichloropropane[1,2,3-]	3.29E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
13	Trimethylbenzene[1,2,4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
13	Trimethylbenzene[1,3,5-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
13	Vinyl Chloride	3.29E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
13	Xylene[1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	8.17E+02	FALSE	N/A	FALSE
13	Xylene[1,3-]+Xylene[1,4-]	6.59E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
14	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**1.59E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	**Heptachlorodibenzodioxins (Total)**	**5.98E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	**Heptachlorodibenzofuran[1,2,3,4,6,7,8-]**	**9.11E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	**Heptachlorodibenzofurans (Total)**	**2.52E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	**Hexachlorodibenzodioxins (Total)**	**2.77E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Hexachlorodibenzofuran[1,2,3,4,7,8-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Hexachlorodibenzofuran[1,2,3,6,7,8-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Hexachlorodibenzofuran[1,2,3,7,8,9-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Hexachlorodibenzofuran[2,3,4,6,7,8-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	**Hexachlorodibenzofurans (Total)**	**7.43E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**1.14E-04**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	**Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]**	**2.47E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Pentachlorodibenzodioxin[1,2,3,7,8-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Pentachlorodibenzofuran[1,2,3,7,8-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Pentachlorodibenzofuran[2,3,4,7,8-]	5.00E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Tetrachlorodibenzodioxin[2,3,7,8-]	9.99E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
14	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
14	Tetrachlorodibenzofuran[2,3,7,8-]	1.78E-07	mg/kg	N	U	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
14	Tetrachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	**Aluminum**	**2.46E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
14	Antimony	3.20E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
14	**Arsenic**	**1.19E+00**	mg/kg	**Y**	NQ	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
14	**Barium**	**5.56E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
14	**Beryllium**	**2.13E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
14	**Cadmium**	**2.52E-01**	mg/kg	**Y**	J	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
14	**Calcium**	**3.17E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
14	**Chromium**	**8.55E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
14	**Cobalt**	**3.83E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
14	**Copper**	**2.77E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
14	**Iron**	**1.10E+04**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
14	**Lead**	**9.29E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
14	**Magnesium**	**1.56E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
14	**Manganese**	**1.61E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
14	**Mercury**	**6.49E-03**	mg/kg	**Y**	J	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
14	**Nickel**	**4.97E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
14	**Potassium**	**4.58E+02**	mg/kg	**Y**	J+	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
14	**Selenium**	**5.49E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
14	**Silver**	**3.26E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
14	**Sodium**	**6.90E+01**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
14	Thallium	1.36E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
14	**Vanadium**	**2.38E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
14	**Zinc**	**5.32E+01**	mg/kg	**Y**	NQ	N/A	FALSE	2.35E+04	FALSE	4.88E+01	TRUE
14	2,4-Diamino-6-nitrotoluene	4.98E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
14	2,6-Diamino-4-nitrotoluene	6.57E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	3,5-Dinitroaniline	2.99E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Amino-2,6-dinitrotoluene[4-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Amino-4,6-dinitrotoluene[2-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Dinitrobenzene[1,3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Dinitrotoluene[2,4-]	1.49E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
14	Dinitrotoluene[2,6-]	1.49E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
14	**HMX**	**1.01E+00**	mg/kg	**Y**	NQ	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
14	Nitrobenzene	1.49E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
14	Nitrotoluene[2-]	1.49E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
14	Nitrotoluene[3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
14	Nitrotoluene[4-]	1.49E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
14	PETN	2.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	RDX	1.49E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
14	**TATB**	**1.11E+01**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Tetryl	1.49E-01	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
14	Trinitrobenzene[1,3,5-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Trinitrotoluene[2,4,6-]	1.49E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
14	Tris (o-cresyl) phosphate	2.99E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Perchlorate	4.99E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
14	**Gross alpha**	**1.73E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	**Gross beta**	**3.01E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Plutonium-238	-1.29E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
14	Plutonium-239/240	6.44E-10	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
14	Acenaphthene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
14	Acenaphthene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
14	Acenaphthylene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Acenaphthylene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Aniline	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Aniline	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Anthracene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
14	Anthracene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
14	Azobenzene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Azobenzene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Benzo(a)anthracene	1.01E-02	mg/kg	N	UJ	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
14	Benzo(a)anthracene	1.01E-02	mg/kg	N	UJ	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
14	Benzo(a)pyrene	1.01E-02	mg/kg	N	UJ	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
14	Benzo(a)pyrene	1.01E-02	mg/kg	N	UJ	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
14	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	UJ	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
14	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	UJ	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
14	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	UJ	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
14	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	UJ	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
14	Benzoic Acid	1.68E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Benzoic Acid	1.68E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Benzyl Alcohol	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Benzyl Alcohol	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	UJ	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
14	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	UJ	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
14	Bis(2-ethylhexyl)phthalate	1.01E-02	mg/kg	N	UJ	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
14	**Bis(2-ethylhexyl)phthalate**	**2.55E-02**	mg/kg	**Y**	J-	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
14	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Butylbenzylphthalate	1.01E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Butylbenzylphthalate	1.01E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Chloroaniline[4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Chloroaniline[4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	UJ	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
14	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	UJ	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
14	Chlorophenol[2-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
14	Chlorophenol[2-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
14	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Chrysene	1.01E-02	mg/kg	N	UJ	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
14	Chrysene	1.01E-02	mg/kg	N	UJ	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
14	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	UJ	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
14	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	UJ	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
14	Dibenzofuran	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Dibenzofuran	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
14	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
14	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
14	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	UJ	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
14	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	UJ	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
14	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	UJ	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
14	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	UJ	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
14	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
14	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
14	Diethylphthalate	1.01E-02	mg/kg	N	UJ	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
14	**Diethylphthalate**	**1.44E-02**	mg/kg	**Y**	J-	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
14	Dimethyl Phthalate	1.01E-02	mg/kg	N	UJ	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
14	Dimethyl Phthalate	1.01E-02	mg/kg	N	UJ	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
14	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
14	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
14	Di-n-butylphthalate	1.01E-02	mg/kg	N	UJ	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
14	**Di-n-butylphthalate**	**1.31E-02**	mg/kg	**Y**	J-	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
14	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE
14	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE
14	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
14	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
14	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	UJ	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
14	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	UJ	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
14	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	UJ	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
14	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	UJ	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
14	Di-n-octylphthalate	1.01E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Di-n-octylphthalate	1.01E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Diphenylamine	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
14	Diphenylamine	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Fluoranthene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
14	Fluoranthene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
14	Fluorene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
14	Fluorene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
14	Hexachlorobenzene	1.01E-01	mg/kg	N	UJ	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
14	Hexachlorobenzene	1.01E-01	mg/kg	N	UJ	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
14	Hexachlorobutadiene	1.01E-01	mg/kg	N	UJ	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
14	Hexachlorobutadiene	1.01E-01	mg/kg	N	UJ	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
14	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
14	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
14	Hexachloroethane	1.01E-01	mg/kg	N	UJ	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
14	Hexachloroethane	1.01E-01	mg/kg	N	UJ	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
14	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	UJ	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
14	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	UJ	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
14	Isophorone	1.01E-01	mg/kg	N	UJ	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
14	**Isophorone**	**3.24E-01**	mg/kg	**Y**	J-	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
14	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	UJ	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
14	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	UJ	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
14	Methylphenol[2-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Methylphenol[2-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Naphthalene	1.01E-02	mg/kg	N	UJ	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
14	Naphthalene	1.01E-02	mg/kg	N	UJ	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
14	Nitroaniline[2-]	1.11E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
14	Nitroaniline[2-]	1.11E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Nitroaniline[3-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Nitroaniline[3-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Nitroaniline[4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Nitroaniline[4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Nitrobenzene	1.01E-01	mg/kg	N	UJ	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
14	Nitrobenzene	1.01E-01	mg/kg	N	UJ	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
14	Nitrophenol[2-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Nitrophenol[2-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Nitrophenol[4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Nitrophenol[4-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	UJ	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
14	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	UJ	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
14	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	UJ	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
14	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	UJ	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
14	Pentachlorophenol	1.01E-01	mg/kg	N	UJ	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
14	Pentachlorophenol	1.01E-01	mg/kg	N	UJ	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
14	Phenanthrene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
14	Phenanthrene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
14	Phenol	1.01E-01	mg/kg	N	UJ	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
14	Phenol	1.01E-01	mg/kg	N	UJ	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
14	Pyrene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
14	Pyrene	1.01E-02	mg/kg	N	UJ	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
14	Pyridine	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
14	Pyridine	1.01E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	UJ	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
14	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	UJ	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
14	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
14	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	UJ	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
14	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	UJ	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
14	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	UJ	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
14	Acetone	1.65E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
14	Benzene	3.29E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
14	Bromobenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Bromochloromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Bromodichloromethane	3.29E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
14	Bromoform	3.29E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
14	Bromomethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
14	Butanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
14	Butylbenzene[n-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Butylbenzene[sec-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Butylbenzene[tert-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Carbon Disulfide	1.65E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
14	Carbon Tetrachloride	3.29E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
14	Chlorobenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
14	Chlorodibromomethane	3.29E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
14	Chloroethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
14	Chloroform	3.29E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
14	Chloromethane	3.29E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
14	Chlorotoluene[2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	1.56E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
14	Chlorotoluene[4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Dibromo-3-Chloropropane[1,2-]	4.94E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
14	Dibromoethane[1,2-]	3.29E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
14	Dibromomethane	3.29E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
14	Dichlorobenzene[1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
14	Dichlorobenzene[1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Dichlorobenzene[1,4-]	3.29E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
14	Dichlorodifluoromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
14	Dichloroethane[1,1-]	3.29E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
14	Dichloroethane[1,2-]	3.29E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
14	Dichloroethene[1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
14	Dichloroethene[cis-1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
14	Dichloroethene[trans-1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
14	Dichloropropane[1,2-]	3.29E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
14	Dichloropropane[1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Dichloropropane[2,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Dichloropropene[1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Dichloropropene[cis-1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Dichloropropene[trans-1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Ethylbenzene	3.29E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
14	Hexanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Iodomethane	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Isopropylbenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
14	Isopropyltoluene[4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Methyl-2-pentanone[4-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
14	Methylene Chloride	1.65E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
14	Propylbenzene[1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Styrene	3.29E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
14	Temperature	5.70E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Temperature	4.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Tetrachloroethane[1,1,1,2-]	3.29E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
14	Tetrachloroethane[1,1,2,2-]	3.29E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
14	Tetrachloroethene	3.29E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
14	Toluene	3.29E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
14	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
14	Trichloroethane[1,1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
14	Trichloroethane[1,1,2-]	3.29E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
14	Trichloroethene	3.29E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
14	Trichlorofluoromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
14	Trichloropropane[1,2,3-]	3.29E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
14	Trimethylbenzene[1,2,4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Trimethylbenzene[1,3,5-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
14	Vinyl Chloride	3.29E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
14	Xylene[1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	8.18E+02	FALSE	N/A	FALSE
14	Xylene[1,3-]+Xylene[1,4-]	6.59E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
15	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**7.51E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	**Heptachlorodibenzodioxins (Total)**	**1.67E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Heptachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
15	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Hexachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**5.49E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	9.93E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Pentachlorodibenzofuran[1,2,3,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Pentachlorodibenzofuran[2,3,4,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Tetrachlorodibenzodioxin[2,3,7,8-]	1.12E-07	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
15	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Tetrachlorodibenzofuran[2,3,7,8-]	2.13E-07	mg/kg	N	U	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
15	Tetrachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	**Aluminum**	**2.90E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
15	Antimony	3.23E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
15	**Arsenic**	**1.41E+00**	mg/kg	**Y**	NQ	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
15	**Barium**	**4.44E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
15	**Beryllium**	**3.31E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
15	Cadmium	9.77E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
15	**Calcium**	**2.28E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
15	**Chromium**	**7.33E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
15	**Cobalt**	**3.23E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
15	**Copper**	**2.30E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
15	**Iron**	**8.63E+03**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
15	**Lead**	**5.39E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
15	**Magnesium**	**1.17E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
15	**Manganese**	**1.55E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
15	Mercury	3.83E-03	mg/kg	N	U	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
15	**Nickel**	**7.63E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
15	**Potassium**	**6.91E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
15	**Selenium**	**5.71E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
15	**Silver**	**2.70E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
15	**Sodium**	**4.51E+01**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
15	Thallium	1.41E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
15	**Vanadium**	**1.86E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
15	**Zinc**	**2.19E+01**	mg/kg	**Y**	NQ	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
15	2,4-Diamino-6-nitrotoluene	4.98E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	2,6-Diamino-4-nitrotoluene	6.57E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	3,5-Dinitroaniline	2.99E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Amino-2,6-dinitrotoluene[4-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Amino-4,6-dinitrotoluene[2-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Dinitrobenzene[1,3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Dinitrotoluene[2,4-]	1.49E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
15	Dinitrotoluene[2,6-]	1.49E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
15	HMX	1.49E-01	mg/kg	N	U	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
15	Nitrobenzene	1.49E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
15	Nitrotoluene[2-]	1.49E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
15	Nitrotoluene[3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
15	Nitrotoluene[4-]	1.49E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
15	PETN	2.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	RDX	1.49E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
15	**TATB**	**1.26E+01**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Tetryl	1.49E-01	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
15	Trinitrobenzene[1,3,5-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Trinitrotoluene[2,4,6-]	1.49E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
15	Tris (o-cresyl) phosphate	2.99E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	**Perchlorate**	**1.10E-03**	mg/kg	**Y**	J-	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
15	**Gross alpha**	**1.52E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	**Gross beta**	**2.63E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Plutonium-238	4.88E-10	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
15	Plutonium-239/240	-7.31E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
15	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
15	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
15	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Benzo(a)anthracene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
15	Benzo(a)pyrene	1.01E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
15	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
15	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
15	Benzoic Acid	1.68E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
15	**Benzyl Alcohol**	**1.18E-01**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
15	**Bis(2-ethylhexyl)phthalate**	**1.32E+00**	mg/kg	**Y**	NQ	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
15	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Chloro-3-methylphenol[4-]	1.35E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
15	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
15	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Chrysene	1.01E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
15	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
15	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
15	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
15	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
15	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
15	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
15	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
15	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
15	**Di-n-butylphthalate**	**1.67E-01**	mg/kg	**Y**	NQ	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
15	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE
15	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
15	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
15	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
15	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Fluoranthene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
15	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
15	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
15	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
15	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
15	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
15	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
15	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
15	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
15	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
15	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
15	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
15	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
15	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
15	Phenanthrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
15	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
15	Pyrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
15	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
15	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
15	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
15	Acetone	1.62E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
15	Benzene	3.24E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
15	Bromobenzene	3.24E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Bromochloromethane	3.24E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Bromodichloromethane	3.24E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
15	Bromoform	3.24E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
15	Bromomethane	3.24E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
15	Butanone[2-]	1.62E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
15	Butylbenzene[n-]	3.24E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Butylbenzene[sec-]	3.24E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Butylbenzene[tert-]	3.24E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Carbon Disulfide	1.62E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
15	Carbon Tetrachloride	3.24E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
15	Chlorobenzene	3.24E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
15	Chlorodibromomethane	3.24E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
15	Chloroethane	3.24E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
15	Chloroform	3.24E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
15	Chloromethane	3.24E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
15	Chlorotoluene[2-]	3.24E-04	mg/kg	N	U	N/A	FALSE	1.56E+03	FALSE	N/A	FALSE
15	Chlorotoluene[4-]	3.24E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
15	Dibromo-3-Chloropropane[1,2-]	4.87E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
15	Dibromoethane[1,2-]	3.24E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
15	Dibromomethane	3.24E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
15	Dichlorobenzene[1,2-]	3.24E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
15	Dichlorobenzene[1,3-]	3.24E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Dichlorobenzene[1,4-]	3.24E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
15	Dichlorodifluoromethane	3.24E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
15	Dichloroethane[1,1-]	3.24E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
15	Dichloroethane[1,2-]	3.24E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
15	Dichloroethene[1,1-]	3.24E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
15	Dichloroethene[cis-1,2-]	3.24E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
15	Dichloroethene[trans-1,2-]	3.24E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
15	Dichloropropane[1,2-]	3.24E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
15	Dichloropropane[1,3-]	3.24E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Dichloropropane[2,2-]	3.24E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Dichloropropene[1,1-]	3.24E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Dichloropropene[cis-1,3-]	3.24E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Dichloropropene[trans-1,3-]	3.24E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Ethylbenzene	3.24E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
15	Hexanone[2-]	1.62E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Iodomethane	1.62E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Isopropylbenzene	3.24E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
15	Isopropyltoluene[4-]	3.24E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Methyl-2-pentanone[4-]	1.62E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
15	Methylene Chloride	1.62E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
15	Propylbenzene[1-]	3.24E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
15	Styrene	3.24E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
15	Temperature	5.70E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Temperature	4.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Tetrachloroethane[1,1,1,2-]	3.24E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
15	Tetrachloroethane[1,1,2,2-]	3.24E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
15	Tetrachloroethene	3.24E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
15	Toluene	3.24E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
15	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.62E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
15	Trichloroethane[1,1,1-]	3.24E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
15	Trichloroethane[1,1,2-]	3.24E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
15	Trichloroethene	3.24E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
15	Trichlorofluoromethane	3.24E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
15	Trichloropropane[1,2,3-]	3.24E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
15	Trimethylbenzene[1,2,4-]	3.24E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Trimethylbenzene[1,3,5-]	3.24E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
15	Vinyl Chloride	3.24E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
15	Xylene[1,2-]	3.24E-04	mg/kg	N	U	N/A	FALSE	8.19E+02	FALSE	N/A	FALSE
15	Xylene[1,3-]+Xylene[1,4-]	6.49E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
1 dup	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**6.82E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Heptachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Heptachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1 dup	Hexachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**4.56E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	9.94E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Pentachlorodibenzofuran[1,2,3,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Pentachlorodibenzofuran[2,3,4,7,8-]	4.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Tetrachlorodibenzodioxin[2,3,7,8-]	9.94E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
1 dup	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	**Tetrachlorodibenzofuran[2,3,7,8-]**	**1.75E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
1 dup	**Tetrachlorodibenzofurans (Totals)**	**1.75E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	**Aluminum**	**2.19E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
1 dup	Antimony	3.16E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
1 dup	**Arsenic**	**1.44E+00**	mg/kg	**Y**	NQ	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
1 dup	**Barium**	**2.70E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
1 dup	**Beryllium**	**2.68E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
1 dup	Cadmium	9.57E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
1 dup	**Calcium**	**5.74E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
1 dup	**Chromium**	**6.25E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
1 dup	**Cobalt**	**3.14E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1 dup	**Copper**	**1.03E+02**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
1 dup	**Iron**	**9.24E+03**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
1 dup	**Lead**	**4.00E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
1 dup	**Magnesium**	**1.34E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
1 dup	**Manganese**	**1.42E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
1 dup	Mercury	3.53E-03	mg/kg	N	U	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
1 dup	**Nickel**	**6.34E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
1 dup	**Potassium**	**3.90E+02**	mg/kg	**Y**	J+	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
1 dup	**Selenium**	**5.07E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
1 dup	**Silver**	**2.37E-01**	mg/kg	**Y**	J	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
1 dup	**Sodium**	**4.71E+01**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
1 dup	Thallium	1.34E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
1 dup	**Vanadium**	**2.09E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
1 dup	**Zinc**	**1.96E+01**	mg/kg	**Y**	NQ	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
1 dup	2,4-Diamino-6-nitrotoluene	5.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	2,6-Diamino-4-nitrotoluene	6.60E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	3,5-Dinitroaniline	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Amino-2,6-dinitrotoluene[4-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Amino-4,6-dinitrotoluene[2-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dinitrobenzene[1,3-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dinitrotoluene[2,4-]	1.50E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
1 dup	Dinitrotoluene[2,6-]	1.50E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE
1 dup	**HMX**	**6.52E-01**	mg/kg	**Y**	NQ	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
1 dup	Nitrobenzene	1.50E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
1 dup	Nitrotoluene[2-]	1.50E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
1 dup	Nitrotoluene[3-]	1.50E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1 dup	Nitrotoluene[4-]	1.50E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
1 dup	PETN	2.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	RDX	1.50E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
1 dup	**TATB**	**1.16E+01**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Tetryl	1.50E-01	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
1 dup	Trinitrobenzene[1,3,5-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Trinitrotoluene[2,4,6-]	1.50E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
1 dup	Tris (o-cresyl) phosphate	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Perchlorate	5.03E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
1 dup	**Gross alpha**	**9.73E+00**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	**Gross beta**	**2.04E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Plutonium-238	1.60E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
1 dup	Plutonium-239/240	-6.41E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
1 dup	Acenaphthene	1.00E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
1 dup	Acenaphthylene	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Aniline	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Anthracene	1.00E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
1 dup	Azobenzene	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Benzo(a)anthracene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Benzo(a)pyrene	1.00E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
1 dup	Benzo(b)fluoranthene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Benzo(g,h,i)perylene	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Benzo(k)fluoranthene	1.00E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Benzoic Acid	1.67E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Benzyl Alcohol	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1 dup	Bis(2-chloroethoxy)methane	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Bis(2-chloroethyl)ether	1.00E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Bis(2-ethylhexyl)phthalate	1.00E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
1 dup	Bromophenyl-phenylether[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Butylbenzylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Chloroaniline[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Chloronaphthalene[2-]	1.00E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
1 dup	Chlorophenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
1 dup	Chlorophenyl-phenyl[4-] Ether	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Chrysene	1.00E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dibenz(a,h)anthracene	1.00E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dibenzofuran	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dichlorobenzene[1,2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
1 dup	Dichlorobenzene[1,3-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dichlorobenzene[1,4-]	1.00E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
1 dup	Dichlorobenzidine[3,3'-]	1.00E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dichlorophenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
1 dup	Diethylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
1 dup	Dimethyl Phthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
1 dup	Dimethylphenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
1 dup	Di-n-butylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
1 dup	Dinitro-2-methylphenol[4,6-]	1.00E-01	mg/kg	N	U	N/A	FALSE	4.93E+00	FALSE	N/A	FALSE
1 dup	Dinitrophenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
1 dup	Dinitrotoluene[2,4-]	1.00E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
1 dup	Dinitrotoluene[2,6-]	1.00E-01	mg/kg	N	U	3.56E+00	FALSE	1.85E+01	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1 dup	Di-n-octylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Diphenylamine	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Fluoranthene	1.00E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
1 dup	Fluorene	1.00E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
1 dup	Hexachlorobenzene	1.00E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
1 dup	Hexachlorobutadiene	1.00E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
1 dup	Hexachlorocyclopentadiene	1.00E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
1 dup	Hexachloroethane	1.00E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
1 dup	Indeno(1,2,3-cd)pyrene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Isophorone	1.00E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
1 dup	Methylnaphthalene[2-]	1.00E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
1 dup	Methylphenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Methylphenol[3-,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Naphthalene	1.00E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
1 dup	Nitroaniline[2-]	1.10E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Nitroaniline[3-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Nitroaniline[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Nitrobenzene	1.00E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
1 dup	Nitrophenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Nitrophenol[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Nitrosodimethylamine[N-]	1.00E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
1 dup	Nitroso-di-n-propylamine[N-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Oxybis(1-chloropropane)[2,2'-]	1.00E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Pentachlorophenol	1.00E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
1 dup	Phenanthrene	1.00E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
1 dup	Phenol	1.00E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1 dup	Pyrene	1.00E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
1 dup	Pyridine	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Trichlorobenzene[1,2,4-]	1.00E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
1 dup	Trichlorophenol[2,4,5-]	1.00E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
1 dup	Trichlorophenol[2,4,6-]	1.00E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
1 dup	Acetone	1.58E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
1 dup	Benzene	3.16E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
1 dup	Bromobenzene	3.16E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Bromochloromethane	3.16E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Bromodichloromethane	3.16E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
1 dup	Bromoform	3.16E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
1 dup	Bromomethane	3.16E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
1 dup	Butanone[2-]	1.58E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
1 dup	Butylbenzene[n-]	3.16E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Butylbenzene[sec-]	3.16E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Butylbenzene[tert-]	3.16E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Carbon Disulfide	1.58E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
1 dup	Carbon Tetrachloride	3.16E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
1 dup	Chlorobenzene	3.16E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
1 dup	Chlorodibromomethane	3.16E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
1 dup	Chloroethane	3.16E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
1 dup	Chloroform	3.16E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
1 dup	Chloromethane	3.16E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
1 dup	Chlorotoluene[2-]	3.16E-04	mg/kg	N	U	N/A	FALSE	1.56E+03	FALSE	N/A	FALSE
1 dup	Chlorotoluene[4-]	3.16E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dibromo-3-Chloropropane[1,2-]	4.74E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1 dup	Dibromoethane[1,2-]	3.16E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
1 dup	Dibromomethane	3.16E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
1 dup	Dichlorobenzene[1,2-]	3.16E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
1 dup	Dichlorobenzene[1,3-]	3.16E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dichlorobenzene[1,4-]	3.16E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
1 dup	Dichlorodifluoromethane	3.16E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
1 dup	Dichloroethane[1,1-]	3.16E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
1 dup	Dichloroethane[1,2-]	3.16E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
1 dup	Dichloroethene[1,1-]	3.16E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
1 dup	Dichloroethene[cis-1,2-]	3.16E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
1 dup	Dichloroethene[trans-1,2-]	3.16E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
1 dup	Dichloropropane[1,2-]	3.16E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
1 dup	Dichloropropane[1,3-]	3.16E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dichloropropane[2,2-]	3.16E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dichloropropene[1,1-]	3.16E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dichloropropene[cis-1,3-]	3.16E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dichloropropene[trans-1,3-]	3.16E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Ethylbenzene	3.16E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
1 dup	Hexanone[2-]	1.58E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Iodomethane	1.58E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Isopropylbenzene	3.16E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
1 dup	Isopropyltoluene[4-]	3.16E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Methyl-2-pentanone[4-]	1.58E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
1 dup	Methylene Chloride	1.58E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
1 dup	Propylbenzene[1-]	3.16E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Styrene	3.16E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1 dup	Temperature	5.70E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Temperature	4.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Tetrachloroethane[1,1,1,2-]	3.16E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
1 dup	Tetrachloroethane[1,1,2,2-]	3.16E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
1 dup	Tetrachloroethene	3.16E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
1 dup	Toluene	3.16E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
1 dup	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.58E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
1 dup	Trichloroethane[1,1,1-]	3.16E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
1 dup	Trichloroethane[1,1,2-]	3.16E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
1 dup	Trichloroethene	3.16E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
1 dup	Trichlorofluoromethane	3.16E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
1 dup	Trichloropropane[1,2,3-]	3.16E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
1 dup	Trimethylbenzene[1,2,4-]	3.16E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Trimethylbenzene[1,3,5-]	3.16E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Vinyl Chloride	3.16E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
1 dup	Xylene[1,2-]	3.16E-04	mg/kg	N	U	N/A	FALSE	8.06E+02	FALSE	N/A	FALSE
1 dup	Xylene[1,3-]+Xylene[1,4-]	6.33E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
Trip Blank	**Acetone**	**2.99E-02**	mg/kg	**Y**	NQ	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
Trip Blank	Benzene	3.20E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
Trip Blank	Bromobenzene	3.20E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Bromochloromethane	3.20E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Bromodichloromethane	3.20E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
Trip Blank	Bromoform	3.20E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
Trip Blank	Bromomethane	3.20E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
Trip Blank	**Butanone[2-]**	**3.03E-03**	mg/kg	**Y**	J	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
Trip Blank	Butylbenzene[n-]	3.20E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Butylbenzene[sec-]	3.20E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Butylbenzene[tert-]	3.20E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Carbon Disulfide	1.60E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
Trip Blank	Carbon Tetrachloride	3.20E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
Trip Blank	Chlorobenzene	3.20E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
Trip Blank	Chlorodibromomethane	3.20E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
Trip Blank	Chloroethane	3.20E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
Trip Blank	Chloroform	3.20E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
Trip Blank	Chloromethane	3.20E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
Trip Blank	Chlorotoluene[2-]	3.20E-04	mg/kg	N	U	N/A	FALSE	1.56E+03	FALSE	N/A	FALSE
Trip Blank	Chlorotoluene[4-]	3.20E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Dibromo-3-Chloropropane[1,2-]	4.81E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
Trip Blank	Dibromoethane[1,2-]	3.20E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
Trip Blank	Dibromomethane	3.20E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
Trip Blank	Dichlorobenzene[1,2-]	3.20E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
Trip Blank	Dichlorobenzene[1,3-]	3.20E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Dichlorobenzene[1,4-]	3.20E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
Trip Blank	Dichlorodifluoromethane	3.20E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
Trip Blank	Dichloroethane[1,1-]	3.20E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
Trip Blank	Dichloroethane[1,2-]	3.20E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
Trip Blank	Dichloroethene[1,1-]	3.20E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
Trip Blank	Dichloroethene[cis-1,2-]	3.20E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
Trip Blank	Dichloroethene[trans-1,2-]	3.20E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
Trip Blank	Dichloropropane[1,2-]	3.20E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
Trip Blank	Dichloropropane[1,3-]	3.20E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Dichloropropane[2,2-]	3.20E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Dichloropropene[1,1-]	3.20E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Dichloropropene[cis-1,3-]	3.20E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
Trip Blank	Dichloropropene[trans-1,3-]	3.20E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Ethylbenzene	3.20E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
Trip Blank	**Hexanone[2-]**	**1.71E-03**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Iodomethane	1.60E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Isopropylbenzene	3.20E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
Trip Blank	Isopropyltoluene[4-]	3.20E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Methyl-2-pentanone[4-]	1.60E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
Trip Blank	Methylene Chloride	1.60E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
Trip Blank	Propylbenzene[1-]	3.20E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Styrene	3.20E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
Trip Blank	Temperature	4.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Tetrachloroethane[1,1,1,2-]	3.20E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
Trip Blank	Tetrachloroethane[1,1,2,2-]	3.20E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
Trip Blank	Tetrachloroethene	3.20E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
Trip Blank	Toluene	3.20E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
Trip Blank	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.60E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE

Table 1. TA-36-8 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
Trip Blank	Trichloroethane[1,1,1-]	3.20E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
Trip Blank	Trichloroethane[1,1,2-]	3.20E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
Trip Blank	Trichloroethene	3.20E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
Trip Blank	Trichlorofluoromethane	3.20E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
Trip Blank	Trichloropropane[1,2,3-]	3.20E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
Trip Blank	Trimethylbenzene[1,2,4-]	3.20E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Trimethylbenzene[1,3,5-]	3.20E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Vinyl Chloride	3.20E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
Trip Blank	Xylene[1,2-]	3.20E-04	mg/kg	N	U	N/A	FALSE	8.21E+02	FALSE	N/A	FALSE
Trip Blank	Xylene[1,3-]+Xylene[1,4-]	6.41E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE

BOLD TEXT Constituent detected above the detection limit, but below the select soil screening limit

Highlighted “TRUE” value – constituent detected above either the selected soil screening level or above the background value

Attachment 12

Revised Supplement 4-6,
Soil Sampling Results Summary Report for the Open Detonation Unit at Technical Area 39-6

TA-39-6 Open Detonation Unit

This summary report includes discussion of the analytical results associated with soil sampling conducted at the Technical Area 39, Building 6 (TA-39-6) open detonation unit on September 27, 2018. Twelve soil samples were collected from pre-selected locations (Figure 1) based on a defined area where deposition of particulates from air to soil, including predominant downwind locations, and areas of potential storm water runoff are most likely to occur. Soil samples were analyzed for volatile organic compounds (VOCs), semi-volatile compounds (SVOCs), total metals, dioxins/furans, perchlorates and high explosives, gross alpha and beta and isotopic plutonium. Surface soil samples were collected as grab samples from a depth of 0 to 2 inches below ground surface.

In 2010 and early 2011, soil data were collected to determine the baseline soil constituent of concern concentrations at the unit after more than 50 years of use. A summary of the soil analytical results for the sample collection events is included in Attachment D of the *Los Alamos National Laboratory Permit Modification Request for Open Detonation Units at Technical Areas 36 and 39 (TA-36-8 & TA-39-6), Revision 0* (LANL, 2011). Soil samples were analyzed for high explosives, metals, dioxins/furans, SVOCs, VOCs, PCBs, perchlorates, and radiological constituents (gross alpha, gross beta, and isotopic uranium). Analytical results indicate that the average soil constituent concentrations in and around the TA-39-6 open detonation unit are less than the New Mexico Environment Department (NMED) Residential Soil Screening Levels (RSSLs) (NMED, 2019).

PCB soil data was collected in 2010 and 2011, because the soil monitoring conducted at that time was designed to be a baseline data set to begin an assumed soil monitoring program at the detonation unit. Constituents chosen for the 2018 sampling effort were based on the likelihood that current operational activities may contribute to deposition of the constituents.

PCB waste is not treated or used in association with the current operational activities at either of the units; therefore, PCBs should not be added to the soil surface since initial detection. At the time of closure of the units, PCBs should be evaluated based on the sites historic use.

The results of the 2018 soil sampling event, discussed in detail below, indicate that active operations at the unit does not pose an unnecessary risk to human health based on the soil sample analytical results. Any potential contamination at the site is believed to be primarily limited to the surface (i.e., the first few inches in depth) of the site.

Laboratory Analysis and Reporting

The soil samples collected in 2018 were analyzed at a qualified offsite laboratory. The LANL Sample Management Office qualifies contract laboratories and ensures these laboratories adhere to U.S. Environmental Protection Agency (EPA) quality assurance and quality control (QA/QC) requirements. All sampling and analyses were conducted in accordance with QA/QC procedures defined by the latest revision of SW-846 (EPA, 1986) or other NMED-approved procedures. Field sampling procedures and laboratory analyses are evaluated through the use of QA/QC samples to assess the overall quality of the data produced. The field QC samples included trip blanks, field blanks, field duplicates, and equipment rinsate blanks. Field QC samples were given a unique sample identification number and submitted to the analytical laboratory as blind samples. Laboratory QC samples include calibrations, blanks, duplicates, and spike samples. QC sample results are included in the analytical results received from the laboratory so the results can be applied to the associated samples.

Samples were analyzed for the following constituents using the methods indicated in the parentheses:

- High explosives (SW-846-8330B)
- Metals (SW-846-6010C, SW-846-6020, and SW-846-7471A)
- Dioxins/Furans (SW-846-8290A)
- SVOCs (SW-846-8270D)
- VOCs (SW-846-8260B)
- Percphlorates (SW-846-6850)
- Gross alpha beta (SW-846 EPA Method 900)
- Isotopic plutonium (HASL-300:ISOP)

Complete analytical results are included in Table 1, *TA-39-6 Analytical Data Summary*. Data are reported with qualifiers that denote the following analytical situations:

- For Dioxins/Furans
    - U – Compound analyzed for, but not detected, reported quantity equals the contract required quantitation limit (CRQL)
    - J - Estimated value; the analyte is present, but at a concentration below the CRQL
        - J+ – percent recovery is over the qualification standard
        - J- – percent recovery is below the qualification standard
    - B – Analyte detected in associated blank
    - K – Estimated Maximum Possible Concentration
    - NQ – No qualification
- For Metals and Isotopic Plutonium
    - U – reading was less than the method detection limit (MDL); reported value equals the CRQL
    - J – The reported value was obtained from a reading less than the CRQL but greater than or equal to the MDL
        - J+ – percent recovery is over the qualification standard
        - J- – percent recovery is below the qualification standard
    - B – Analyte detected in associated blank
    - NQ – No qualification
- For VOCs and SVOCs
    - U – Compound analyzed for, but not detected; reported value equals the CRQL
    - J – Estimated value; the analyte is present, but at a concentration below the CRQL
        - J+ – percent recovery is over the qualification standard
        - J- – percent recovery is below the qualification standard
    - B – Analyte detected in associated blank

- <u>For Explosives</u>
  - U – Compound analyzed for, but not detected; reported value equals the CRQL
  - J – Estimated value; the analyte is present, but at a concentration below the CRQL
    - J+ – percent recovery is over the qualification standard
    - J- – percent recovery is below the qualification standard
  - B – Analyte detected in associated blank
  - Blank qualifier field – No qualification

Soil samples collected in 2018 were intended to be analyzed for isotopic uranium, but were analyzed for isotopic plutonium instead, which is not a constituent that should be present at the site. A miscommunication on the chain of custody forms for the sample suites led to analysis for isotopic plutonium and as expected, there was no plutonium detected at the site. However, previously collected data regarding isotopic uranium (the applicable constituent) concentration information is included within Attachment D of the *Los Alamos National Laboratory Permit Modification Request for Open Detonation Units at Technical Areas 36 and 39 (TA-36-8 & TA-39-6), Revision 0* (LANL, 2011). The data were also analyzed within the 2013 revised risk assessment included as Permit Application Supplement 4-9, *Revised 2011 Open Detonation Risk Assessment*.

Summary of Results

Compiled data were compared to NMED RSSLs. It is important to note that very few constituents, when compared to the constituents that the soil was tested for, were detected. The paragraphs below provide a discussion of the compounds detected within the soil, as well as other information about the analytical data that provide a more in depth discussion regarding some of the results.

Organic constituents detected within the soils at the TA-39-6 open detonation unit include:

- 0 of the 62 VOCs analyzed;
- 6 of the 69 SVOCs analyzed;
- 2 of the 20 explosives compounds analyzed; and
- 10 of the 25 dioxin or furan compounds analyzed.

For the TA-39-6 open detonation unit, none of the detected concentrations of SVOCs within the samples exceed the NMED RSSLs. However, when a constituent is reported as a CRQL which is greater than the screening level, it appears that the constituent is detected at a concentration that is greater than the NMED RSSL. This is the case for n-nitrosodimethylamine within this dataset. It is not detected in any of the samples analyzed and is included within the 'U' qualifier, as referenced above. However, because the reported results are the same as the CRQL, and the CRQL is above the NMED RSSL, n-nitrosodimethylamine appears to be detected at a concentration greater than the NMED RSSLs. The method utilized by the analytical laboratory for the SVOC analysis can detect the presence of nitrosamines; however, it is not the most sensitive method and therefore, the detection limit is higher than the soil screening level. Since the presence of n-nitrosodimethylamine due to operations at the TA-36-8 open detonation is not likely, a more focused analytical validation was deemed not necessary. Further discussion regarding the likelihood of the presence of n-nitrosodimethylamine at the site is below.

N-nitrosodimethylamine is produced by industry only in small amounts for research. It was used to make rocket fuel, but this use was stopped after unusually high levels of the chemical were found in air, water, and soil samples collected near a rocket fuel manufacturing plant. It is currently used in some cosmetic and toiletry products and in cleansers. N-nitrosodimethylamine is unintentionally formed during various manufacturing processes and in air, water, and soil from reactions involving other chemicals called alkylamines. It is also found in some foods and may be formed in the body. When released to the air, it is broken down by sunlight in a matter of minutes. When released to soil, it may evaporate into air or could sink down into deeper soil. It is unlikely that n-nitrosodimethylamine was deposited by past or current activities at the TA-39-6 open detonation unit, given that rocket fuel was never manufactured at LANL.

The two explosives compounds (HMX and RDX) detected within the soil at TA-39-6 open detonation unit were detected at concentrations below the NMED RSSLs.

For dioxins and furans, EPA has established 50 parts per trillion (ppt) Toxic Equivalency Quantity (TEQ) as being an acceptable limit for residential contamination. The TEQ system was developed for the purpose of comparing the relative risk of exposure in areas of contamination that vary widely in the composition and level of most toxic dioxins and furans. Each of the 17 highly toxic dioxins/furans are assigned a Toxic Equivalency Factor (TEF) based on a particular chemical's toxicity relative to 2,3,7,8-tetrachlorodibenzodioxin (TCDD), with the toxicity of TCDD being equal to 1.0. The concentration of each dioxin/furan is multiplied by its respective TEF and the results are summed. The summed results are known as the TEQ of the sample and it is this value that is compared to the 50 ppt screening level. This analysis is conducted as part of the health and ecological risk assessment included with this application and is included within Permit Application Supplement 4-8, *Technical Area 39 - Open Burn/Open Detonation (OB/OD) Area - Technical Area 39-6 Open Detonation Unit Human Health and Ecological Risk- Screening Assessments*.

There were no detections of perchlorate within the 12 locations sampled at the TA-39-6 open detonation unit.

Eighteen (18) of the 23 metals analyzed for were detected in the soil at the TA-39-6 open detonation unit. There were no detected metals above NMED RSSLs. Most of the detected metal concentrations are below the established background levels at the Los Alamos National Laboratory. Seven of the metals detected are present at concentrations above background values. Human health and ecological risks associated with these detections are included in Supplement 4-7, *Technical Area 36 - Open Burn/Open Detonation (OB/OD) Area - Technical Area 36-8 Open Detonation Unit Human Health and Ecological Risk- Screening Assessments*.

- Calcium (2 locations)
- Chromium (3 locations)
- Cobalt (1 location)
- Copper (11 locations)
- Mercury (2 locations)
- Vanadium (4 locations)
- Zinc (2 locations)

Antimony, while not detected at in any soil samples collected at the site, is reported in 7 of the locations as a CRQL that is greater than the establish background value at LANL. The CRQL is less than the NMED RSSL.

Conclusion

Sampling and analysis results indicate that none of the soil samples have constituent concentrations greater than the screening levels (see Table 1) when compared directly to the screening levels. Detected metals at 11 of 12 soil sample locations were measured above established background values.

References

EPA, 1986 (and all approved updates). *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846, U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response, U.S Government Printing Office, Washington D.C.

LANL, 2011. *Los Alamos National Laboratory Permit Modification Request for Open Detonation Units at Technical Areas 36 and 39 (TA-36-8 & TA-39-6), Revision 0*. Los Alamos National Laboratory. July 2011. (http://permalink.lanl.gov/object/tr?what=info:lanl-repo/lareport/LA-UR-11-04739)

NMED, 2010. *Los Alamos National Laboratory Hazardous Waste Facility Permit,* EPA ID# NM0890010515, New Mexico Environment Department, Santa Fe, New Mexico.

NMED, 2019. *New Mexico Environment Department Risk Assessment Guidance for Site Investigations and Remediation*, February 2019 (Revision 2, 6/19/19).

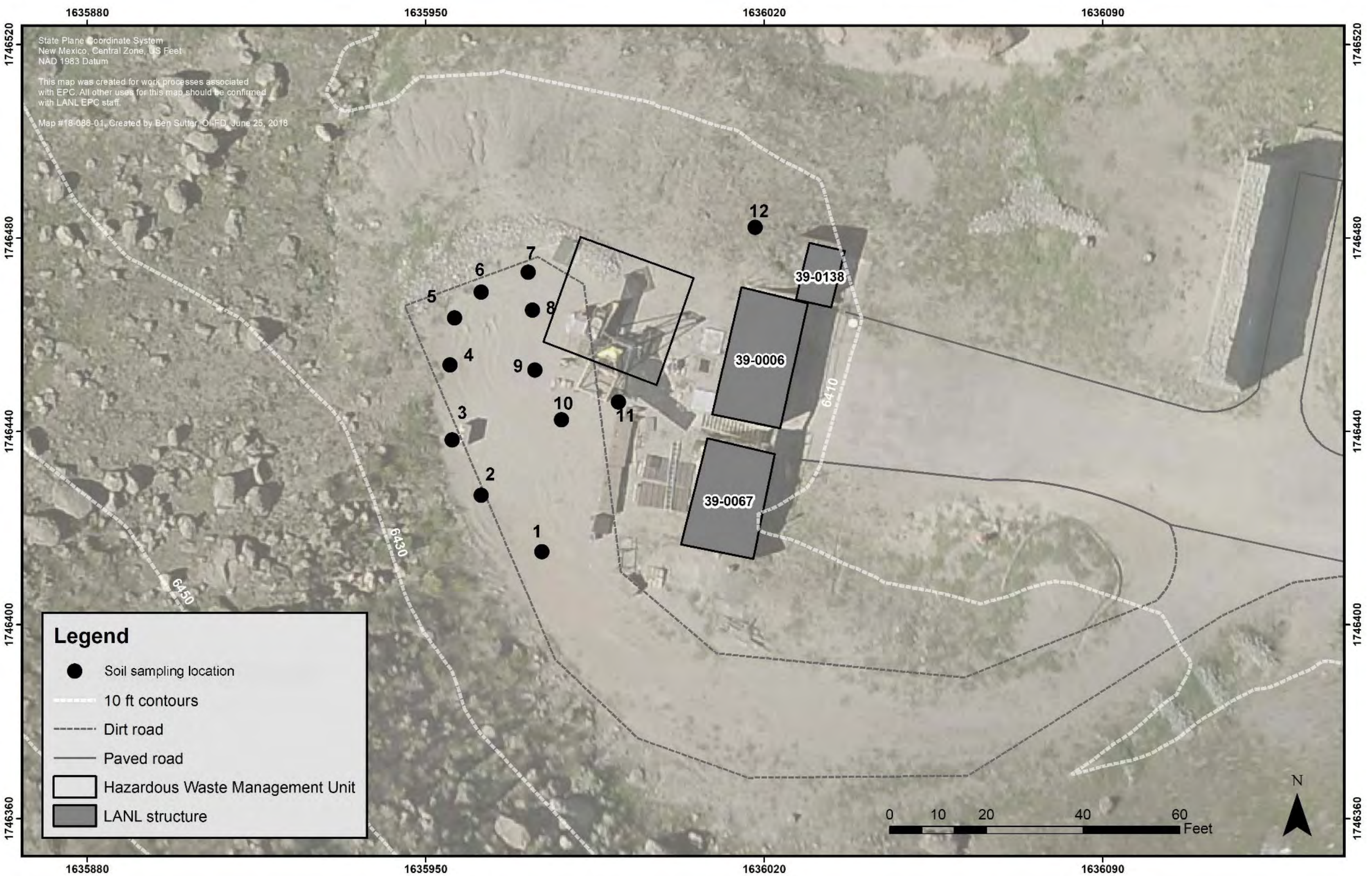

Figure 1. TA-39-6 Soil Sample Locations

Table 1. TA-39-6 2018 Analytical Data Summary

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**8.52E-06**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	**Heptachlorodibenzodioxins (Total)**	**1.53E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	**Heptachlorodibenzofuran[1,2,3,4,6,7,8-]**	**9.01E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	**Heptachlorodibenzofurans (Total)**	**2.91E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	**Hexachlorodibenzodioxins (Total)**	**5.90E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	**Hexachlorodibenzofurans (Total)**	**5.32E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**7.21E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	**Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]**	**2.49E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Pentachlorodibenzofuran[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Pentachlorodibenzofuran[2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Tetrachlorodibenzodioxin[2,3,7,8-]	9.97E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
1	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	**Tetrachlorodibenzofuran[2,3,7,8-]**	**3.65E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
1	**Tetrachlorodibenzofurans (Totals)**	**6.28E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	**Aluminum**	**3.91E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1	Antimony	3.16E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
1	**Arsenic**	**7.58E-01**	mg/kg	**Y**	J	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
1	**Barium**	**5.67E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
1	**Beryllium**	**2.32E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
1	Cadmium	9.57E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
1	**Calcium**	**4.70E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
1	**Chromium**	**1.05E+01**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
1	**Cobalt**	**4.49E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
1	**Copper**	**2.78E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
1	**Iron**	**1.33E+04**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
1	**Lead**	**9.00E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
1	**Magnesium**	**2.13E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
1	**Manganese**	**1.92E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
1	**Mercury**	**1.05E-01**	mg/kg	**Y**	NQ	N/A	FALSE	2.38E+01	FALSE	1.00E-01	TRUE
1	**Nickel**	**8.05E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
1	**Potassium**	**7.38E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
1	Selenium	3.57E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
1	Silver	3.31E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
1	**Sodium**	**3.17E+02**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
1	Thallium	1.39E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
1	**Vanadium**	**2.77E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
1	**Zinc**	**3.36E+01**	mg/kg	**Y**	J+	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
1	2,4-Diamino-6-nitrotoluene	5.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	2,6-Diamino-4-nitrotoluene	6.60E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	3,5-Dinitroaniline	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Amino-2,6-dinitrotoluene[4-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1	Amino-4,6-dinitrotoluene[2-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dinitrobenzene[1,3-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dinitrotoluene[2,4-]	1.50E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
1	Dinitrotoluene[2,6-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	**HMX**	**2.82E-01**	mg/kg	**Y**	J	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
1	Nitrobenzene	1.50E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
1	Nitrotoluene[2-]	1.50E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
1	Nitrotoluene[3-]	1.50E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
1	Nitrotoluene[4-]	1.50E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
1	PETN	2.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	RDX	1.50E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
1	**TATB**	**6.76E+00**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Tetryl	1.50E-01	mg/kg	N	UJ	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
1	Trinitrobenzene[1,3,5-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Trinitrotoluene[2,4,6-]	1.50E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
1	Tris (o-cresyl) phosphate	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Perchlorate	4.92E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
1	**Gross alpha**	**8.86E+00**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	**Gross beta**	**2.49E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Plutonium-238	0.00E+00	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
1	Plutonium-239/240	1.87E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
1	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
1	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
1	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1	Benzo(a)anthracene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
1	Benzo(a)pyrene	1.01E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
1	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
1	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
1	Benzoic Acid	1.68E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Benzyl Alcohol	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
1	Bis(2-ethylhexyl)phthalate	1.01E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
1	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
1	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
1	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Chrysene	1.01E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
1	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
1	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
1	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
1	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
1	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
1	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
1	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
1	**Di-n-butylphthalate**	**2.38E-02**	mg/kg	**Y**	J	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
1	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	7.33E+01	FALSE	N/A	FALSE
1	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
1	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
1	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Fluoranthene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
1	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
1	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
1	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
1	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	U	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
1	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
1	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
1	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
1	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
1	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
1	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
1	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
1	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
1	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
1	Phenanthrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
1	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
1	Pyrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
1	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
1	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
1	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
1	Acetone	1.65E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
1	Benzene	3.29E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
1	Bromobenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Bromochloromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Bromodichloromethane	3.29E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
1	Bromoform	3.29E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
1	Bromomethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
1	Butanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
1	Butylbenzene[n-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Butylbenzene[sec-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Butylbenzene[tert-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Carbon Disulfide	1.65E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
1	Carbon Tetrachloride	3.29E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
1	Chlorobenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1	Chlorodibromomethane	3.29E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
1	Chloroethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
1	Chloroform	3.29E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
1	Chloromethane	3.29E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
1	Chlorotoluene[2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Chlorotoluene[4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dibromo-3-Chloropropane[1,2-]	4.94E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
1	Dibromoethane[1,2-]	3.29E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
1	Dibromomethane	3.29E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
1	Dichlorobenzene[1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
1	Dichlorobenzene[1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dichlorobenzene[1,4-]	3.29E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
1	Dichlorodifluoromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
1	Dichloroethane[1,1-]	3.29E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
1	Dichloroethane[1,2-]	3.29E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
1	Dichloroethene[1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
1	Dichloroethene[cis-1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
1	Dichloroethene[trans-1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
1	Dichloropropane[1,2-]	3.29E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
1	Dichloropropane[1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dichloropropane[2,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dichloropropene[1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dichloropropene[cis-1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Dichloropropene[trans-1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Ethylbenzene	3.29E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
1	Hexanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1	Iodomethane	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Isopropylbenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
1	Isopropyltoluene[4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Methyl-2-pentanone[4-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
1	Methylene Chloride	1.65E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
1	Propylbenzene[1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Styrene	3.29E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
1	Temperature	5.20E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Temperature	5.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Tetrachloroethane[1,1,1,2-]	3.29E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
1	Tetrachloroethane[1,1,2,2-]	3.29E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
1	Tetrachloroethene	3.29E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
1	Toluene	3.29E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
1	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
1	Trichloroethane[1,1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
1	Trichloroethane[1,1,2-]	3.29E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
1	Trichloroethene	3.29E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
1	Trichlorofluoromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
1	Trichloropropane[1,2,3-]	3.29E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
1	Trimethylbenzene[1,2,4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Trimethylbenzene[1,3,5-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1	Vinyl Chloride	3.29E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
1	Xylene[1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	8.05E+02	FALSE	N/A	FALSE
1	Xylene[1,3-]+Xylene[1,4-]	6.59E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
2	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**4.57E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Heptachlorodibenzodioxins (Total)**	**7.80E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
2	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Heptachlorodibenzofurans (Total)**	**1.02E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Hexachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Hexachlorodibenzofuran[1,2,3,4,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Hexachlorodibenzofuran[1,2,3,6,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Hexachlorodibenzofuran[1,2,3,7,8,9-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Hexachlorodibenzofuran[2,3,4,6,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**3.58E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]**	**1.38E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Pentachlorodibenzodioxin[1,2,3,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Pentachlorodibenzofuran[1,2,3,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Pentachlorodibenzofuran[2,3,4,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Tetrachlorodibenzodioxin[2,3,7,8-]	1.00E-07	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
2	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Tetrachlorodibenzofuran[2,3,7,8-]**	**2.01E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
2	**Tetrachlorodibenzofurans (Totals)**	**2.01E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Aluminum**	**3.91E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
2	Antimony	3.13E+00	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	TRUE
2	**Arsenic**	**1.28E+00**	mg/kg	**Y**	NQ	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
2	**Barium**	**3.92E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
2	**Beryllium**	**2.23E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
2	Cadmium	9.47E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
2	**Calcium**	**4.81E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
2	**Chromium**	**1.21E+01**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
2	**Cobalt**	**6.40E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
2	**Copper**	**5.56E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
2	**Iron**	**1.81E+04**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
2	**Lead**	**1.56E+01**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
2	**Magnesium**	**2.34E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
2	**Manganese**	**2.17E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
2	**Mercury**	**1.92E-02**	mg/kg	**Y**	NQ	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
2	**Nickel**	**6.85E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
2	**Potassium**	**5.99E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
2	Selenium	3.53E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
2	Silver	5.94E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
2	**Sodium**	**2.49E+02**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
2	Thallium	1.37E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
2	**Vanadium**	**4.38E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	TRUE
2	**Zinc**	**4.56E+01**	mg/kg	**Y**	J+	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
2	2,4-Diamino-6-nitrotoluene	4.95E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	2,6-Diamino-4-nitrotoluene	6.53E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	3,5-Dinitroaniline	2.97E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Amino-2,6-dinitrotoluene[4-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Amino-4,6-dinitrotoluene[2-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dinitrobenzene[1,3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
2	Dinitrotoluene[2,4-]	1.49E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
2	Dinitrotoluene[2,6-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	HMX	1.49E-01	mg/kg	N	U	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
2	Nitrobenzene	1.49E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
2	Nitrotoluene[2-]	1.49E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
2	Nitrotoluene[3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
2	Nitrotoluene[4-]	1.49E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
2	PETN	2.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	RDX	1.49E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
2	**TATB**	**9.65E-01**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Tetryl	1.49E-01	mg/kg	N	UJ	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
2	Trinitrobenzene[1,3,5-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Trinitrotoluene[2,4,6-]	1.49E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
2	Tris (o-cresyl) phosphate	2.97E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Perchlorate	4.86E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
2	**Gross alpha**	**1.34E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Gross beta**	**2.44E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Plutonium-238	-3.82E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
2	Plutonium-239/240	1.02E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
2	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
2	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
2	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Benzo(a)anthracene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
2	Benzo(a)pyrene	1.01E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
2	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
2	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
2	Benzoic Acid	1.68E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	**Benzyl Alcohol**	**1.04E+00**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
2	Bis(2-ethylhexyl)phthalate	1.01E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
2	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
2	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
2	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Chrysene	1.01E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
2	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
2	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
2	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
2	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
2	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
2	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
2	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
2	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
2	**Di-n-butylphthalate**	**1.54E-02**	mg/kg	**Y**	J	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
2	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	7.33E+01	FALSE	N/A	FALSE
2	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
2	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
2	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Fluoranthene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
2	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
2	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
2	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
2	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	U	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
2	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
2	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
2	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
2	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
2	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
2	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
2	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
2	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
2	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
2	Phenanthrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
2	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
2	Pyrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
2	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
2	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
2	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
2	Acetone	1.68E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
2	Benzene	3.35E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
2	Bromobenzene	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Bromochloromethane	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Bromodichloromethane	3.35E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
2	Bromoform	3.35E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
2	Bromomethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
2	Butanone[2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
2	Butylbenzene[n-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Butylbenzene[sec-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Butylbenzene[tert-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Carbon Disulfide	1.68E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
2	Carbon Tetrachloride	3.35E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
2	Chlorobenzene	3.35E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
2	Chlorodibromomethane	3.35E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
2	Chloroethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
2	Chloroform	3.35E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
2	Chloromethane	3.35E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
2	Chlorotoluene[2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Chlorotoluene[4-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dibromo-3-Chloropropane[1,2-]	5.03E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
2	Dibromoethane[1,2-]	3.35E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
2	Dibromomethane	3.35E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
2	Dichlorobenzene[1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
2	Dichlorobenzene[1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dichlorobenzene[1,4-]	3.35E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
2	Dichlorodifluoromethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
2	Dichloroethane[1,1-]	3.35E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
2	Dichloroethane[1,2-]	3.35E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
2	Dichloroethene[1,1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
2	Dichloroethene[cis-1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
2	Dichloroethene[trans-1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
2	Dichloropropane[1,2-]	3.35E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
2	Dichloropropane[1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dichloropropane[2,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dichloropropene[1,1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dichloropropene[cis-1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Dichloropropene[trans-1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Ethylbenzene	3.35E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
2	Hexanone[2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Iodomethane	1.68E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Isopropylbenzene	3.35E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
2	Isopropyltoluene[4-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Methyl-2-pentanone[4-]	1.68E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
2	Methylene Chloride	1.68E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
2	Propylbenzene[1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Styrene	3.35E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
2	Temperature	5.20E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Temperature	5.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Tetrachloroethane[1,1,1,2-]	3.35E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
2	Tetrachloroethane[1,1,2,2-]	3.35E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
2	Tetrachloroethene	3.35E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
2	Toluene	3.35E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
2	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
2	Trichloroethane[1,1,1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
2	Trichloroethane[1,1,2-]	3.35E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
2	Trichloroethene	3.35E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
2	Trichlorofluoromethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
2	Trichloropropane[1,2,3-]	3.35E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
2	Trimethylbenzene[1,2,4-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Trimethylbenzene[1,3,5-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
2	Vinyl Chloride	3.35E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
2	Xylene[1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	8.05E+02	FALSE	N/A	FALSE
2	Xylene[1,3-]+Xylene[1,4-]	6.71E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
3	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**3.49E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	**Heptachlorodibenzodioxins (Total)**	**6.56E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
3	**Heptachlorodibenzofurans (Total)**	**7.60E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Hexachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**2.99E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	9.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Pentachlorodibenzofuran[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Pentachlorodibenzofuran[2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Tetrachlorodibenzodioxin[2,3,7,8-]	9.97E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
3	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	**Tetrachlorodibenzofuran[2,3,7,8-]**	**2.57E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
3	**Tetrachlorodibenzofurans (Totals)**	**2.07E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	**Aluminum**	**4.01E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
3	Antimony	3.17E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
3	**Arsenic**	**8.68E-01**	mg/kg	**Y**	J	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
3	**Barium**	**3.00E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
3	**Beryllium**	**1.88E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
3	Cadmium	9.60E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
3	**Calcium**	**3.49E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
3	**Chromium**	**9.47E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
3	**Cobalt**	**3.89E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
3	**Copper**	**7.38E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
3	**Iron**	**1.12E+04**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
3	**Lead**	**6.00E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
3	**Magnesium**	**2.17E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
3	**Manganese**	**1.47E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
3	**Mercury**	**1.51E-02**	mg/kg	**Y**	NQ	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
3	**Nickel**	**9.05E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
3	**Potassium**	**8.12E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
3	Selenium	3.48E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
3	Silver	2.33E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
3	**Sodium**	**3.36E+02**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
3	Thallium	1.35E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
3	**Vanadium**	**2.22E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
3	**Zinc**	**2.47E+01**	mg/kg	**Y**	J+	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
3	2,4-Diamino-6-nitrotoluene	4.98E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	2,6-Diamino-4-nitrotoluene	6.57E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	3,5-Dinitroaniline	2.99E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Amino-2,6-dinitrotoluene[4-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Amino-4,6-dinitrotoluene[2-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dinitrobenzene[1,3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dinitrotoluene[2,4-]	1.49E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
3	Dinitrotoluene[2,6-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
3	HMX	1.49E-01	mg/kg	N	U	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
3	Nitrobenzene	1.49E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
3	Nitrotoluene[2-]	1.49E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
3	Nitrotoluene[3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
3	Nitrotoluene[4-]	1.49E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
3	PETN	2.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	RDX	1.49E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
3	**TATB**	**1.86E+00**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Tetryl	1.49E-01	mg/kg	N	UJ	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
3	Trinitrobenzene[1,3,5-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Trinitrotoluene[2,4,6-]	1.49E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
3	Tris (o-cresyl) phosphate	2.99E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Perchlorate	5.01E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
3	**Gross alpha**	**1.10E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	**Gross beta**	**2.48E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Plutonium-238	-3.74E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
3	Plutonium-239/240	1.49E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
3	Acenaphthene	1.00E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
3	Acenaphthylene	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Aniline	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Anthracene	1.00E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
3	Azobenzene	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Benzo(a)anthracene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
3	Benzo(a)pyrene	1.00E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
3	Benzo(b)fluoranthene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
3	Benzo(g,h,i)perylene	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
3	Benzo(k)fluoranthene	1.00E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
3	Benzoic Acid	1.67E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	**Benzyl Alcohol**	**3.33E-01**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Bis(2-chloroethoxy)methane	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Bis(2-chloroethyl)ether	1.00E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
3	Bis(2-ethylhexyl)phthalate	1.00E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
3	Bromophenyl-phenylether[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Butylbenzylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Chloroaniline[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Chloronaphthalene[2-]	1.00E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
3	Chlorophenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
3	Chlorophenyl-phenyl[4-] Ether	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Chrysene	1.00E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
3	Dibenz(a,h)anthracene	1.00E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
3	Dibenzofuran	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dichlorobenzene[1,2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
3	Dichlorobenzene[1,3-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dichlorobenzene[1,4-]	1.00E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
3	Dichlorobenzidine[3,3'-]	1.00E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
3	Dichlorophenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
3	Diethylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
3	Dimethyl Phthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
3	Dimethylphenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
3	Di-n-butylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
3	Dinitro-2-methylphenol[4,6-]	1.00E-01	mg/kg	N	U	N/A	FALSE	7.33E+01	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
3	Dinitrophenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
3	Dinitrotoluene[2,4-]	1.00E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
3	Dinitrotoluene[2,6-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Di-n-octylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Diphenylamine	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Fluoranthene	1.00E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
3	Fluorene	1.00E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
3	Hexachlorobenzene	1.00E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
3	Hexachlorobutadiene	1.00E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
3	Hexachlorocyclopentadiene	1.00E-01	mg/kg	N	U	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
3	Hexachloroethane	1.00E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
3	Indeno(1,2,3-cd)pyrene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
3	Isophorone	1.00E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
3	Methylnaphthalene[2-]	1.00E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
3	Methylphenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Methylphenol[3-,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Naphthalene	1.00E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
3	Nitroaniline[2-]	1.10E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Nitroaniline[3-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Nitroaniline[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Nitrobenzene	1.00E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
3	Nitrophenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Nitrophenol[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Nitrosodimethylamine[N-]	1.00E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
3	Nitroso-di-n-propylamine[N-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Oxybis(1-chloropropane)[2,2'-]	1.00E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
3	Pentachlorophenol	1.00E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
3	Phenanthrene	1.00E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
3	Phenol	1.00E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
3	Pyrene	1.00E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
3	Pyridine	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Trichlorobenzene[1,2,4-]	1.00E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
3	Trichlorophenol[2,4,5-]	1.00E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
3	Trichlorophenol[2,4,6-]	1.00E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
3	Acetone	1.64E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
3	Benzene	3.28E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
3	Bromobenzene	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Bromochloromethane	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Bromodichloromethane	3.28E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
3	Bromoform	3.28E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
3	Bromomethane	3.28E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
3	Butanone[2-]	1.64E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
3	Butylbenzene[n-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Butylbenzene[sec-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Butylbenzene[tert-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Carbon Disulfide	1.64E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
3	Carbon Tetrachloride	3.28E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
3	Chlorobenzene	3.28E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
3	Chlorodibromomethane	3.28E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
3	Chloroethane	3.28E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
3	Chloroform	3.28E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
3	Chloromethane	3.28E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
3	Chlorotoluene[2-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Chlorotoluene[4-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dibromo-3-Chloropropane[1,2-]	4.93E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
3	Dibromoethane[1,2-]	3.28E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
3	Dibromomethane	3.28E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
3	Dichlorobenzene[1,2-]	3.28E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
3	Dichlorobenzene[1,3-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dichlorobenzene[1,4-]	3.28E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
3	Dichlorodifluoromethane	3.28E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
3	Dichloroethane[1,1-]	3.28E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
3	Dichloroethane[1,2-]	3.28E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
3	Dichloroethene[1,1-]	3.28E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
3	Dichloroethene[cis-1,2-]	3.28E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
3	Dichloroethene[trans-1,2-]	3.28E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
3	Dichloropropane[1,2-]	3.28E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
3	Dichloropropane[1,3-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dichloropropane[2,2-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dichloropropene[1,1-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dichloropropene[cis-1,3-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Dichloropropene[trans-1,3-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Ethylbenzene	3.28E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
3	Hexanone[2-]	1.64E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Iodomethane	1.64E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Isopropylbenzene	3.28E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
3	Isopropyltoluene[4-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Methyl-2-pentanone[4-]	1.64E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
3	Methylene Chloride	1.64E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
3	Propylbenzene[1-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Styrene	3.28E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
3	Temperature	5.20E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Temperature	5.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Tetrachloroethane[1,1,1,2-]	3.28E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
3	Tetrachloroethane[1,1,2,2-]	3.28E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
3	Tetrachloroethene	3.28E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
3	Toluene	3.28E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
3	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.64E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
3	Trichloroethane[1,1,1-]	3.28E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
3	Trichloroethane[1,1,2-]	3.28E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
3	Trichloroethene	3.28E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
3	Trichlorofluoromethane	3.28E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
3	Trichloropropane[1,2,3-]	3.28E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
3	Trimethylbenzene[1,2,4-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Trimethylbenzene[1,3,5-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
3	Vinyl Chloride	3.28E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
3	Xylene[1,2-]	3.28E-04	mg/kg	N	U	N/A	FALSE	8.05E+02	FALSE	N/A	FALSE
3	Xylene[1,3-]+Xylene[1,4-]	6.58E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
4	Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Heptachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Heptachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
4	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Hexachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Hexachlorodibenzofuran[1,2,3,4,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Hexachlorodibenzofuran[1,2,3,6,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Hexachlorodibenzofuran[1,2,3,7,8,9-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Hexachlorodibenzofuran[2,3,4,6,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**1.96E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	1.00E-06	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Pentachlorodibenzodioxin[1,2,3,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Pentachlorodibenzofuran[1,2,3,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Pentachlorodibenzofuran[2,3,4,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Tetrachlorodibenzodioxin[2,3,7,8-]	1.00E-07	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
4	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Tetrachlorodibenzofuran[2,3,7,8-]	1.05E-07	mg/kg	N	U	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
4	Tetrachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	**Aluminum**	**3.48E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
4	Antimony	3.03E+00	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	TRUE
4	**Arsenic**	**1.01E+00**	mg/kg	**Y**	NQ	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
4	**Barium**	**4.19E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
4	**Beryllium**	**2.03E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
4	Cadmium	9.17E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
4	**Calcium**	**6.78E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	TRUE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
4	**Chromium**	**1.24E+01**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
4	**Cobalt**	**4.84E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
4	**Copper**	**1.58E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
4	**Iron**	**1.26E+04**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
4	**Lead**	**8.89E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
4	**Magnesium**	**2.32E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
4	**Manganese**	**2.81E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
4	Mercury	3.73E-03	mg/kg	N	U	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
4	**Nickel**	**9.96E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
4	**Potassium**	**4.64E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
4	Selenium	3.45E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
4	Silver	2.44E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
4	**Sodium**	**2.04E+02**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
4	Thallium	1.34E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
4	**Vanadium**	**2.83E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
4	**Zinc**	**2.44E+01**	mg/kg	**Y**	J+	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
4	2,4-Diamino-6-nitrotoluene	5.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	2,6-Diamino-4-nitrotoluene	6.60E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	3,5-Dinitroaniline	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Amino-2,6-dinitrotoluene[4-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Amino-4,6-dinitrotoluene[2-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dinitrobenzene[1,3-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dinitrotoluene[2,4-]	1.50E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
4	Dinitrotoluene[2,6-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	HMX	1.50E-01	mg/kg	N	U	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
4	Nitrobenzene	1.50E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
4	Nitrotoluene[2-]	1.50E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
4	Nitrotoluene[3-]	1.50E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
4	Nitrotoluene[4-]	1.50E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
4	PETN	2.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	RDX	1.50E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
4	TATB	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Tetryl	1.50E-01	mg/kg	N	UJ	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
4	Trinitrobenzene[1,3,5-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Trinitrotoluene[2,4,6-]	1.50E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
4	Tris (o-cresyl) phosphate	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Perchlorate	4.91E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
4	**Gross alpha**	**1.10E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	**Gross beta**	**2.42E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Plutonium-238	-9.85E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
4	Plutonium-239/240	5.63E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
4	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
4	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
4	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Benzo(a)anthracene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
4	Benzo(a)pyrene	1.01E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
4	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
4	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
4	Benzoic Acid	1.68E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
4	Benzyl Alcohol	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
4	Bis(2-ethylhexyl)phthalate	1.01E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
4	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
4	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
4	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Chrysene	1.01E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
4	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
4	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
4	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
4	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
4	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
4	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
4	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
4	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
4	Di-n-butylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
4	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	7.33E+01	FALSE	N/A	FALSE
4	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
4	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
4	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Fluoranthene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
4	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
4	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
4	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
4	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	U	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
4	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
4	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
4	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
4	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
4	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
4	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
4	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
4	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
4	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
4	Phenanthrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
4	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
4	Pyrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
4	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
4	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
4	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
4	Acetone	1.65E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
4	Benzene	3.29E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
4	Bromobenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Bromochloromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Bromodichloromethane	3.29E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
4	Bromoform	3.29E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
4	Bromomethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
4	Butanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
4	Butylbenzene[n-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Butylbenzene[sec-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Butylbenzene[tert-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Carbon Disulfide	1.65E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
4	Carbon Tetrachloride	3.29E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
4	Chlorobenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
4	Chlorodibromomethane	3.29E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
4	Chloroethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
4	Chloroform	3.29E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
4	Chloromethane	3.29E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
4	Chlorotoluene[2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Chlorotoluene[4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
4	Dibromo-3-Chloropropane[1,2-]	4.94E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
4	Dibromoethane[1,2-]	3.29E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
4	Dibromomethane	3.29E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
4	Dichlorobenzene[1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
4	Dichlorobenzene[1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dichlorobenzene[1,4-]	3.29E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
4	Dichlorodifluoromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
4	Dichloroethane[1,1-]	3.29E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
4	Dichloroethane[1,2-]	3.29E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
4	Dichloroethene[1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
4	Dichloroethene[cis-1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
4	Dichloroethene[trans-1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
4	Dichloropropane[1,2-]	3.29E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
4	Dichloropropane[1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dichloropropane[2,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dichloropropene[1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dichloropropene[cis-1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Dichloropropene[trans-1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Ethylbenzene	3.29E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
4	Hexanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Iodomethane	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Isopropylbenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
4	Isopropyltoluene[4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Methyl-2-pentanone[4-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
4	Methylene Chloride	1.65E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
4	Propylbenzene[1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
4	Styrene	3.29E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
4	Temperature	5.20E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Temperature	5.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Tetrachloroethane[1,1,1,2-]	3.29E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
4	Tetrachloroethane[1,1,2,2-]	3.29E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
4	Tetrachloroethene	3.29E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
4	Toluene	3.29E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
4	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
4	Trichloroethane[1,1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
4	Trichloroethane[1,1,2-]	3.29E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
4	Trichloroethene	3.29E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
4	Trichlorofluoromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
4	Trichloropropane[1,2,3-]	3.29E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
4	Trimethylbenzene[1,2,4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Trimethylbenzene[1,3,5-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
4	Vinyl Chloride	3.29E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
4	Xylene[1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	8.05E+02	FALSE	N/A	FALSE
4	Xylene[1,3-]+Xylene[1,4-]	6.58E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
5	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**8.28E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Heptachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Heptachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
5	Hexachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Hexachlorodibenzofuran[1,2,3,4,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Hexachlorodibenzofuran[1,2,3,6,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Hexachlorodibenzofuran[1,2,3,7,8,9-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Hexachlorodibenzofuran[2,3,4,6,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**5.50E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	1.00E-06	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Pentachlorodibenzodioxin[1,2,3,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Pentachlorodibenzofuran[1,2,3,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Pentachlorodibenzofuran[2,3,4,7,8-]	5.01E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Tetrachlorodibenzodioxin[2,3,7,8-]	1.00E-07	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
5	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	**Tetrachlorodibenzofuran[2,3,7,8-]**	**1.36E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
5	**Tetrachlorodibenzofurans (Totals)**	**1.36E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	**Aluminum**	**4.24E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
5	Antimony	3.31E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
5	**Arsenic**	**6.61E-01**	mg/kg	**Y**	J	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
5	**Barium**	**2.80E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
5	**Beryllium**	**1.67E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
5	Cadmium	1.00E-01	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
5	**Calcium**	**5.64E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
5	**Chromium**	**1.17E+01**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
5	**Cobalt**	**5.31E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
5	**Copper**	**5.27E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
5	**Iron**	**1.42E+04**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
5	**Lead**	**5.83E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
5	**Magnesium**	**2.45E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
5	**Manganese**	**1.95E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
5	Mercury	3.70E-03	mg/kg	N	U	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
5	**Nickel**	**5.57E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
5	**Potassium**	**6.18E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
5	Selenium	3.35E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
5	Silver	2.47E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
5	**Sodium**	**2.76E+02**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
5	Thallium	1.30E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
5	**Vanadium**	**3.18E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
5	**Zinc**	**2.98E+01**	mg/kg	**Y**	J+	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
5	2,4-Diamino-6-nitrotoluene	4.93E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	2,6-Diamino-4-nitrotoluene	6.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	3,5-Dinitroaniline	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Amino-2,6-dinitrotoluene[4-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Amino-4,6-dinitrotoluene[2-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dinitrobenzene[1,3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dinitrotoluene[2,4-]	1.48E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
5	Dinitrotoluene[2,6-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	**HMX**	**6.66E+00**	mg/kg	**Y**	NQ	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
5	Nitrobenzene	1.48E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
5	Nitrotoluene[2-]	1.48E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
5	Nitrotoluene[3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
5	Nitrotoluene[4-]	1.48E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
5	PETN	2.46E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	RDX	1.48E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
5	TATB	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Tetryl	1.48E-01	mg/kg	N	UJ	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
5	Trinitrobenzene[1,3,5-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Trinitrotoluene[2,4,6-]	1.48E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
5	Tris (o-cresyl) phosphate	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Perchlorate	4.91E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
5	**Gross alpha**	**8.53E+00**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	**Gross beta**	**2.32E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Plutonium-238	-1.62E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
5	Plutonium-239/240	-1.24E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
5	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
5	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
5	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Benzo(a)anthracene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
5	Benzo(a)pyrene	1.01E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
5	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
5	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
5	Benzoic Acid	1.68E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	**Benzyl Alcohol**	**7.66E-01**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
5	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
5	Bis(2-ethylhexyl)phthalate	1.01E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
5	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
5	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
5	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Chrysene	1.01E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
5	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
5	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
5	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
5	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
5	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
5	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
5	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
5	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
5	Di-n-butylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
5	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	7.33E+01	FALSE	N/A	FALSE
5	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
5	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
5	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
5	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Fluoranthene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
5	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
5	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
5	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
5	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	U	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
5	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
5	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
5	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
5	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
5	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
5	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
5	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
5	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
5	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
5	Phenanthrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
5	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
5	Pyrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
5	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
5	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
5	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
5	Acetone	1.68E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
5	Benzene	3.35E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
5	Bromobenzene	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Bromochloromethane	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Bromodichloromethane	3.35E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
5	Bromoform	3.35E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
5	Bromomethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
5	Butanone[2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
5	Butylbenzene[n-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Butylbenzene[sec-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Butylbenzene[tert-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Carbon Disulfide	1.68E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
5	Carbon Tetrachloride	3.35E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
5	Chlorobenzene	3.35E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
5	Chlorodibromomethane	3.35E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
5	Chloroethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
5	Chloroform	3.35E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
5	Chloromethane	3.35E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
5	Chlorotoluene[2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Chlorotoluene[4-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dibromo-3-Chloropropane[1,2-]	5.03E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
5	Dibromoethane[1,2-]	3.35E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
5	Dibromomethane	3.35E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
5	Dichlorobenzene[1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
5	Dichlorobenzene[1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dichlorobenzene[1,4-]	3.35E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
5	Dichlorodifluoromethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
5	Dichloroethane[1,1-]	3.35E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
5	Dichloroethane[1,2-]	3.35E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
5	Dichloroethene[1,1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
5	Dichloroethene[cis-1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
5	Dichloroethene[trans-1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
5	Dichloropropane[1,2-]	3.35E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
5	Dichloropropane[1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dichloropropane[2,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dichloropropene[1,1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dichloropropene[cis-1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Dichloropropene[trans-1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Ethylbenzene	3.35E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
5	Hexanone[2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Iodomethane	1.68E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Isopropylbenzene	3.35E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
5	Isopropyltoluene[4-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Methyl-2-pentanone[4-]	1.68E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
5	Methylene Chloride	1.68E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
5	Propylbenzene[1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Styrene	3.35E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
5	Temperature	5.20E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
5	Temperature	5.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Tetrachloroethane[1,1,1,2-]	3.35E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
5	Tetrachloroethane[1,1,2,2-]	3.35E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
5	Tetrachloroethene	3.35E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
5	Toluene	3.35E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
5	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
5	Trichloroethane[1,1,1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
5	Trichloroethane[1,1,2-]	3.35E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
5	Trichloroethene	3.35E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
5	Trichlorofluoromethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
5	Trichloropropane[1,2,3-]	3.35E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
5	Trimethylbenzene[1,2,4-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Trimethylbenzene[1,3,5-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
5	Vinyl Chloride	3.35E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
5	Xylene[1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	8.05E+02	FALSE	N/A	FALSE
5	Xylene[1,3-]+Xylene[1,4-]	6.72E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
6	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**8.60E-06**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	**Heptachlorodibenzodioxins (Total)**	**1.45E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	**Heptachlorodibenzofuran[1,2,3,4,6,7,8-]**	**7.97E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	**Heptachlorodibenzofurans (Total)**	**7.97E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Hexachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Hexachlorodibenzofuran[1,2,3,4,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
6	Hexachlorodibenzofuran[1,2,3,6,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Hexachlorodibenzofuran[1,2,3,7,8,9-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Hexachlorodibenzofuran[2,3,4,6,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**5.49E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	**Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]**	**2.51E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Pentachlorodibenzodioxin[1,2,3,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Pentachlorodibenzofuran[1,2,3,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Pentachlorodibenzofuran[2,3,4,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Tetrachlorodibenzodioxin[2,3,7,8-]	1.00E-07	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
6	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	**Tetrachlorodibenzofuran[2,3,7,8-]**	**1.87E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
6	**Tetrachlorodibenzofurans (Totals)**	**1.87E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	**Aluminum**	**2.93E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
6	Antimony	3.07E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
6	**Arsenic**	**6.99E-01**	mg/kg	**Y**	J	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
6	**Barium**	**3.00E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
6	**Beryllium**	**1.90E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
6	Cadmium	9.32E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
6	**Calcium**	**2.93E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
6	**Chromium**	**8.96E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
6	**Cobalt**	**3.89E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
6	**Copper**	**2.02E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
6	**Iron**	**1.03E+04**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
6	**Lead**	**7.72E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
6	**Magnesium**	**1.75E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
6	**Manganese**	**1.50E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
6	**Mercury**	**5.07E-03**	mg/kg	**Y**	J	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
6	**Nickel**	**6.68E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
6	**Potassium**	**5.44E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
6	Selenium	3.54E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
6	Silver	3.84E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
6	**Sodium**	**2.38E+02**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
6	Thallium	1.38E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
6	**Vanadium**	**2.32E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
6	**Zinc**	**3.04E+01**	mg/kg	**Y**	J+	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
6	2,4-Diamino-6-nitrotoluene	5.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	2,6-Diamino-4-nitrotoluene	6.60E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	3,5-Dinitroaniline	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Amino-2,6-dinitrotoluene[4-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Amino-4,6-dinitrotoluene[2-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dinitrobenzene[1,3-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dinitrotoluene[2,4-]	1.50E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
6	Dinitrotoluene[2,6-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	HMX	1.50E-01	mg/kg	N	U	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
6	Nitrobenzene	1.50E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
6	Nitrotoluene[2-]	1.50E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
6	Nitrotoluene[3-]	1.50E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
6	Nitrotoluene[4-]	1.50E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
6	PETN	2.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
6	RDX	1.50E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
6	TATB	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Tetryl	1.50E-01	mg/kg	N	UJ	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
6	Trinitrobenzene[1,3,5-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Trinitrotoluene[2,4,6-]	1.50E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
6	Tris (o-cresyl) phosphate	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Perchlorate	4.98E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
6	**Gross alpha**	**1.01E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	**Gross beta**	**2.81E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Plutonium-238	-5.42E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
6	Plutonium-239/240	-8.67E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
6	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
6	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
6	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Benzo(a)anthracene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
6	Benzo(a)pyrene	1.01E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
6	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
6	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
6	**Benzoic Acid**	**4.83E-01**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Benzyl Alcohol	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
6	Bis(2-ethylhexyl)phthalate	1.01E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
6	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
6	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
6	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Chrysene	1.01E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
6	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
6	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
6	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
6	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
6	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
6	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
6	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
6	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
6	Di-n-butylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
6	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	7.33E+01	FALSE	N/A	FALSE
6	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
6	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
6	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Fluoranthene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
6	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
6	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
6	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
6	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	U	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
6	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
6	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
6	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
6	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
6	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
6	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
6	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
6	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
6	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
6	Phenanthrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
6	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
6	Pyrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
6	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
6	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
6	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
6	Acetone	1.64E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
6	Benzene	3.29E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
6	Bromobenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Bromochloromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Bromodichloromethane	3.29E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
6	Bromoform	3.29E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
6	Bromomethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
6	Butanone[2-]	1.64E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
6	Butylbenzene[n-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Butylbenzene[sec-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Butylbenzene[tert-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Carbon Disulfide	1.64E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
6	Carbon Tetrachloride	3.29E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
6	Chlorobenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
6	Chlorodibromomethane	3.29E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
6	Chloroethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
6	Chloroform	3.29E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
6	Chloromethane	3.29E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
6	Chlorotoluene[2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Chlorotoluene[4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dibromo-3-Chloropropane[1,2-]	4.93E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
6	Dibromoethane[1,2-]	3.29E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
6	Dibromomethane	3.29E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
6	Dichlorobenzene[1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
6	Dichlorobenzene[1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dichlorobenzene[1,4-]	3.29E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
6	Dichlorodifluoromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
6	Dichloroethane[1,1-]	3.29E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
6	Dichloroethane[1,2-]	3.29E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
6	Dichloroethene[1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
6	Dichloroethene[cis-1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
6	Dichloroethene[trans-1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
6	Dichloropropane[1,2-]	3.29E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
6	Dichloropropane[1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dichloropropane[2,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dichloropropene[1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dichloropropene[cis-1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Dichloropropene[trans-1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Ethylbenzene	3.29E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
6	Hexanone[2-]	1.64E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Iodomethane	1.64E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Isopropylbenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
6	Isopropyltoluene[4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Methyl-2-pentanone[4-]	1.64E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
6	Methylene Chloride	1.64E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
6	Propylbenzene[1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Styrene	3.29E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
6	Temperature	5.20E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Temperature	5.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Tetrachloroethane[1,1,1,2-]	3.29E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
6	Tetrachloroethane[1,1,2,2-]	3.29E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
6	Tetrachloroethene	3.29E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
6	Toluene	3.29E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
6	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.64E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
6	Trichloroethane[1,1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
6	Trichloroethane[1,1,2-]	3.29E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
6	Trichloroethene	3.29E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
6	Trichlorofluoromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
6	Trichloropropane[1,2,3-]	3.29E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
6	Trimethylbenzene[1,2,4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Trimethylbenzene[1,3,5-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
6	Vinyl Chloride	3.29E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
6	Xylene[1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	8.05E+02	FALSE	N/A	FALSE
6	Xylene[1,3-]+Xylene[1,4-]	6.58E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
7	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**5.86E-06**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	**Heptachlorodibenzodioxins (Total)**	**1.01E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	**Heptachlorodibenzofuran[1,2,3,4,6,7,8-]**	**2.21E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	**Heptachlorodibenzofurans (Total)**	**1.22E-05**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Hexachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
7	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	**Hexachlorodibenzofurans (Total)**	**1.36E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**6.84E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	**Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]**	**1.92E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Pentachlorodibenzofuran[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Pentachlorodibenzofuran[2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Tetrachlorodibenzodioxin[2,3,7,8-]	9.97E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
7	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Tetrachlorodibenzofuran[2,3,7,8-]	1.16E-07	mg/kg	N	U	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
7	Tetrachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	**Aluminum**	**5.28E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
7	Antimony	3.19E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
7	**Arsenic**	**8.22E-01**	mg/kg	**Y**	J	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
7	**Barium**	**4.12E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
7	**Beryllium**	**1.67E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
7	Cadmium	9.68E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
7	**Calcium**	**5.81E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
7	**Chromium**	**1.86E+01**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
7	**Cobalt**	**8.42E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
7	**Copper**	**1.74E+02**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
7	**Iron**	**2.14E+04**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
7	**Lead**	**9.68E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
7	**Magnesium**	**3.74E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
7	**Manganese**	**2.58E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
7	Mercury	3.77E-03	mg/kg	N	U	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
7	**Nickel**	**7.61E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
7	**Potassium**	**6.13E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
7	Selenium	3.44E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
7	Silver	6.85E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
7	**Sodium**	**2.61E+02**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
7	Thallium	1.34E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
7	**Vanadium**	**4.83E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	TRUE
7	**Zinc**	**5.73E+01**	mg/kg	**Y**	J+	N/A	FALSE	2.35E+04	FALSE	4.88E+01	TRUE
7	2,4-Diamino-6-nitrotoluene	4.98E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	2,6-Diamino-4-nitrotoluene	6.57E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	3,5-Dinitroaniline	2.99E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Amino-2,6-dinitrotoluene[4-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Amino-4,6-dinitrotoluene[2-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dinitrobenzene[1,3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dinitrotoluene[2,4-]	1.49E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
7	Dinitrotoluene[2,6-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	**HMX**	**1.72E-01**	mg/kg	**Y**	J	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
7	Nitrobenzene	1.49E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
7	Nitrotoluene[2-]	1.49E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
7	Nitrotoluene[3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
7	Nitrotoluene[4-]	1.49E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
7	PETN	2.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	RDX	1.49E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
7	TATB	2.99E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
7	Tetryl	1.49E-01	mg/kg	N	UJ	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
7	Trinitrobenzene[1,3,5-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Trinitrotoluene[2,4,6-]	1.49E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
7	Tris (o-cresyl) phosphate	2.99E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Perchlorate	4.93E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
7	**Gross alpha**	**8.70E+00**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	**Gross beta**	**2.40E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Plutonium-238	-1.31E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
7	Plutonium-239/240	1.31E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
7	Acenaphthene	1.00E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
7	Acenaphthylene	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Aniline	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Anthracene	1.00E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
7	Azobenzene	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Benzo(a)anthracene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
7	Benzo(a)pyrene	1.00E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
7	Benzo(b)fluoranthene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
7	Benzo(g,h,i)perylene	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Benzo(k)fluoranthene	1.00E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
7	Benzoic Acid	1.67E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Benzyl Alcohol	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Bis(2-chloroethoxy)methane	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Bis(2-chloroethyl)ether	1.00E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
7	Bis(2-ethylhexyl)phthalate	1.00E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
7	Bromophenyl-phenylether[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Butylbenzylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
7	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Chloroaniline[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Chloronaphthalene[2-]	1.00E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
7	Chlorophenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
7	Chlorophenyl-phenyl[4-] Ether	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Chrysene	1.00E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
7	Dibenz(a,h)anthracene	1.00E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
7	Dibenzofuran	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dichlorobenzene[1,2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
7	Dichlorobenzene[1,3-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dichlorobenzene[1,4-]	1.00E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
7	Dichlorobenzidine[3,3'-]	1.00E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
7	Dichlorophenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
7	Diethylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
7	Dimethyl Phthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
7	Dimethylphenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
7	Di-n-butylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
7	Dinitro-2-methylphenol[4,6-]	1.00E-01	mg/kg	N	U	N/A	FALSE	7.33E+01	FALSE	N/A	FALSE
7	Dinitrophenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
7	Dinitrotoluene[2,4-]	1.00E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
7	Dinitrotoluene[2,6-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Di-n-octylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Diphenylamine	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Fluoranthene	1.00E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
7	Fluorene	1.00E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
7	Hexachlorobenzene	1.00E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
7	Hexachlorobutadiene	1.00E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
7	Hexachlorocyclopentadiene	1.00E-01	mg/kg	N	U	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
7	Hexachloroethane	1.00E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
7	Indeno(1,2,3-cd)pyrene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
7	Isophorone	1.00E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
7	Methylnaphthalene[2-]	1.00E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
7	Methylphenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Methylphenol[3-,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Naphthalene	1.00E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
7	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Nitroaniline[3-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Nitroaniline[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Nitrobenzene	1.00E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
7	Nitrophenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Nitrophenol[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Nitrosodimethylamine[N-]	1.00E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
7	Nitroso-di-n-propylamine[N-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Oxybis(1-chloropropane)[2,2'-]	1.00E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
7	Pentachlorophenol	1.00E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
7	Phenanthrene	1.00E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
7	Phenol	1.00E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
7	Pyrene	1.00E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
7	Pyridine	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Trichlorobenzene[1,2,4-]	1.00E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
7	Trichlorophenol[2,4,5-]	1.00E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
7	Trichlorophenol[2,4,6-]	1.00E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
7	Acetone	1.68E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
7	Benzene	3.35E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
7	Bromobenzene	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Bromochloromethane	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Bromodichloromethane	3.35E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
7	Bromoform	3.35E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
7	Bromomethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
7	Butanone[2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
7	Butylbenzene[n-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Butylbenzene[sec-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Butylbenzene[tert-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Carbon Disulfide	1.68E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
7	Carbon Tetrachloride	3.35E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
7	Chlorobenzene	3.35E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
7	Chlorodibromomethane	3.35E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
7	Chloroethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
7	Chloroform	3.35E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
7	Chloromethane	3.35E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
7	Chlorotoluene[2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Chlorotoluene[4-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dibromo-3-Chloropropane[1,2-]	5.03E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
7	Dibromoethane[1,2-]	3.35E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
7	Dibromomethane	3.35E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
7	Dichlorobenzene[1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
7	Dichlorobenzene[1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dichlorobenzene[1,4-]	3.35E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
7	Dichlorodifluoromethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
7	Dichloroethane[1,1-]	3.35E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
7	Dichloroethane[1,2-]	3.35E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
7	Dichloroethene[1,1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
7	Dichloroethene[cis-1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
7	Dichloroethene[trans-1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
7	Dichloropropane[1,2-]	3.35E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
7	Dichloropropane[1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dichloropropane[2,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dichloropropene[1,1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dichloropropene[cis-1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Dichloropropene[trans-1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Ethylbenzene	3.35E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
7	Hexanone[2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Iodomethane	1.68E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Isopropylbenzene	3.35E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
7	Isopropyltoluene[4-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Methyl-2-pentanone[4-]	1.68E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
7	Methylene Chloride	1.68E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
7	Propylbenzene[1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Styrene	3.35E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
7	Temperature	5.20E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Temperature	5.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Tetrachloroethane[1,1,1,2-]	3.35E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
7	Tetrachloroethane[1,1,2,2-]	3.35E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
7	Tetrachloroethene	3.35E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
7	Toluene	3.35E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
7	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
7	Trichloroethane[1,1,1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
7	Trichloroethane[1,1,2-]	3.35E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
7	Trichloroethene	3.35E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
7	Trichlorofluoromethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
7	Trichloropropane[1,2,3-]	3.35E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
7	Trimethylbenzene[1,2,4-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Trimethylbenzene[1,3,5-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
7	Vinyl Chloride	3.35E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
7	Xylene[1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	8.05E+02	FALSE	N/A	FALSE
7	Xylene[1,3-]+Xylene[1,4-]	6.71E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
8	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**1.13E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	**Heptachlorodibenzodioxins (Total)**	**1.13E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Heptachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Hexachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
8	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**9.66E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	9.97E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Pentachlorodibenzofuran[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Pentachlorodibenzofuran[2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Tetrachlorodibenzodioxin[2,3,7,8-]	9.97E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
8	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	**Tetrachlorodibenzofuran[2,3,7,8-]**	**1.44E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
8	**Tetrachlorodibenzofurans (Totals)**	**1.44E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	**Aluminum**	**3.96E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
8	Antimony	3.07E+00	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	TRUE
8	**Arsenic**	**8.66E-01**	mg/kg	**Y**	J	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
8	**Barium**	**4.71E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
8	**Beryllium**	**1.79E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
8	Cadmium	9.31E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
8	**Calcium**	**4.19E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
8	**Chromium**	**3.20E+01**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	TRUE
8	**Cobalt**	**8.95E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	TRUE
8	**Copper**	**2.54E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
8	**Iron**	**2.01E+04**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
8	**Lead**	**7.31E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
8	**Magnesium**	**2.31E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
8	**Manganese**	**2.44E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
8	Mercury	3.55E-03	mg/kg	N	U	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
8	**Nickel**	**1.01E+01**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
8	**Potassium**	**6.34E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
8	Selenium	3.57E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
8	Silver	5.76E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
8	**Sodium**	**2.86E+02**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
8	Thallium	1.39E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
8	**Vanadium**	**4.65E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	TRUE
8	**Zinc**	**3.95E+01**	mg/kg	**Y**	J+	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
8	2,4-Diamino-6-nitrotoluene	4.93E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	2,6-Diamino-4-nitrotoluene	6.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	3,5-Dinitroaniline	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Amino-2,6-dinitrotoluene[4-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Amino-4,6-dinitrotoluene[2-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dinitrobenzene[1,3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dinitrotoluene[2,4-]	1.48E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
8	Dinitrotoluene[2,6-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	**HMX**	**1.37E+00**	mg/kg	**Y**	NQ	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
8	Nitrobenzene	1.48E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
8	Nitrotoluene[2-]	1.48E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
8	Nitrotoluene[3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
8	Nitrotoluene[4-]	1.48E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
8	PETN	2.46E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	RDX	1.48E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
8	TATB	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Tetryl	1.48E-01	mg/kg	N	UJ	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
8	Trinitrobenzene[1,3,5-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
8	Trinitrotoluene[2,4,6-]	1.48E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
8	Tris (o-cresyl) phosphate	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Perchlorate	4.96E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
8	**Gross alpha**	**1.01E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	**Gross beta**	**2.36E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Plutonium-238	-3.76E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
8	Plutonium-239/240	1.13E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
8	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
8	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
8	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Benzo(a)anthracene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
8	Benzo(a)pyrene	1.01E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
8	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
8	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
8	Benzoic Acid	1.68E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	**Benzyl Alcohol**	**1.27E-01**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
8	Bis(2-ethylhexyl)phthalate	1.01E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
8	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
8	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
8	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
8	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Chrysene	1.01E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
8	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
8	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
8	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
8	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
8	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
8	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
8	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
8	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
8	Di-n-butylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
8	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	7.33E+01	FALSE	N/A	FALSE
8	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
8	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
8	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Fluoranthene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
8	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
8	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
8	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
8	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	U	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
8	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
8	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
8	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
8	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
8	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
8	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
8	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
8	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
8	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
8	Phenanthrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
8	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
8	Pyrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
8	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
8	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
8	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
8	Acetone	1.68E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
8	Benzene	3.35E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
8	Bromobenzene	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Bromochloromethane	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Bromodichloromethane	3.35E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
8	Bromoform	3.35E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
8	Bromomethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
8	Butanone[2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
8	Butylbenzene[n-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Butylbenzene[sec-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Butylbenzene[tert-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Carbon Disulfide	1.68E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
8	Carbon Tetrachloride	3.35E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
8	Chlorobenzene	3.35E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
8	Chlorodibromomethane	3.35E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
8	Chloroethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
8	Chloroform	3.35E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
8	Chloromethane	3.35E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
8	Chlorotoluene[2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Chlorotoluene[4-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dibromo-3-Chloropropane[1,2-]	5.04E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
8	Dibromoethane[1,2-]	3.35E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
8	Dibromomethane	3.35E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
8	Dichlorobenzene[1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
8	Dichlorobenzene[1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dichlorobenzene[1,4-]	3.35E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
8	Dichlorodifluoromethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
8	Dichloroethane[1,1-]	3.35E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
8	Dichloroethane[1,2-]	3.35E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
8	Dichloroethene[1,1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
8	Dichloroethene[cis-1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
8	Dichloroethene[trans-1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
8	Dichloropropane[1,2-]	3.35E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
8	Dichloropropane[1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dichloropropane[2,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dichloropropene[1,1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dichloropropene[cis-1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Dichloropropene[trans-1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Ethylbenzene	3.35E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
8	Hexanone[2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Iodomethane	1.68E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Isopropylbenzene	3.35E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
8	Isopropyltoluene[4-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Methyl-2-pentanone[4-]	1.68E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
8	Methylene Chloride	1.68E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
8	Propylbenzene[1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Styrene	3.35E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
8	Temperature	5.20E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Temperature	5.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Tetrachloroethane[1,1,1,2-]	3.35E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
8	Tetrachloroethane[1,1,2,2-]	3.35E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
8	Tetrachloroethene	3.35E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
8	Toluene	3.35E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
8	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
8	Trichloroethane[1,1,1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
8	Trichloroethane[1,1,2-]	3.35E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
8	Trichloroethene	3.35E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
8	Trichlorofluoromethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
8	Trichloropropane[1,2,3-]	3.35E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
8	Trimethylbenzene[1,2,4-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Trimethylbenzene[1,3,5-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
8	Vinyl Chloride	3.35E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
8	Xylene[1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	8.05E+02	FALSE	N/A	FALSE
8	Xylene[1,3-]+Xylene[1,4-]	6.72E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
9	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**6.07E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Heptachlorodibenzodioxins (Total)**	**6.07E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Heptachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Hexachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**3.91E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	9.96E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
9	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Pentachlorodibenzofuran[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Pentachlorodibenzofuran[2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Tetrachlorodibenzodioxin[2,3,7,8-]	9.96E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
9	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Tetrachlorodibenzofuran[2,3,7,8-]**	**1.06E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
9	Tetrachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Aluminum**	**4.10E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
9	Antimony	3.12E+00	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	TRUE
9	**Arsenic**	**7.81E-01**	mg/kg	**Y**	J	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
9	**Barium**	**4.55E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
9	**Beryllium**	**1.43E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
9	Cadmium	9.46E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
9	**Calcium**	**6.00E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
9	**Chromium**	**4.79E+01**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	TRUE
9	**Cobalt**	**6.65E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
9	**Copper**	**2.71E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
9	**Iron**	**1.71E+04**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
9	**Lead**	**9.07E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
9	**Magnesium**	**2.62E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
9	**Manganese**	**2.22E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
9	Mercury	3.90E-03	mg/kg	N	U	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
9	**Nickel**	**1.04E+01**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
9	**Potassium**	**7.58E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
9	Selenium	3.30E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
9	Silver	2.59E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
9	**Sodium**	**3.22E+02**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
9	Thallium	1.28E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
9	**Vanadium**	**3.39E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
9	**Zinc**	**3.65E+01**	mg/kg	**Y**	J+	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
9	2,4-Diamino-6-nitrotoluene	4.98E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	2,6-Diamino-4-nitrotoluene	6.57E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	3,5-Dinitroaniline	2.99E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Amino-2,6-dinitrotoluene[4-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Amino-4,6-dinitrotoluene[2-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dinitrobenzene[1,3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dinitrotoluene[2,4-]	1.49E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
9	Dinitrotoluene[2,6-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**HMX**	**2.95E-01**	mg/kg	**Y**	J	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
9	Nitrobenzene	1.49E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
9	Nitrotoluene[2-]	1.49E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
9	Nitrotoluene[3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
9	Nitrotoluene[4-]	1.49E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
9	PETN	2.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	RDX	1.49E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
9	TATB	2.99E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Tetryl	1.49E-01	mg/kg	N	UJ	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
9	Trinitrobenzene[1,3,5-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Trinitrotoluene[2,4,6-]	1.49E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
9	Tris (o-cresyl) phosphate	2.99E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
9	Perchlorate	4.97E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
9	**Gross alpha**	**7.22E+00**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Gross beta**	**2.19E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Plutonium-238	-4.05E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
9	Plutonium-239/240	-2.70E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
9	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
9	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
9	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Benzo(a)anthracene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
9	Benzo(a)pyrene	1.01E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
9	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
9	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
9	Benzoic Acid	1.68E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	**Benzyl Alcohol**	**1.60E-01**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
9	Bis(2-ethylhexyl)phthalate	1.38E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
9	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Butylbenzylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
9	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
9	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Chrysene	1.01E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
9	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
9	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
9	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
9	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
9	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
9	Diethylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
9	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
9	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
9	Di-n-butylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
9	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	7.33E+01	FALSE	N/A	FALSE
9	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
9	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
9	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Fluoranthene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
9	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
9	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
9	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
9	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	U	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
9	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
9	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
9	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
9	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
9	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
9	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
9	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
9	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
9	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
9	Phenanthrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
9	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
9	Pyrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
9	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
9	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
9	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
9	Acetone	1.68E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
9	Benzene	3.36E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
9	Bromobenzene	3.36E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Bromochloromethane	3.36E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
9	Bromodichloromethane	3.36E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
9	Bromoform	3.36E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
9	Bromomethane	3.36E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
9	Butanone[2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
9	Butylbenzene[n-]	3.36E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Butylbenzene[sec-]	3.36E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Butylbenzene[tert-]	3.36E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Carbon Disulfide	1.68E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
9	Carbon Tetrachloride	3.36E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
9	Chlorobenzene	3.36E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
9	Chlorodibromomethane	3.36E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
9	Chloroethane	3.36E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
9	Chloroform	3.36E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
9	Chloromethane	3.36E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
9	Chlorotoluene[2-]	3.36E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Chlorotoluene[4-]	3.36E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dibromo-3-Chloropropane[1,2-]	5.04E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
9	Dibromoethane[1,2-]	3.36E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
9	Dibromomethane	3.36E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
9	Dichlorobenzene[1,2-]	3.36E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
9	Dichlorobenzene[1,3-]	3.36E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dichlorobenzene[1,4-]	3.36E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
9	Dichlorodifluoromethane	3.36E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
9	Dichloroethane[1,1-]	3.36E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
9	Dichloroethane[1,2-]	3.36E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
9	Dichloroethene[1,1-]	3.36E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
9	Dichloroethene[cis-1,2-]	3.36E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
9	Dichloroethene[trans-1,2-]	3.36E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
9	Dichloropropane[1,2-]	3.36E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
9	Dichloropropane[1,3-]	3.36E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dichloropropane[2,2-]	3.36E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dichloropropene[1,1-]	3.36E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dichloropropene[cis-1,3-]	3.36E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Dichloropropene[trans-1,3-]	3.36E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Ethylbenzene	3.36E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
9	Hexanone[2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Iodomethane	1.68E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Isopropylbenzene	3.36E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
9	Isopropyltoluene[4-]	3.36E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Methyl-2-pentanone[4-]	1.68E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
9	Methylene Chloride	1.68E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
9	Propylbenzene[1-]	3.36E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Styrene	3.36E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
9	Temperature	5.20E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Temperature	5.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Tetrachloroethane[1,1,1,2-]	3.36E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
9	Tetrachloroethane[1,1,2,2-]	3.36E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
9	Tetrachloroethene	3.36E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
9	Toluene	3.36E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
9	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
9	Trichloroethane[1,1,1-]	3.36E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
9	Trichloroethane[1,1,2-]	3.36E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
9	Trichloroethene	3.36E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
9	Trichlorofluoromethane	3.36E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
9	Trichloropropane[1,2,3-]	3.36E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
9	Trimethylbenzene[1,2,4-]	3.36E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Trimethylbenzene[1,3,5-]	3.36E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
9	Vinyl Chloride	3.36E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
9	Xylene[1,2-]	3.36E-04	mg/kg	N	U	N/A	FALSE	8.05E+02	FALSE	N/A	FALSE
9	Xylene[1,3-]+Xylene[1,4-]	6.73E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
10	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**5.21E-06**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Heptachlorodibenzodioxins (Total)**	**1.04E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Heptachlorodibenzofuran[1,2,3,4,6,7,8-]**	**6.88E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Heptachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Hexachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**4.10E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]**	**1.18E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	Pentachlorodibenzofuran[1,2,3,7,8-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Pentachlorodibenzofuran[2,3,4,7,8-]	4.99E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Tetrachlorodibenzodioxin[2,3,7,8-]	9.97E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
10	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Tetrachlorodibenzofuran[2,3,7,8-]**	**5.50E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
10	**Tetrachlorodibenzofurans (Totals)**	**2.41E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Aluminum**	**4.13E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
10	Antimony	3.15E+00	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	TRUE
10	**Arsenic**	**7.59E-01**	mg/kg	**Y**	J	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
10	**Barium**	**8.86E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
10	**Beryllium**	**1.62E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
10	Cadmium	9.55E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
10	**Calcium**	**5.04E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
10	**Chromium**	**2.16E+01**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	TRUE
10	**Cobalt**	**6.60E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
10	**Copper**	**1.58E+02**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
10	**Iron**	**1.76E+04**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
10	**Lead**	**1.39E+01**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
10	**Magnesium**	**2.45E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
10	**Manganese**	**2.35E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
10	**Mercury**	**5.68E-02**	mg/kg	**Y**	NQ	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
10	**Nickel**	**8.75E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
10	**Potassium**	**6.88E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
10	Selenium	3.33E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
10	Silver	5.31E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	**Sodium**	**3.04E+02**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
10	Thallium	1.29E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
10	**Vanadium**	**4.29E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	TRUE
10	**Zinc**	**4.55E+01**	mg/kg	**Y**	J+	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
10	2,4-Diamino-6-nitrotoluene	5.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	2,6-Diamino-4-nitrotoluene	6.60E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	3,5-Dinitroaniline	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Amino-2,6-dinitrotoluene[4-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Amino-4,6-dinitrotoluene[2-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dinitrobenzene[1,3-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dinitrotoluene[2,4-]	1.50E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
10	Dinitrotoluene[2,6-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**HMX**	**1.14E+00**	mg/kg	**Y**	NQ	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
10	Nitrobenzene	1.50E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
10	Nitrotoluene[2-]	1.50E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
10	Nitrotoluene[3-]	1.50E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
10	Nitrotoluene[4-]	1.50E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
10	PETN	2.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	RDX	1.50E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
10	**TATB**	**1.06E+00**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Tetryl	1.50E-01	mg/kg	N	UJ	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
10	Trinitrobenzene[1,3,5-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Trinitrotoluene[2,4,6-]	1.50E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
10	Tris (o-cresyl) phosphate	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Perchlorate	4.98E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
10	**Gross alpha**	**1.22E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	**Gross beta**	**3.21E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Plutonium-238	1.01E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
10	Plutonium-239/240	1.15E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
10	Acenaphthene	1.00E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
10	Acenaphthylene	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Aniline	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Anthracene	1.00E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
10	Azobenzene	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Benzo(a)anthracene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
10	Benzo(a)pyrene	1.00E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
10	Benzo(b)fluoranthene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
10	Benzo(g,h,i)perylene	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Benzo(k)fluoranthene	1.00E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
10	Benzoic Acid	1.67E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Benzyl Alcohol**	**1.65E+00**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Bis(2-chloroethoxy)methane	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Bis(2-chloroethyl)ether	1.00E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
10	Bis(2-ethylhexyl)phthalate	3.05E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
10	Bromophenyl-phenylether[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Butylbenzylphthalate**	**3.21E-02**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Chloroaniline[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Chloronaphthalene[2-]	1.00E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
10	Chlorophenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
10	Chlorophenyl-phenyl[4-] Ether	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Chrysene	1.00E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	Dibenz(a,h)anthracene	1.00E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
10	Dibenzofuran	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dichlorobenzene[1,2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
10	Dichlorobenzene[1,3-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dichlorobenzene[1,4-]	1.00E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
10	Dichlorobenzidine[3,3'-]	1.00E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
10	Dichlorophenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
10	Diethylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
10	Dimethyl Phthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
10	Dimethylphenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
10	**Di-n-butylphthalate**	**2.48E-02**	mg/kg	**Y**	J	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
10	Dinitro-2-methylphenol[4,6-]	1.00E-01	mg/kg	N	U	N/A	FALSE	7.33E+01	FALSE	N/A	FALSE
10	Dinitrophenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
10	Dinitrotoluene[2,4-]	1.00E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
10	Dinitrotoluene[2,6-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Di-n-octylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Diphenylamine	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	**Fluoranthene**	**1.87E-02**	mg/kg	**Y**	J	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
10	Fluorene	1.00E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
10	Hexachlorobenzene	1.00E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
10	Hexachlorobutadiene	1.00E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
10	Hexachlorocyclopentadiene	1.00E-01	mg/kg	N	U	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
10	Hexachloroethane	1.00E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
10	Indeno(1,2,3-cd)pyrene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
10	Isophorone	1.00E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
10	Methylnaphthalene[2-]	1.00E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	Methylphenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Methylphenol[3-,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Naphthalene	1.00E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
10	Nitroaniline[2-]	1.10E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Nitroaniline[3-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Nitroaniline[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Nitrobenzene	1.00E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
10	Nitrophenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Nitrophenol[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Nitrosodimethylamine[N-]	1.00E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
10	Nitroso-di-n-propylamine[N-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Oxybis(1-chloropropane)[2,2'-]	1.00E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
10	Pentachlorophenol	1.00E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
10	Phenanthrene	1.00E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
10	Phenol	1.00E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
10	**Pyrene**	**1.61E-02**	mg/kg	**Y**	J	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
10	Pyridine	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Trichlorobenzene[1,2,4-]	1.00E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
10	Trichlorophenol[2,4,5-]	1.00E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
10	Trichlorophenol[2,4,6-]	1.00E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
10	Acetone	1.64E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
10	Benzene	3.28E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
10	Bromobenzene	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Bromochloromethane	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Bromodichloromethane	3.28E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
10	Bromoform	3.28E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	Bromomethane	3.28E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
10	Butanone[2-]	1.64E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
10	Butylbenzene[n-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Butylbenzene[sec-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Butylbenzene[tert-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Carbon Disulfide	1.64E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
10	Carbon Tetrachloride	3.28E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
10	Chlorobenzene	3.28E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
10	Chlorodibromomethane	3.28E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
10	Chloroethane	3.28E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
10	Chloroform	3.28E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
10	Chloromethane	3.28E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
10	Chlorotoluene[2-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Chlorotoluene[4-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dibromo-3-Chloropropane[1,2-]	4.93E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
10	Dibromoethane[1,2-]	3.28E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
10	Dibromomethane	3.28E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
10	Dichlorobenzene[1,2-]	3.28E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
10	Dichlorobenzene[1,3-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dichlorobenzene[1,4-]	3.28E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
10	Dichlorodifluoromethane	3.28E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
10	Dichloroethane[1,1-]	3.28E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
10	Dichloroethane[1,2-]	3.28E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
10	Dichloroethene[1,1-]	3.28E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
10	Dichloroethene[cis-1,2-]	3.28E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
10	Dichloroethene[trans-1,2-]	3.28E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	Dichloropropane[1,2-]	3.28E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
10	Dichloropropane[1,3-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dichloropropane[2,2-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dichloropropene[1,1-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dichloropropene[cis-1,3-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Dichloropropene[trans-1,3-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Ethylbenzene	3.28E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
10	Hexanone[2-]	1.64E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Iodomethane	1.64E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Isopropylbenzene	3.28E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
10	Isopropyltoluene[4-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Methyl-2-pentanone[4-]	1.64E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
10	Methylene Chloride	1.64E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
10	Propylbenzene[1-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Styrene	3.28E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
10	Temperature	5.20E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Temperature	5.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Tetrachloroethane[1,1,1,2-]	3.28E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
10	Tetrachloroethane[1,1,2,2-]	3.28E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
10	Tetrachloroethene	3.28E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
10	Toluene	3.28E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
10	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.64E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
10	Trichloroethane[1,1,1-]	3.28E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
10	Trichloroethane[1,1,2-]	3.28E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
10	Trichloroethene	3.28E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
10	Trichlorofluoromethane	3.28E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
10	Trichloropropane[1,2,3-]	3.28E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
10	Trimethylbenzene[1,2,4-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Trimethylbenzene[1,3,5-]	3.28E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
10	Vinyl Chloride	3.28E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
10	Xylene[1,2-]	3.28E-04	mg/kg	N	U	N/A	FALSE	8.05E+02	FALSE	N/A	FALSE
10	Xylene[1,3-]+Xylene[1,4-]	6.57E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
11	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**1.17E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Heptachlorodibenzodioxins (Total)**	**2.07E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Heptachlorodibenzofuran[1,2,3,4,6,7,8-]**	**1.10E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Heptachlorodibenzofurans (Total)**	**2.70E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Hexachlorodibenzodioxins (Total)**	**9.86E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Hexachlorodibenzofurans (Total)**	**7.05E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**9.57E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]**	**3.40E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Pentachlorodibenzofuran[1,2,3,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Pentachlorodibenzofuran[2,3,4,7,8-]	4.98E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
11	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Tetrachlorodibenzodioxin[2,3,7,8-]	9.96E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
11	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Tetrachlorodibenzofuran[2,3,7,8-]**	**5.60E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
11	Tetrachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Aluminum**	**4.37E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
11	Antimony	3.24E+00	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	TRUE
11	**Arsenic**	**8.85E-01**	mg/kg	**Y**	J	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
11	**Barium**	**3.93E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
11	**Beryllium**	**2.25E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
11	Cadmium	9.81E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
11	**Calcium**	**3.59E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
11	**Chromium**	**1.49E+01**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
11	**Cobalt**	**5.81E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
11	**Copper**	**6.42E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
11	**Iron**	**1.39E+04**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
11	**Lead**	**9.56E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
11	**Magnesium**	**3.16E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
11	**Manganese**	**2.05E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
11	**Mercury**	**1.31E-01**	mg/kg	**Y**	NQ	N/A	FALSE	2.38E+01	FALSE	1.00E-01	TRUE
11	**Nickel**	**8.35E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
11	**Potassium**	**6.09E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
11	Selenium	3.42E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
11	Silver	3.49E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
11	**Sodium**	**2.66E+02**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
11	Thallium	1.33E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
11	**Vanadium**	**2.80E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
11	**Zinc**	**6.25E+01**	mg/kg	**Y**	J+	N/A	FALSE	2.35E+04	FALSE	4.88E+01	TRUE
11	2,4-Diamino-6-nitrotoluene	4.95E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	2,6-Diamino-4-nitrotoluene	6.53E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	3,5-Dinitroaniline	2.97E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Amino-2,6-dinitrotoluene[4-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Amino-4,6-dinitrotoluene[2-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dinitrobenzene[1,3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dinitrotoluene[2,4-]	1.49E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
11	Dinitrotoluene[2,6-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**HMX**	**1.93E+00**	mg/kg	**Y**	NQ	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
11	Nitrobenzene	1.49E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
11	Nitrotoluene[2-]	1.49E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
11	Nitrotoluene[3-]	1.49E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
11	Nitrotoluene[4-]	1.49E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
11	PETN	2.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	RDX	1.49E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
11	**TATB**	**7.91E-01**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Tetryl	1.49E-01	mg/kg	N	UJ	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
11	Trinitrobenzene[1,3,5-]	1.49E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Trinitrotoluene[2,4,6-]	1.49E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
11	Tris (o-cresyl) phosphate	2.97E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Perchlorate	5.04E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
11	**Gross alpha**	**1.29E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Gross beta**	**2.77E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Plutonium-238	6.80E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
11	**Plutonium-239/240**	**4.62E-02**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
11	Acenaphthene	1.01E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
11	Acenaphthylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Aniline	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Anthracene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
11	Azobenzene	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Benzo(a)anthracene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
11	Benzo(a)pyrene	1.01E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
11	Benzo(b)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
11	Benzo(g,h,i)perylene	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Benzo(k)fluoranthene	1.01E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
11	Benzoic Acid	1.68E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Benzyl Alcohol**	**4.34E-01**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Bis(2-chloroethoxy)methane	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Bis(2-chloroethyl)ether	1.01E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
11	Bis(2-ethylhexyl)phthalate	1.48E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
11	Bromophenyl-phenylether[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	**Butylbenzylphthalate**	**6.35E-02**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Chloroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Chloronaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
11	Chlorophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
11	Chlorophenyl-phenyl[4-] Ether	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Chrysene	1.01E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
11	Dibenz(a,h)anthracene	1.01E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
11	Dibenzofuran	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
11	Dichlorobenzene[1,2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
11	Dichlorobenzene[1,3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dichlorobenzene[1,4-]	1.01E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
11	Dichlorobenzidine[3,3'-]	1.01E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
11	Dichlorophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
11	Diethylphthalate	1.28E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
11	Dimethyl Phthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
11	Dimethylphenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
11	**Di-n-butylphthalate**	**1.00E-01**	mg/kg	**Y**	NQ	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
11	Dinitro-2-methylphenol[4,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	7.33E+01	FALSE	N/A	FALSE
11	Dinitrophenol[2,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
11	Dinitrotoluene[2,4-]	1.01E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
11	Dinitrotoluene[2,6-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Di-n-octylphthalate	1.01E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Diphenylamine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Fluoranthene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
11	Fluorene	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
11	Hexachlorobenzene	1.01E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
11	Hexachlorobutadiene	1.01E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
11	Hexachlorocyclopentadiene	1.01E-01	mg/kg	N	U	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
11	Hexachloroethane	1.01E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
11	Indeno(1,2,3-cd)pyrene	1.01E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
11	Isophorone	1.01E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
11	Methylnaphthalene[2-]	1.01E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
11	Methylphenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Methylphenol[3-,4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
11	Naphthalene	1.01E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
11	Nitroaniline[2-]	1.11E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Nitroaniline[3-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Nitroaniline[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Nitrobenzene	1.01E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
11	Nitrophenol[2-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Nitrophenol[4-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Nitrosodimethylamine[N-]	1.01E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
11	Nitroso-di-n-propylamine[N-]	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Oxybis(1-chloropropane)[2,2'-]	1.01E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
11	Pentachlorophenol	1.01E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
11	Phenanthrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
11	Phenol	1.01E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
11	Pyrene	1.01E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
11	Pyridine	1.01E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Trichlorobenzene[1,2,4-]	1.01E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
11	Trichlorophenol[2,4,5-]	1.01E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
11	Trichlorophenol[2,4,6-]	1.01E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
11	Acetone	1.65E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
11	Benzene	3.29E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
11	Bromobenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Bromochloromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Bromodichloromethane	3.29E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
11	Bromoform	3.29E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
11	Bromomethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
11	Butanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
11	Butylbenzene[n-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Butylbenzene[sec-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Butylbenzene[tert-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Carbon Disulfide	1.65E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
11	Carbon Tetrachloride	3.29E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
11	Chlorobenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
11	Chlorodibromomethane	3.29E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
11	Chloroethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
11	Chloroform	3.29E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
11	Chloromethane	3.29E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
11	Chlorotoluene[2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Chlorotoluene[4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dibromo-3-Chloropropane[1,2-]	4.95E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
11	Dibromoethane[1,2-]	3.29E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
11	Dibromomethane	3.29E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
11	Dichlorobenzene[1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
11	Dichlorobenzene[1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dichlorobenzene[1,4-]	3.29E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
11	Dichlorodifluoromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
11	Dichloroethane[1,1-]	3.29E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
11	Dichloroethane[1,2-]	3.29E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
11	Dichloroethene[1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
11	Dichloroethene[cis-1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
11	Dichloroethene[trans-1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
11	Dichloropropane[1,2-]	3.29E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
11	Dichloropropane[1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
11	Dichloropropane[2,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dichloropropene[1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dichloropropene[cis-1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Dichloropropene[trans-1,3-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Ethylbenzene	3.29E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
11	Hexanone[2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Iodomethane	1.65E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Isopropylbenzene	3.29E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
11	Isopropyltoluene[4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Methyl-2-pentanone[4-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
11	Methylene Chloride	1.65E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
11	Propylbenzene[1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Styrene	3.29E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
11	Temperature	5.20E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Temperature	5.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Tetrachloroethane[1,1,1,2-]	3.29E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
11	Tetrachloroethane[1,1,2,2-]	3.29E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
11	Tetrachloroethene	3.29E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
11	Toluene	3.29E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
11	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.65E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
11	Trichloroethane[1,1,1-]	3.29E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
11	Trichloroethane[1,1,2-]	3.29E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
11	Trichloroethene	3.29E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
11	Trichlorofluoromethane	3.29E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
11	Trichloropropane[1,2,3-]	3.29E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
11	Trimethylbenzene[1,2,4-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
11	Trimethylbenzene[1,3,5-]	3.29E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
11	Vinyl Chloride	3.29E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
11	Xylene[1,2-]	3.29E-04	mg/kg	N	U	N/A	FALSE	8.05E+02	FALSE	N/A	FALSE
11	Xylene[1,3-]+Xylene[1,4-]	6.60E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
12	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**3.01E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Heptachlorodibenzodioxins (Total)**	**5.65E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	4.96E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.96E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Heptachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.96E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.96E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.96E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Hexachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.96E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.96E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.96E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.96E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Hexachlorodibenzofurans (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**2.49E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	9.93E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Pentachlorodibenzodioxin[1,2,3,7,8-]	4.96E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Pentachlorodibenzofuran[1,2,3,7,8-]	4.96E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Pentachlorodibenzofuran[2,3,4,7,8-]	4.96E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Tetrachlorodibenzodioxin[2,3,7,8-]	9.93E-08	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
12	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Tetrachlorodibenzofuran[2,3,7,8-]**	**3.75E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE
12	**Tetrachlorodibenzofurans (Totals)**	**3.75E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Aluminum**	**1.76E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
12	Antimony	3.08E+00	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	TRUE
12	**Arsenic**	**3.65E-01**	mg/kg	**Y**	J	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
12	**Barium**	**1.68E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
12	**Beryllium**	**2.05E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
12	Cadmium	9.34E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
12	**Calcium**	**5.88E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	FALSE
12	**Chromium**	**3.22E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
12	**Cobalt**	**2.25E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
12	**Copper**	**4.92E+00**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	FALSE
12	**Iron**	**9.03E+03**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
12	**Lead**	**7.11E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
12	**Magnesium**	**3.75E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
12	**Manganese**	**2.17E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
12	Mercury	3.77E-03	mg/kg	N	U	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
12	**Nickel**	**1.27E+00**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
12	**Potassium**	**3.74E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
12	Selenium	3.58E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
12	Silver	1.67E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
12	**Sodium**	**1.28E+02**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
12	Thallium	1.39E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
12	**Vanadium**	**1.14E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
12	**Zinc**	**3.86E+01**	mg/kg	**Y**	J+	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
12	2,4-Diamino-6-nitrotoluene	5.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	2,6-Diamino-4-nitrotoluene	6.60E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	3,5-Dinitroaniline	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Amino-2,6-dinitrotoluene[4-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Amino-4,6-dinitrotoluene[2-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dinitrobenzene[1,3-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dinitrotoluene[2,4-]	1.50E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
12	Dinitrotoluene[2,6-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	HMX	1.50E-01	mg/kg	N	U	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
12	Nitrobenzene	1.50E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
12	Nitrotoluene[2-]	1.50E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
12	Nitrotoluene[3-]	1.50E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
12	Nitrotoluene[4-]	1.50E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
12	PETN	2.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	RDX	1.50E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
12	TATB	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Tetryl	1.50E-01	mg/kg	N	UJ	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
12	Trinitrobenzene[1,3,5-]	1.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Trinitrotoluene[2,4,6-]	1.50E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
12	Tris (o-cresyl) phosphate	3.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Perchlorate	4.92E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
12	**Gross alpha**	**1.42E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	**Gross beta**	**3.67E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Plutonium-238	-5.36E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
12	Plutonium-239/240	2.01E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
12	Acenaphthene	1.00E-02	mg/kg	N	U	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
12	Acenaphthylene	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Aniline	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Anthracene	1.00E-02	mg/kg	N	U	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
12	Azobenzene	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Benzo(a)anthracene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
12	Benzo(a)pyrene	1.00E-02	mg/kg	N	U	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
12	Benzo(b)fluoranthene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
12	Benzo(g,h,i)perylene	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Benzo(k)fluoranthene	1.00E-02	mg/kg	N	U	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
12	Benzoic Acid	1.67E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Benzyl Alcohol	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Bis(2-chloroethoxy)methane	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Bis(2-chloroethyl)ether	1.00E-01	mg/kg	N	U	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
12	Bis(2-ethylhexyl)phthalate	1.00E-02	mg/kg	N	U	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
12	Bromophenyl-phenylether[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Butylbenzylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Chloroaniline[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Chloronaphthalene[2-]	1.00E-02	mg/kg	N	U	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
12	Chlorophenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
12	Chlorophenyl-phenyl[4-] Ether	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Chrysene	1.00E-02	mg/kg	N	U	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
12	Dibenz(a,h)anthracene	1.00E-02	mg/kg	N	U	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
12	Dibenzofuran	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dichlorobenzene[1,2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
12	Dichlorobenzene[1,3-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
12	Dichlorobenzene[1,4-]	1.00E-01	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
12	Dichlorobenzidine[3,3'-]	1.00E-01	mg/kg	N	U	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE
12	Dichlorophenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
12	Diethylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
12	Dimethyl Phthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
12	Dimethylphenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
12	Di-n-butylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
12	Dinitro-2-methylphenol[4,6-]	1.00E-01	mg/kg	N	U	N/A	FALSE	7.33E+01	FALSE	N/A	FALSE
12	Dinitrophenol[2,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
12	Dinitrotoluene[2,4-]	1.00E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
12	Dinitrotoluene[2,6-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Di-n-octylphthalate	1.00E-02	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Diphenylamine	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Fluoranthene	1.00E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
12	Fluorene	1.00E-02	mg/kg	N	U	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
12	Hexachlorobenzene	1.00E-01	mg/kg	N	U	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
12	Hexachlorobutadiene	1.00E-01	mg/kg	N	U	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
12	Hexachlorocyclopentadiene	1.00E-01	mg/kg	N	U	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
12	Hexachloroethane	1.00E-01	mg/kg	N	U	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
12	Indeno(1,2,3-cd)pyrene	1.00E-02	mg/kg	N	U	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
12	Isophorone	1.00E-01	mg/kg	N	U	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
12	Methylnaphthalene[2-]	1.00E-02	mg/kg	N	U	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
12	Methylphenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Methylphenol[3-,4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Naphthalene	1.00E-02	mg/kg	N	U	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
12	Nitroaniline[2-]	1.10E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
12	Nitroaniline[3-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Nitroaniline[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Nitrobenzene	1.00E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
12	Nitrophenol[2-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Nitrophenol[4-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Nitrosodimethylamine[N-]	1.00E-01	mg/kg	N	U	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
12	Nitroso-di-n-propylamine[N-]	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Oxybis(1-chloropropane)[2,2'-]	1.00E-01	mg/kg	N	U	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
12	Pentachlorophenol	1.00E-01	mg/kg	N	U	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
12	Phenanthrene	1.00E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
12	Phenol	1.00E-01	mg/kg	N	U	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
12	Pyrene	1.00E-02	mg/kg	N	U	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
12	Pyridine	1.00E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Trichlorobenzene[1,2,4-]	1.00E-01	mg/kg	N	U	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
12	Trichlorophenol[2,4,5-]	1.00E-01	mg/kg	N	U	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
12	Trichlorophenol[2,4,6-]	1.00E-01	mg/kg	N	U	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
12	Acetone	1.67E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
12	Benzene	3.34E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
12	Bromobenzene	3.34E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Bromochloromethane	3.34E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Bromodichloromethane	3.34E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
12	Bromoform	3.34E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
12	Bromomethane	3.34E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
12	Butanone[2-]	1.67E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
12	Butylbenzene[n-]	3.34E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Butylbenzene[sec-]	3.34E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
12	Butylbenzene[tert-]	3.34E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Carbon Disulfide	1.67E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
12	Carbon Tetrachloride	3.34E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
12	Chlorobenzene	3.34E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
12	Chlorodibromomethane	3.34E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
12	Chloroethane	3.34E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
12	Chloroform	3.34E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
12	Chloromethane	3.34E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
12	Chlorotoluene[2-]	3.34E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Chlorotoluene[4-]	3.34E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dibromo-3-Chloropropane[1,2-]	5.02E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
12	Dibromoethane[1,2-]	3.34E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
12	Dibromomethane	3.34E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
12	Dichlorobenzene[1,2-]	3.34E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
12	Dichlorobenzene[1,3-]	3.34E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dichlorobenzene[1,4-]	3.34E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
12	Dichlorodifluoromethane	3.34E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
12	Dichloroethane[1,1-]	3.34E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
12	Dichloroethane[1,2-]	3.34E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
12	Dichloroethene[1,1-]	3.34E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
12	Dichloroethene[cis-1,2-]	3.34E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
12	Dichloroethene[trans-1,2-]	3.34E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
12	Dichloropropane[1,2-]	3.34E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
12	Dichloropropane[1,3-]	3.34E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dichloropropane[2,2-]	3.34E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dichloropropene[1,1-]	3.34E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
12	Dichloropropene[cis-1,3-]	3.34E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Dichloropropene[trans-1,3-]	3.34E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Ethylbenzene	3.34E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
12	Hexanone[2-]	1.67E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Iodomethane	1.67E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Isopropylbenzene	3.34E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
12	Isopropyltoluene[4-]	3.34E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Methyl-2-pentanone[4-]	1.67E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
12	Methylene Chloride	1.67E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
12	Propylbenzene[1-]	3.34E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Styrene	3.34E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
12	Temperature	5.20E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Temperature	5.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Tetrachloroethane[1,1,1,2-]	3.34E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
12	Tetrachloroethane[1,1,2,2-]	3.34E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
12	Tetrachloroethene	3.34E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
12	Toluene	3.34E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
12	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.67E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
12	Trichloroethane[1,1,1-]	3.34E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
12	Trichloroethane[1,1,2-]	3.34E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
12	Trichloroethene	3.34E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
12	Trichlorofluoromethane	3.34E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
12	Trichloropropane[1,2,3-]	3.34E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
12	Trimethylbenzene[1,2,4-]	3.34E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Trimethylbenzene[1,3,5-]	3.34E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
12	Vinyl Chloride	3.34E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
12	Xylene[1,2-]	3.34E-04	mg/kg	N	U	N/A	FALSE	8.05E+02	FALSE	N/A	FALSE
12	Xylene[1,3-]+Xylene[1,4-]	6.70E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE
1 dup	**Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]**	**9.83E-06**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	**Heptachlorodibenzodioxins (Total)**	**1.76E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	**Heptachlorodibenzofuran[1,2,3,4,6,7,8-]**	**1.00E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	**Heptachlorodibenzofurans (Total)**	**3.22E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	**Hexachlorodibenzodioxins (Total)**	**1.10E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Hexachlorodibenzofuran[1,2,3,4,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Hexachlorodibenzofuran[1,2,3,6,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Hexachlorodibenzofuran[1,2,3,7,8,9-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Hexachlorodibenzofuran[2,3,4,6,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	**Hexachlorodibenzofurans (Total)**	**6.26E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	**Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]**	**8.89E-05**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	**Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]**	**2.73E-06**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Pentachlorodibenzodioxin[1,2,3,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Pentachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Pentachlorodibenzofuran[1,2,3,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Pentachlorodibenzofuran[2,3,4,7,8-]	5.02E-07	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Pentachlorodibenzofurans (Totals)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Tetrachlorodibenzodioxin[2,3,7,8-]	1.00E-07	mg/kg	N	U	4.90E-05	FALSE	5.06E-05	FALSE	N/A	FALSE
1 dup	Tetrachlorodibenzodioxins (Total)	0.00E+00	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	**Tetrachlorodibenzofuran[2,3,7,8-]**	**3.63E-07**	mg/kg	**Y**	J	4.90E-04	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1 dup	**Tetrachlorodibenzofurans (Totals)**	**3.63E-07**	mg/kg	**Y**	J	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	**Aluminum**	**4.67E+03**	mg/kg	**Y**	NQ	N/A	FALSE	7.80E+04	FALSE	2.92E+04	FALSE
1 dup	Antimony	3.13E-01	mg/kg	N	U	N/A	FALSE	3.13E+01	FALSE	8.30E-01	FALSE
1 dup	**Arsenic**	**8.18E-01**	mg/kg	**Y**	J	7.07E+00	FALSE	1.30E+01	FALSE	8.17E+00	FALSE
1 dup	**Barium**	**5.37E+01**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+04	FALSE	2.95E+02	FALSE
1 dup	**Beryllium**	**1.91E-01**	mg/kg	**Y**	NQ	6.44E+04	FALSE	1.56E+02	FALSE	1.83E+00	FALSE
1 dup	Cadmium	9.48E-02	mg/kg	N	U	8.59E+04	FALSE	7.05E+01	FALSE	4.00E-01	FALSE
1 dup	**Calcium**	**7.16E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.30E+07	FALSE	6.12E+03	TRUE
1 dup	**Chromium**	**9.63E+00**	mg/kg	**Y**	NQ	9.66E+01	FALSE	4.52E+04	FALSE	1.93E+01	FALSE
1 dup	**Cobalt**	**5.17E+00**	mg/kg	**Y**	NQ	1.72E+04	FALSE	2.34E+01	FALSE	8.64E+00	FALSE
1 dup	**Copper**	**5.15E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.13E+03	FALSE	1.47E+01	TRUE
1 dup	**Iron**	**1.50E+04**	mg/kg	**Y**	NQ	N/A	FALSE	5.48E+04	FALSE	2.15E+04	FALSE
1 dup	**Lead**	**7.04E+00**	mg/kg	**Y**	NQ	N/A	FALSE	4.00E+02	FALSE	2.23E+01	FALSE
1 dup	**Magnesium**	**3.40E+03**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	4.61E+03	FALSE
1 dup	**Manganese**	**2.16E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.05E+04	FALSE	6.71E+02	FALSE
1 dup	**Mercury**	**8.37E-02**	mg/kg	**Y**	NQ	N/A	FALSE	2.38E+01	FALSE	1.00E-01	FALSE
1 dup	**Nickel**	**1.38E+01**	mg/kg	**Y**	NQ	5.95E+05	FALSE	1.56E+03	FALSE	1.54E+01	FALSE
1 dup	**Potassium**	**6.20E+02**	mg/kg	**Y**	NQ	N/A	FALSE	1.56E+07	FALSE	3.46E+03	FALSE
1 dup	Selenium	3.43E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.52E+00	FALSE
1 dup	Silver	3.02E-01	mg/kg	N	U	N/A	FALSE	3.91E+02	FALSE	1.00E+00	FALSE
1 dup	**Sodium**	**3.99E+02**	mg/kg	**Y**	NQ	N/A	FALSE	7.82E+06	FALSE	9.15E+02	FALSE
1 dup	Thallium	1.33E-01	mg/kg	N	U	N/A	FALSE	7.82E-01	FALSE	7.30E-01	FALSE
1 dup	**Vanadium**	**2.36E+01**	mg/kg	**Y**	NQ	N/A	FALSE	3.94E+02	FALSE	3.96E+01	FALSE
1 dup	**Zinc**	**3.73E+01**	mg/kg	**Y**	J+	N/A	FALSE	2.35E+04	FALSE	4.88E+01	FALSE
1 dup	2,4-Diamino-6-nitrotoluene	4.93E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	2,6-Diamino-4-nitrotoluene	6.50E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1 dup	3,5-Dinitroaniline	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Amino-2,6-dinitrotoluene[4-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Amino-4,6-dinitrotoluene[2-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dinitrobenzene[1,3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dinitrotoluene[2,4-]	1.48E-01	mg/kg	N	U	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
1 dup	Dinitrotoluene[2,6-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	HMX	1.48E-01	mg/kg	N	U	N/A	FALSE	3.85E+03	FALSE	N/A	FALSE
1 dup	Nitrobenzene	1.48E-01	mg/kg	N	U	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
1 dup	Nitrotoluene[2-]	1.48E-01	mg/kg	N	U	3.16E+01	FALSE	7.04E+01	FALSE	N/A	FALSE
1 dup	Nitrotoluene[3-]	1.48E-01	mg/kg	N	U	N/A	FALSE	6.16E+00	FALSE	N/A	FALSE
1 dup	Nitrotoluene[4-]	1.48E-01	mg/kg	N	U	3.33E+02	FALSE	2.47E+02	FALSE	N/A	FALSE
1 dup	PETN	2.46E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	RDX	1.48E-01	mg/kg	N	U	8.31E+01	FALSE	3.01E+02	FALSE	N/A	FALSE
1 dup	**TATB**	**4.31E+00**	mg/kg	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Tetryl	1.48E-01	mg/kg	N	UJ	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
1 dup	Trinitrobenzene[1,3,5-]	1.48E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Trinitrotoluene[2,4,6-]	1.48E-01	mg/kg	N	U	2.11E+02	FALSE	3.60E+01	FALSE	N/A	FALSE
1 dup	Tris (o-cresyl) phosphate	2.96E-01	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Perchlorate	4.86E-04	mg/kg	N	U	N/A	FALSE	5.48E+01	FALSE	N/A	FALSE
1 dup	**Gross alpha**	**7.77E+00**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	**Gross beta**	**2.70E+01**	pCi/g	**Y**	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Plutonium-238	1.68E-02	pCi/g	N	U	N/A	FALSE	N/A	FALSE	2.30E-02	FALSE
1 dup	Plutonium-239/240	3.05E-03	pCi/g	N	U	N/A	FALSE	N/A	FALSE	5.40E-02	FALSE
1 dup	Acenaphthene	1.00E-02	mg/kg	N	UJ	N/A	FALSE	3.48E+03	FALSE	N/A	FALSE
1 dup	Acenaphthylene	1.00E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Aniline	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1 dup	Anthracene	1.00E-02	mg/kg	N	UJ	N/A	FALSE	1.74E+04	FALSE	N/A	FALSE
1 dup	Azobenzene	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Benzo(a)anthracene	1.00E-02	mg/kg	N	UJ	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Benzo(a)pyrene	1.00E-02	mg/kg	N	UJ	1.12E+00	FALSE	1.74E+01	FALSE	N/A	FALSE
1 dup	Benzo(b)fluoranthene	1.00E-02	mg/kg	N	UJ	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Benzo(g,h,i)perylene	1.00E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Benzo(k)fluoranthene	1.00E-02	mg/kg	N	UJ	1.53E+01	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Benzoic Acid	1.67E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Benzyl Alcohol	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Bis(2-chloroethoxy)methane	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Bis(2-chloroethyl)ether	1.00E-01	mg/kg	N	UJ	3.11E+00	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Bis(2-ethylhexyl)phthalate	1.00E-02	mg/kg	N	UJ	3.80E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
1 dup	Bromophenyl-phenylether[4-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Butylbenzylphthalate	1.00E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Chloro-3-methylphenol[4-]	1.34E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Chloroaniline[4-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Chloronaphthalene[2-]	1.00E-02	mg/kg	N	UJ	N/A	FALSE	6.26E+03	FALSE	N/A	FALSE
1 dup	Chlorophenol[2-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	3.91E+02	FALSE	N/A	FALSE
1 dup	Chlorophenyl-phenyl[4-] Ether	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Chrysene	1.00E-02	mg/kg	N	UJ	1.53E+02	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dibenz(a,h)anthracene	1.00E-02	mg/kg	N	UJ	1.53E-01	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dibenzofuran	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dichlorobenzene[1,2-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
1 dup	Dichlorobenzene[1,3-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dichlorobenzene[1,4-]	1.00E-01	mg/kg	N	UJ	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
1 dup	Dichlorobenzidine[3,3'-]	1.00E-01	mg/kg	N	UJ	1.18E+01	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1 dup	Dichlorophenol[2,4-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	1.85E+02	FALSE	N/A	FALSE
1 dup	Diethylphthalate	1.00E-02	mg/kg	N	UJ	N/A	FALSE	4.93E+04	FALSE	N/A	FALSE
1 dup	Dimethyl Phthalate	1.00E-02	mg/kg	N	UJ	N/A	FALSE	6.16E+04	FALSE	N/A	FALSE
1 dup	Dimethylphenol[2,4-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
1 dup	**Di-n-butylphthalate**	**5.46E-02**	mg/kg	**Y**	J-	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
1 dup	Dinitro-2-methylphenol[4,6-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	7.33E+01	FALSE	N/A	FALSE
1 dup	Dinitrophenol[2,4-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	1.23E+02	FALSE	N/A	FALSE
1 dup	Dinitrotoluene[2,4-]	1.00E-01	mg/kg	N	UJ	1.71E+01	FALSE	1.23E+02	FALSE	N/A	FALSE
1 dup	Dinitrotoluene[2,6-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Di-n-octylphthalate	1.00E-02	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Diphenylamine	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Fluoranthene	1.00E-02	mg/kg	N	UJ	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
1 dup	Fluorene	1.00E-02	mg/kg	N	UJ	N/A	FALSE	2.32E+03	FALSE	N/A	FALSE
1 dup	Hexachlorobenzene	1.00E-01	mg/kg	N	UJ	3.33E+00	FALSE	4.93E+01	FALSE	N/A	FALSE
1 dup	Hexachlorobutadiene	1.00E-01	mg/kg	N	UJ	6.83E+01	FALSE	6.16E+01	FALSE	N/A	FALSE
1 dup	Hexachlorocyclopentadiene	1.00E-01	mg/kg	N	UJ	N/A	FALSE	2.30E+00	FALSE	N/A	FALSE
1 dup	Hexachloroethane	1.00E-01	mg/kg	N	UJ	1.33E+02	FALSE	4.31E+01	FALSE	N/A	FALSE
1 dup	Indeno(1,2,3-cd)pyrene	1.00E-02	mg/kg	N	UJ	1.53E+00	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Isophorone	1.00E-01	mg/kg	N	UJ	5.61E+03	FALSE	1.23E+04	FALSE	N/A	FALSE
1 dup	Methylnaphthalene[2-]	1.00E-02	mg/kg	N	UJ	N/A	FALSE	2.32E+02	FALSE	N/A	FALSE
1 dup	Methylphenol[2-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Methylphenol[3-,4-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Naphthalene	1.00E-02	mg/kg	N	UJ	4.97E+01	FALSE	1.62E+02	FALSE	N/A	FALSE
1 dup	Nitroaniline[2-]	1.11E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Nitroaniline[3-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Nitroaniline[4-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1 dup	Nitrobenzene	1.00E-01	mg/kg	N	UJ	6.04E+01	FALSE	1.31E+02	FALSE	N/A	FALSE
1 dup	Nitrophenol[2-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Nitrophenol[4-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Nitrosodimethylamine[N-]	1.00E-01	mg/kg	N	UJ	2.34E-02	TRUE	4.93E-01	FALSE	N/A	FALSE
1 dup	Nitroso-di-n-propylamine[N-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Oxybis(1-chloropropane)[2,2'-]	1.00E-01	mg/kg	N	UJ	9.93E+01	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Pentachlorophenol	1.00E-01	mg/kg	N	UJ	9.85E+00	FALSE	2.34E+02	FALSE	N/A	FALSE
1 dup	Phenanthrene	1.00E-02	mg/kg	N	UJ	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
1 dup	Phenol	1.00E-01	mg/kg	N	UJ	N/A	FALSE	1.85E+04	FALSE	N/A	FALSE
1 dup	Pyrene	1.00E-02	mg/kg	N	UJ	N/A	FALSE	1.74E+03	FALSE	N/A	FALSE
1 dup	Pyridine	1.00E-01	mg/kg	N	UJ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Trichlorobenzene[1,2,4-]	1.00E-01	mg/kg	N	UJ	2.40E+02	FALSE	8.29E+01	FALSE	N/A	FALSE
1 dup	Trichlorophenol[2,4,5-]	1.00E-01	mg/kg	N	UJ	N/A	FALSE	6.16E+03	FALSE	N/A	FALSE
1 dup	Trichlorophenol[2,4,6-]	1.00E-01	mg/kg	N	UJ	4.84E+02	FALSE	6.16E+01	FALSE	N/A	FALSE
1 dup	Acetone	1.68E-03	mg/kg	N	U	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
1 dup	Benzene	3.35E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
1 dup	Bromobenzene	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Bromochloromethane	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Bromodichloromethane	3.35E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
1 dup	Bromoform	3.35E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
1 dup	Bromomethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
1 dup	Butanone[2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
1 dup	Butylbenzene[n-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Butylbenzene[sec-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Butylbenzene[tert-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Carbon Disulfide	1.68E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1 dup	Carbon Tetrachloride	3.35E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
1 dup	Chlorobenzene	3.35E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
1 dup	Chlorodibromomethane	3.35E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
1 dup	Chloroethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
1 dup	Chloroform	3.35E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
1 dup	Chloromethane	3.35E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
1 dup	Chlorotoluene[2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Chlorotoluene[4-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dibromo-3-Chloropropane[1,2-]	5.03E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
1 dup	Dibromoethane[1,2-]	3.35E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
1 dup	Dibromomethane	3.35E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
1 dup	Dichlorobenzene[1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
1 dup	Dichlorobenzene[1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dichlorobenzene[1,4-]	3.35E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE
1 dup	Dichlorodifluoromethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
1 dup	Dichloroethane[1,1-]	3.35E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
1 dup	Dichloroethane[1,2-]	3.35E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
1 dup	Dichloroethene[1,1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
1 dup	Dichloroethene[cis-1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
1 dup	Dichloroethene[trans-1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
1 dup	Dichloropropane[1,2-]	3.35E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
1 dup	Dichloropropane[1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dichloropropane[2,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dichloropropene[1,1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dichloropropene[cis-1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Dichloropropene[trans-1,3-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
1 dup	Ethylbenzene	3.35E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
1 dup	Hexanone[2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Iodomethane	1.68E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Isopropylbenzene	3.35E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
1 dup	Isopropyltoluene[4-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Methyl-2-pentanone[4-]	1.68E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
1 dup	Methylene Chloride	1.68E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
1 dup	Propylbenzene[1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Styrene	3.35E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
1 dup	Temperature	5.20E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Temperature	5.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Tetrachloroethane[1,1,1,2-]	3.35E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
1 dup	Tetrachloroethane[1,1,2,2-]	3.35E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
1 dup	Tetrachloroethene	3.35E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
1 dup	Toluene	3.35E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE
1 dup	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.68E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
1 dup	Trichloroethane[1,1,1-]	3.35E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
1 dup	Trichloroethane[1,1,2-]	3.35E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
1 dup	Trichloroethene	3.35E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
1 dup	Trichlorofluoromethane	3.35E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
1 dup	Trichloropropane[1,2,3-]	3.35E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
1 dup	Trimethylbenzene[1,2,4-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Trimethylbenzene[1,3,5-]	3.35E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
1 dup	Vinyl Chloride	3.35E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
1 dup	Xylene[1,2-]	3.35E-04	mg/kg	N	U	N/A	FALSE	8.05E+02	FALSE	N/A	FALSE
1 dup	Xylene[1,3-]+Xylene[1,4-]	6.71E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
Trip Blank	**Acetone**	**3.05E-02**	mg/kg	**Y**	J-	N/A	FALSE	6.63E+04	FALSE	N/A	FALSE
Trip Blank	Benzene	3.33E-04	mg/kg	N	U	1.78E+01	FALSE	1.14E+02	FALSE	N/A	FALSE
Trip Blank	Bromobenzene	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Bromochloromethane	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Bromodichloromethane	3.33E-04	mg/kg	N	U	6.19E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
Trip Blank	Bromoform	3.33E-04	mg/kg	N	U	6.74E+02	FALSE	1.23E+03	FALSE	N/A	FALSE
Trip Blank	Bromomethane	3.33E-04	mg/kg	N	U	N/A	FALSE	1.77E+01	FALSE	N/A	FALSE
Trip Blank	**Butanone[2-]**	**2.89E-03**	mg/kg	**Y**	J-	N/A	FALSE	3.74E+04	FALSE	N/A	FALSE
Trip Blank	Butylbenzene[n-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Butylbenzene[sec-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Butylbenzene[tert-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Carbon Disulfide	1.67E-03	mg/kg	N	U	N/A	FALSE	1.55E+03	FALSE	N/A	FALSE
Trip Blank	Carbon Tetrachloride	3.33E-04	mg/kg	N	U	1.07E+01	FALSE	1.44E+02	FALSE	N/A	FALSE
Trip Blank	Chlorobenzene	3.33E-04	mg/kg	N	U	N/A	FALSE	3.78E+02	FALSE	N/A	FALSE
Trip Blank	Chlorodibromomethane	3.33E-04	mg/kg	N	U	1.39E+01	FALSE	1.23E+03	FALSE	N/A	FALSE
Trip Blank	Chloroethane	3.33E-04	mg/kg	N	U	N/A	FALSE	1.90E+04	FALSE	N/A	FALSE
Trip Blank	Chloroform	3.33E-04	mg/kg	N	U	5.90E+00	FALSE	3.06E+02	FALSE	N/A	FALSE
Trip Blank	Chloromethane	3.33E-04	mg/kg	N	U	4.11E+01	FALSE	2.68E+02	FALSE	N/A	FALSE
Trip Blank	Chlorotoluene[2-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Chlorotoluene[4-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Dibromo-3-Chloropropane[1,2-]	5.00E-04	mg/kg	N	U	8.58E-02	FALSE	5.88E+00	FALSE	N/A	FALSE
Trip Blank	Dibromoethane[1,2-]	3.33E-04	mg/kg	N	U	6.72E-01	FALSE	1.35E+02	FALSE	N/A	FALSE
Trip Blank	Dibromomethane	3.33E-04	mg/kg	N	U	N/A	FALSE	5.79E+01	FALSE	N/A	FALSE
Trip Blank	Dichlorobenzene[1,2-]	3.33E-04	mg/kg	N	U	N/A	FALSE	2.15E+03	FALSE	N/A	FALSE
Trip Blank	Dichlorobenzene[1,3-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Dichlorobenzene[1,4-]	3.33E-04	mg/kg	N	U	1.29E+03	FALSE	5.48E+03	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
Trip Blank	Dichlorodifluoromethane	3.33E-04	mg/kg	N	U	N/A	FALSE	1.82E+02	FALSE	N/A	FALSE
Trip Blank	Dichloroethane[1,1-]	3.33E-04	mg/kg	N	U	7.86E+01	FALSE	1.56E+04	FALSE	N/A	FALSE
Trip Blank	Dichloroethane[1,2-]	3.33E-04	mg/kg	N	U	8.32E+00	FALSE	5.56E+01	FALSE	N/A	FALSE
Trip Blank	Dichloroethene[1,1-]	3.33E-04	mg/kg	N	U	N/A	FALSE	4.40E+02	FALSE	N/A	FALSE
Trip Blank	Dichloroethene[cis-1,2-]	3.33E-04	mg/kg	N	U	N/A	FALSE	1.56E+02	FALSE	N/A	FALSE
Trip Blank	Dichloroethene[trans-1,2-]	3.33E-04	mg/kg	N	U	N/A	FALSE	2.95E+02	FALSE	N/A	FALSE
Trip Blank	Dichloropropane[1,2-]	3.33E-04	mg/kg	N	U	1.78E+01	FALSE	2.90E+01	FALSE	N/A	FALSE
Trip Blank	Dichloropropane[1,3-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Dichloropropane[2,2-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Dichloropropene[1,1-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Dichloropropene[cis-1,3-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Dichloropropene[trans-1,3-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Ethylbenzene	3.33E-04	mg/kg	N	U	7.51E+01	FALSE	3.93E+03	FALSE	N/A	FALSE
Trip Blank	Hexanone[2-]	1.67E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Iodomethane	1.67E-03	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Isopropylbenzene	3.33E-04	mg/kg	N	U	N/A	FALSE	2.36E+03	FALSE	N/A	FALSE
Trip Blank	Isopropyltoluene[4-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Methyl-2-pentanone[4-]	1.67E-03	mg/kg	N	U	N/A	FALSE	5.81E+03	FALSE	N/A	FALSE
Trip Blank	Methylene Chloride	1.67E-03	mg/kg	N	U	7.66E+02	FALSE	4.09E+02	FALSE	N/A	FALSE
Trip Blank	Propylbenzene[1-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Styrene	3.33E-04	mg/kg	N	U	N/A	FALSE	7.26E+03	FALSE	N/A	FALSE
Trip Blank	Temperature	5.00E+00	deg C	Y	NQ	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Tetrachloroethane[1,1,1,2-]	3.33E-04	mg/kg	N	U	2.81E+01	FALSE	2.35E+03	FALSE	N/A	FALSE
Trip Blank	Tetrachloroethane[1,1,2,2-]	3.33E-04	mg/kg	N	U	7.98E+00	FALSE	1.56E+03	FALSE	N/A	FALSE
Trip Blank	Tetrachloroethene	3.33E-04	mg/kg	N	U	3.37E+02	FALSE	1.11E+02	FALSE	N/A	FALSE
Trip Blank	Toluene	3.33E-04	mg/kg	N	U	N/A	FALSE	5.23E+03	FALSE	N/A	FALSE

Table 1. TA-39-6 2018 Analytical Data Summary (continued)

Sample Location	Parameter Name	Report Result	Report Units	Detected	Validation Qualifier	Residential Soil, Cancer (mg/kg)	Residential Soil, Cancer Comparison	Residential Soil, Noncancer (mg/kg)	Residential Soil, Noncancer Comparison	Background Concentration	Background Comparison
Trip Blank	Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.67E-03	mg/kg	N	U	N/A	FALSE	5.08E+04	FALSE	N/A	FALSE
Trip Blank	Trichloroethane[1,1,1-]	3.33E-04	mg/kg	N	U	N/A	FALSE	1.44E+04	FALSE	N/A	FALSE
Trip Blank	Trichloroethane[1,1,2-]	3.33E-04	mg/kg	N	U	1.88E+01	FALSE	2.61E+00	FALSE	N/A	FALSE
Trip Blank	Trichloroethene	3.33E-04	mg/kg	N	U	1.55E+01	FALSE	6.77E+00	FALSE	N/A	FALSE
Trip Blank	Trichlorofluoromethane	3.33E-04	mg/kg	N	U	N/A	FALSE	1.23E+03	FALSE	N/A	FALSE
Trip Blank	Trichloropropane[1,2,3-]	3.33E-04	mg/kg	N	U	5.10E-02	FALSE	7.09E+00	FALSE	N/A	FALSE
Trip Blank	Trimethylbenzene[1,2,4-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Trimethylbenzene[1,3,5-]	3.33E-04	mg/kg	N	U	N/A	FALSE	N/A	FALSE	N/A	FALSE
Trip Blank	Vinyl Chloride	3.33E-04	mg/kg	N	U	7.42E-01	FALSE	1.13E+02	FALSE	N/A	FALSE
Trip Blank	Xylene[1,2-]	3.33E-04	mg/kg	N	U	N/A	FALSE	8.05E+02	FALSE	N/A	FALSE
Trip Blank	Xylene[1,3-]+Xylene[1,4-]	6.67E-04	mg/kg	N	U	N/A	FALSE	7.64E+02	FALSE	N/A	FALSE

BOLD TEXT Constituent detected above the detection limit, but below the select soil screening limit

Highlighted “TRUE” value – constituent detected above either the selected soil screening level or above the background value

Attachment 13

Revised Supplement 4-7,
Open Detonation Unit at Technical Area 36
Human Health and Ecological Risk Screening Assessments

OPEN DETONATION UNIT AT TECHNICAL AREA 36
HUMAN HEALTH AND ECOLOGICAL RISK-SCREENING ASSESSMENTS

May 11, 2022

Prepared by:
TerranearPMC
222 Valley Creek Blvd Exton, PA 19341

For:
Waste Management Programs
Environmental Protection and Compliance Division
Los Alamos National Laboratory
P.O. Box 1663 MS M969, Los Alamos, NM 87545

EXECUTIVE SUMMARY

The area around the open detonation (OD) area Technical Area (TA) 36 (the TA-36 OD Unit) within the Los Alamos National Laboratory (LANL) was sampled as part of the application process for a Resource Conservation and Recovery Act (RCRA) permit to perform hazardous waste treatment operations. The TA-36 OD Unit is referred to as "the Unit" in the remainder of this risk assessment. Surface soil samples were collected in September 2018 and analyzed for inorganic and organic compounds. Data from these samples were used to conduct human health and ecological risk-screening assessments to determine whether hazardous contaminants from ongoing treatment operations are being released into the soil at levels that pose an unacceptable risk to human health or the environment.

Screening criteria for these assessments require that residential, industrial, and construction worker exposure scenarios be evaluated, despite that the TA-36 OD Unit is not located at a residential location. For the human health risk-screening assessment, a hypothetical future resident, industrial, and construction worker exposure scenarios were evaluated by comparing the maximum exposure point concentration for each analyte to the New Mexico Environment Department (NMED) soil screening levels (NMSSLs). The following conclusions are made:

- **Detected inorganics were compared to background values (BVs) and New Mexico risk-based soil screening levels (NMSSLs).** Eight detected inorganics exceeded BVs. Of these, only one (copper) exceeded background based on hypothesis testing. Perchlorate was retained for further evaluation because there was no BV, and cadmium was retained due to low detection frequency in both site and background data sets. Mercury was retained because there were only two detects in the background dataset, and silver was retained because there was only one detect in the background dataset.
- **Detected organics were compared to risk-based NMSSLs.** There are no individual organic constituents that exceed NMSSLs.
- **Cumulative Cancer Risk (CCR) was calculated.** Cumulative cancer risk is the sum of the individual cancer risks. The resident CCR was $3x10^{-6}$, the industrial worker CCR was $4x10^{-7}$, and the construction worker CCR was $6x10^{-8}$. Therefore, there is no excess cancer risk for any human receptor evaluated in this report.
- **Screening Level Hazard Indices (HI) were calculated.** The sum of the screening level noncancer hazard quotients (HQs) is called a HI. The noncancer HI for the hypothetical future resident is 0.3, the HI for industrial workers is 0.02, and the HI for construction workers is 0.09. As all HIs were less than 1, there is no excess noncancer hazard for human receptors evaluated in this report.
- **The screening evaluation indicates that residents or workers are not at risk due to exposure to soils at the Unit.**
- **RDX exceeds groundwater protection screening levels by a factor of 20 based on the refined EPC.**

Potential risk to ecological receptors was evaluated by analyzing different lines of evidence that were weighed to draw a conclusion regarding the potential for adverse ecological effects. This included:

- **Comparing maximum exposure point concentrations (EPC) to no effect (NE) ecological screening levels (ESLs).** There were 12 analytes for which the maximum value exceeded NE ESLs resulting in hazard quotients (HQ) greater than 0.1.
- **Comparing refined EPCs based on upper 95th percentile confidence limits (UCL95) to Low Effect (LE) ESLs.** There were six analytes for which the UCL95 EPC exceeded LE ESLs.

- **Calculating HIs.** The HIs for NE ESL exceeded 1 for all receptors, and LE ESL comparisons to the EPCs exceeded 1 for several ecological receptors.
- **Application of site-specific population area use factors and NE ESLs.** The American robin, plants, and earthworms had HQs above 1 under the area use factor analysis when compared to NE ESLs due to mercury and copper. HIs based on NE ESLs exceeded 1 for robin, deer mouse, earthworm, and plants. The HIs for robins feeding as omnivores or insectivores for comparison to NE ESLs were 2 and 3, respectively, and the HIs based on NE ESLs for earthworms and plants were 20 and 3. The HI for the deer mouse was 2, but no HQs exceeded 1.
- **Application of site-specific population area use factors and LE ESLs.** There were no analytes that exceeded LE ESLs once the areal extent of the Unit was taken into consideration in conjunction with typical home range for ecological receptors and all HQs were less than 1. HIs based on LE ESLs exceeded 1 for earthworms only. A vegetative or invertebrate soil fauna community (as represented in the risk assessment by plants and earthworms) is not expected to occur in the Unit due to intended use and bare ground, and robins are not expected to feed on a daily basis totally within the Unit due to lack of food and cover, as well as human disturbance due to intended use.
- **Avian and mammalian population information does not indicate that birds or mammals are adversely affected**.
- **The ecological risk assessment concludes that there is likely no risk to ecological receptors at the Unit.**

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Acronyms and Abbreviations

AUF	Area Use Factor
BMP	Best Management Practice
BV	Background Benchmark Value
COPC	Contaminant of Potential Concern
COPEC	Contaminant of Potential Ecological Concern
CR	Cancer Risk
CSEM	Conceptual Site Exposure Model
DAF	Dilution Attenuation Factor
EPA	U.S. Environmental Protection Agency
EPC	Exposure Point Concentration
ERA	Ecological Risk Assessment
ESL	Ecological Screening Level
HHRA	Human Health Risk Assessment
HI	Hazard Index
HMX	Cyclotetramethylene-tetranitramine
HQ	Hazard Quotient
HR	Home Range
LANL	Los Alamos National Laboratory
LD50	Lethal Dose for Half of the Population
LE	Low Effect
LOAEL	Lowest Observed Adverse Effect Level
MDL	Method Detection Limit
NE	No Effect
NMED	New Mexico Environment Department
NMSSL	New Mexico Soil Screening Levels
NOAEL	No Observed Adverse Effect Level
OD	Open Detonation
PAUF	Population Area Use Factor
RCRA	Resource Conservation and Recovery Act
RfD	Reference Dose
RSL	Regional Screening Level
RSRL	Regional Statistical Reference Levels
SD	Standard Deviation
SF	Cancer Slope Factor
SL	Screening Level
SL-SSL	Groundwater Protection Soil Screening Level
SVOC	Semi-volatile Organic Compound
TA	Technical Area
TATB	2,4,6-Triamino-1,3,5-trinitrobenzene
TECi	Toxicity Equivalent Concentration for congener ***i***

TEF	Toxicity Equivalency Factor
TEQ	Toxicity Equivalent Quotient
TCDD	2,3,7,8-Tetrachlorodibenzo-p-dioxin
UCL95	95% Upper Confidence Limit of the Mean
VOC	Volatile Organic Compound
WHO	World Health Organization

1. INTRODUCTION

The area around the open detonation (OD) area at Technical Area (TA) 36 (the OD Unit) within the Los Alamos National Laboratory (LANL) was sampled as part of the application process for a Resource Conservation and Recovery Act (RCRA) permit to perform hazardous waste treatment operations. The OD Unit is referred to as “the Unit” in the remainder of this risk assessment.

The Unit is a hazardous waste management unit located in the southern portion of LANL (Figure 1-1), near Building 8. The unit was established in 1959 for the testing of explosives materials and has been used for open detonation of high explosives debris potentially contaminated with depleted uranium and other metals. The Unit consists of a relatively flat area that measures approximately 1.44 acres. All waste treatment detonations are conducted above ground with the use of a predetermined amount of explosive to initiate and increase the effectiveness of the treatment. Waste treatment shots are assembled in a manner to ensure complete detonation of the waste with minimized fragmentation dispersal. There are several firing sites and support buildings. The firing pit is bounded on the east, south, and west sides by storm water best management practices (BMPs) consisting of earth berms that have been hydroseeded and mulched.

One surface soil sampling event of the top 2 inches of soil at 15 discrete locations (Figure 1-1) was conducted in and around the Unit on September 19, 2018. Sample collection included soil both in and out of potential run-off areas; however, sample collection did not include rocks, debris, or vegetation. Data from these samples were used to conduct human health and ecological risk-screening assessments to determine whether hazardous contaminants from ongoing treatment operations are being released to soil at levels that pose an unacceptable risk to human health or the environment.

The results of the risk assessments are presented in the following sections.

2. HUMAN HEALTH RISK ASSESSMENT

2.1. CONCEPTUAL SITE MODEL

The primary land use for the human health risk assessment (HHRA) is industrial because only authorized Laboratory workers currently have access to the area around the Unit. Laboratory workers are the primary human receptors, and the industrial scenario is the defining scenario for the human health risk-screening assessment (i.e., the scenario on which decisions are based).

2.1.1. **Receptors**

Because the site is located within the boundaries of an operational facility (i.e., the Unit), the reasonably foreseeable future land use will continue to be industrial. Both a commercial worker and a construction worker are evaluated. A Hypothetical Future Residential exposure is also assessed and provided for comparison purposes.

2.1.2. **Exposure Pathways**

The release of contaminants from open detonation operations has potentially occurred for many years. Releases are transported primarily by wind, which rapidly disperses the material in ambient air. Most material is likely deposited close to the source(s), and concentrations are expected to decrease with distance from the source. Exposure to a site worker may occur through various surface soil contact pathways. Potential exposure pathways are:

- Incidental ingestion of surface soil
- Inhalation of fugitive dust or volatiles emanating from surface soil
- Dermal contact with surface soil

Storm water discharges from the Unit are regulated under the Clean Water Act by the National Pollutant Discharge Elimination System permit program under the LANL Storm Water Individual Permit. The LANL Storm Water Individual Permit contains nonnumeric technology-based effluent limitations, coupled with a comprehensive, coordinated monitoring program and implementation of corrective actions where necessary, to minimize pollutants in LANL's storm water discharges. Grading for runoff and erosion control has been performed in the area of the Unit. In addition, berms and infiltration system have been installed. This, combined with the distance to the nearest surface water, makes it unlikely that impacts to surface water east of the Unit will occur.

2.1.3. Approach for Identification of Chemicals of Potential Concern

2.1.3.1. Sampling and Data Analysis

Fifteen surface soil samples and one duplicate were collected September 19, 2018. Surface soil samples were collected as grab samples (independent, discrete samples) from a depth of 0 to 2 inches below ground surface. The duplicate pair was WST36-18-162834 and WST36-18-162985. Each sample set was analyzed for the following:

- Volatile Organic Compounds (VOCs)
- Semi-Volatile Organic Compounds (SVOCs)
- Total Metals
- Dioxins/Furans
- Perchlorates
- High Explosives

A staged approach was used for the risk assessment. Duplicates were evaluated consistent with the New Mexico Environment Department (NMED) guidance (NMED 2019) which states that in the initial screening assessment the maximum, and not the average, of the duplicate pair must be used. Figure 1-1 shows the current sampling locations from which data were obtained for use in the risk assessment.

2.1.3.2. Comparison to Background

The background data used in this evaluation is presented in the report "Inorganic and Radionuclide Background Data for Soils, Sediments, and Bandelier Tuff at Los Alamos National Laboratory," (LANL, 1998). The background data are used in the RCRA corrective action process to distinguish between contaminated and uncontaminated media and have been accepted by NMED. As stated in the background report, the background dataset was collected as follows:

> Twenty-one soil profiles distributed across the Pajarito Plateau were described in the field and were sampled for inorganic chemical analyses. These samples provide information about the varied soils and geomorphic settings that occur on the Pajarito Plateau, allowing for an evaluation of the variability in soil characteristics and chemistry within several of the soil series previously described by Nyhan et al. (1978, 05702). Most sampled soils were collected from mesa tops. Other geomorphic settings sampled include hillslopes and canyon bottoms. (LANL, 1998)

The locations sampled as part of the background study were not impacted by deposition from the historical operation of the OD units or other firing sites. Background values (BVs) were obtained from this document to use in comparison to site data.

Inorganic analytes are first compared to BVs established for the site (LANL, 1998). The inorganic data that exceeded BVs were then statistically compared to the background data with hypothesis tests. No further evaluation is necessary for analytes for which the maximum is less than the BV, and these data are not compared to NMED (2019) risk-based soil screening levels (NMSSLs). Organic analytes are not compared to background values as a matter of standard practice, although there are naturally occurring sources of organic constituents.

2.1.3.3. Comparison of Maximum EPCs to NMSSLs

The maximum concentration was used as the maximum exposure point concentration (EPC), which is the environmental concentration to which the receptors are potentially exposed. The screening approach used the maximum of all detected data, including the duplicate pair, for the initial screening evaluation. The maximum concentration of each analyte was divided by its NMSSL. For the HHRA, this meant using two screening levels (SLs) based on toxicity endpoints, (i.e., a cancer and noncancer SL were used to obtain a cancer risk and non-cancer hazard quotient (HQ).

All analytes that exceeded the initial NMSSLs were considered to have "failed" the initial screen. These are considered to be contaminants of potential concern (COPCs).

2.1.3.4. Surrogates

Where an NMSSL was not available, the U.S. Environmental Protection Agency (EPA) Regional Screening Level (RSL) for residential soils was applied as an SL for residential use, and the RSL for industrial commercial soil was used as the SL for industrial and construction workers. Consistent with NMED guidance, cancer-based RSLs were adjusted to a cancer risk (CR) level of $1x10^{-5}$ by multiplying the RSL by 10; noncancer RSLs were based on a HQ of 1. If an RSL was also not available, a suitable surrogate is proposed if physicochemical data suggest identifying a suitable surrogate. Most of the surrogates are proposed for nondetected analytes in order to verify that method detection limits (MDLs) are suitable for performing risk assessment.

The NMED migration to groundwater screening levels (SL-SSL) are used to assess potential migration to groundwater risks assuming human receptors then consume groundwater. Where SL-SSLs are unavailable, surrogates based on EPA RSLs are proposed. In these cases, the EPA RSL for protection of migration to groundwater was used. The EPA RSL for protection of migration to groundwater is based on a dilution attenuation factor (DAF) of 1, whereas the NMED SL-SSL is based on a DAF of 20. For consistency with NMED, the EPA RSL migration to groundwater values were multiplied by a factor of 20.

Surrogates were obtained for the following analytes because NMSSLs were not available (Table 2-1); note that most of these are not detected, and the SL is used to verify reporting limits are adequate:

- 2,4-Diamino-6-nitrotoluene – There is no NMSSL or RSL. Use o-nitrotoluene RSLs, which has both cancer and noncancer RSL values, and the lowest of the nitrotoluene isomer cancer RSLs.
- 2,6-Diamino-4-nitrotoluene – Use o-nitrotoluene RSLs, which has both cancer and noncancer RSL values, and the lowest of the nitrotoluene isomer cancer RSLs.
- 3,5-Dinitroaniline – There is no NMSSL. Use the amino-2,6-dinitrotoluene[4-] RSL as surrogate based on structural similarity.

- Acenaphthylene – There is no NMSSL or RSL. The NMSSLs for acenaphthene were used as a surrogate based on structural similarity.
- Aniline - There is no NMSSL. The RSLs were used as a surrogate.
- Azobenzene - There is no NMSSL. The RSLs were used as a surrogate.
- Benzo(g,h,i)perylene – There is no NMSSL or RSL. The NMSSLs for benzo(a)pyrene were used as a surrogate.
- Benzoic Acid - There is no NMSSL. RSLs were used as a surrogate.
- Benzyl Alcohol- There is no NMSSL. RSLs were used as a surrogate.
- Bis(2-chloroethoxy)methane- There is no NMSSL. RSLs were used as a surrogate.
- Bromobenzene - There is no NMSSL. RSLs were used as a surrogate.
- Bromochloromethane - There is no NMSSL. RSLs were used as a surrogate.
- Bromophenyl-phenylether[4-] – There is no NMSSL or RSL. The RSL for pentabromodiphenyl ether was used.
- Butylbenzene isomers – There are no NMSSLs. The RSLs are used as surrogates.
- Butylbenzylphthalate – There are no NMSSLs. The RSLs are used as surrogates.
- Chloro-3-methylphenol[4-]– There are no NMSSLs. The RSLs are used as surrogates.
- Chloroaniline[4-] – There are no NMSSLs. The RSLs are used as surrogates.
- Chlorophenyl-phenyl[4-] Ether– There is no NMSSL or RSL. No recommendation for a surrogate is made.
- Chlorotoluene[4-] – Use the NMSSLs for the o-chlorotoluene isomer because the RSLs for the two isomers are the same.
- Dibenzofuran – There are no NMSSLs. The RSLs are used as surrogates.
- Dichlorobenzene[1,3-] – There is no NMSSL or RSL. The NMSSLs for 1,4-dichlorobenzene were used as it may be the more toxic isomer considering it has cancer-based as well as noncancer-based endpoints.
- Dichloropropane[2,2-] – There is no NMSSL or RSL. The NMSSLs for 1,2-dichloropropane were used. The RSL is higher for 1,3 than 1,2 dichloropropane, and therefore this is considered conservative.
- Dichloropropane[1,3-] – There is no NMSSL. The NMSSLs for 1,2-dichloropropane were used.
- Dichloropropene[1,1-] – There is no NMSSL or RSL. The NMSSLs for 1,3-dichloropropene were used.
- Dichloropropene[cis-1,3-] – There is no NMSSL or RSL. The NMSSLs for 1,3-dichloropropene were used.
- Dichloropropene[trans-1,3-] – There is no NMSSL or RSL. The NMSSLs for 1,3-dichloropropene were used.
- Dimethyl phthalate– There is no NMSSL or RSL. The NMSSLs for diethyl phthalate were used.
- Dinitrobenzene[1,3-] – There are no NMSSLs. The RSLs are used as surrogates.
- Di-n-octylphthalate – There are no NMSSLs. The RSLs are used as surrogates.
- Diphenylamine – There are no NMSSLs. The RSLs are used as surrogates.
- Hexanone[2] – There are no NMSSLs. The RSLs are used as surrogates.
- Iodomethane – There is no NMSSL or RSL. No recommendation for a surrogate is made.

- 4-Isopropyltoluene – There is no NMSSL. The NMSSL values for toluene were used as a surrogate.
- Methylphenols – There are no NMSSLs for these compounds. The RSLs were applied for 2- and 4- methylphenol. The RSLs for 3-methylphenol were used for 3,4-methylphenol as most conservative option.
- Nitroanilines – There are no NMSSLs for these compounds. The RSLs were applied for 2- and 4-nitroaniline. The RSL for 4-nitroaniline was applied to 3-nitroaniline.
- Nitrophenols – There are no NMSSLs or RSLs for these compounds. The RSLs for phenol were applied for 2- and 4-nitrophenol.
- Nitroso-di-n-propylamine[N-] – There are no NMSSLs. The RSLs were applied.
- PETN - There is no NMSSL for PETN. RSLs were used as a surrogate.
- Propylbenzene[1-] – There are no NMSSLs. The RSLs are used as surrogates.
- Pyridine– There are no NMSSLs. The RSLs are used as surrogates.
- 1,3,5-Trinitrobenzene – There is no NMSSL. RSLs for 1,3,5-trinitrobenzene were used as a surrogate.
- TATB – There is no NMSSL or RSL for TATB. RSLs for 1,3,5-trinitrobenzene were used as a surrogate because of structural similarity.
- Trimethylbenzenes – There are no NMSSLs. The RSLs are used as surrogates.
- Tris (o-cresyl) phosphate – There is no NMSSL or RSL. The RSL for tris(2-ethylhexyl)phosphate was applied as a similar structure without halogen substitutions.

2.1.3.5. Evaluation of Refined EPCs

A refinement of the EPCs is performed if the HI or the cumulative cancer risk based on maxima exceeds target levels of 1 or $1x10^{-5}$, respectively. The maximum of each duplicate pair is used in the upper 95th percent confidence limit on the mean (UCL95). The UCL95 concentrations are compared to NMSSLs, and any analytes above the NMSSLs are considered further if necessary.

2.1.3.6. Calculation of Hazard Index or Cumulative Cancer Risk

Noncancer HQs are calculated as follows using the NMSSL based on noncancer endpoints:

$$HQ = EPC/NMSSL$$

A Hazard Index (HI) was calculated by summing all of the HQs as follows:

$$HI = \sum HQ1, HQ2, \dots$$

A CR was calculated as follows using the cancer-based NMSSL for each receptor and adjusting from a ratio to a cancer risk:

$$CR = \frac{EPC}{NMSSL} * 1 \times 10^{-5}$$

A Cumulative Cancer Risk (CCR) was calculated by summing the cancer risks for each detected analytes as follows:

$$CCR = \sum CR1, CR2, \ldots..$$

If the HI exceeded 1, or the CCR exceeded 1×10^{-5}, a UCL95 was calculated for all COPCs with the EPA ProUCL 5.1.002 software (EPA 2015). The refined EPCs based on UCL95 concentrations were then compared to the NMSSLs.

2.1.3.7. Dioxin/Furans

Guidance from NMED was used to evaluate the potential toxicity of the dioxin/furans. This guidance relies on the 2005 World Health Organization (WHO) toxicity equivalency factors (TEF) (Van den berg et al. 2006) approach (WHO 2009). The TEFs are multiplied by the measured concentration to obtain a congener-specific product called the toxicity equivalent concentration (TECi), and the product for each (TECi) is summed for each sample location. This sum is referred to as the toxicity equivalent quotient (TEQ). The TEQ is divided by the NMED screening level for 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) to obtain a risk ratio.

2.2. Screening Evaluation

The following sections present the human health risk-screening assessment for the Unit.

2.2.1. Data Analysis

Table 2-1 presents the summary statistics. Maximum concentrations in the soil samples analyzed for inorganics were compared to the established soil BVs (LANL 1998) (Table 2-2). The exposure interval for industrial workers is 0–1 ft bgs and for hypothetical future residents and construction workers the exposure interval is 0–10 ft bgs. Since all data fall within the 0–1 ft depth interval, the available data set was used for all receptors.

Antimony was the only inorganic that was never detected. Thallium and cadmium were only detected in 3 of 16 samples. Mercury was also infrequently detected in 6 of 16 samples.

Many of the organics are not detected. Organics that were detected in the surface soil samples are indicated in Table 2-1. These include energetics or explosives (e.g., HMX [cyclotetramethylene-tetranitramine], TATB, and RDX). SVOCs including fluoranthene and pyrene were detected. Phthalates (e.g., butylbenzyl- and di-n-butylphthalate) were also detected (Table 2-1), as were some dioxin/furan congeners. Methylene chloride and toluene were the only volatile organic chemicals (VOCs) detected.

2.2.2. Comparison to Background

The maximum detected result was used as the initial EPC (Table 2-2) and compared to background. Background values for the site are from the 1998 background report (LANL 1998), and soil screening levels are the NMSSLs (Table 2-2). There were no BVs for perchlorate. The maximum concentration for the following detected inorganics exceeded BVs:

- Cadmium
- Chromium
- Copper
- Lead
- Mercury
- Silver
- Thallium

- Zinc

All other inorganics were equal to or lower than BVs. A BV for perchlorate was not available and it was retained for further evaluation.

If the maximum concentration for the an inorganic exceeded its BV, the data were statistically evaluated, and if the Wilcoxon-Mann-Whitney (or Gehan test if ProUCL identified multiple detection limits) two sample hypothesis test indicated the site exceeded background, they were carried forward, in addition to retaining perchlorate for which BVs were not available. The results are as follows:

- Cadmium – BV was exceeded; statistical test showed Site≤BKG, test concluded reject from further evaluation. Only 3 detects in the Unit and background data set, therefore retain for further evaluation due to low detection frequency.
- Chromium – BV was exceeded, statistical test showed Site≤BKG, therefore reject from further evaluation.
- Copper – BV was exceeded; statistical test showed Site>BKG, therefore retain for further evaluation.
- Lead – BV was exceeded, statistical test showed Site≤BKG, therefore reject from further evaluation.
- Mercury – BV was exceeded. All BKG data had same value. No tests could be performed. Retain for further evaluation.
- Silver – BV was exceeded; no background data available for the All H horizon. Only 1 detect in Tuff horizon. Retain for further evaluation.
- Thallium - BV was exceeded, statistical test showed Site≤BKG. Only three detects in site data (two below the residential NMSSL and one above), but 105 detects in background. Since the dataset appears robust despite the low detection frequency for site data, reject from further evaluation.
- Zinc – BV was exceeded; statistical test showed Site ≤BKG, therefore reject from further evaluation.

The maximum concentration of all other inorganics was below BVs, and statistical hypothesis testing was not performed. Only inorganics that both exceeded BVs and were above background by hypothesis testing were carried forward. The ProUCL output is reported in Attachment A.

2.2.3. **Comparison of Maximum EPCs to NMSSLs**

Table 2-3 presents maximum soil concentrations for the September 2018 surface soil samples compared to the NMSSLs. There were 15 samples and one duplicate included in this data set collected in September 2018. The duplicate pair is grid point 1 (WST36-18-162985 and WST36-18-162834).

The maximum EPC for each detected analyte was divided by the industrial (i.e., composite worker and construction worker) and residential NMSSLs to obtain a HQ for each of the noncarcinogens, for which the hazard index (HI) was calculated by summing the HQs (NMED 2019). The NMSSLs used in the evaluations were obtained from current NMED guidance (NMED 2021) or the most recent EPA RSLs (EPA 2021) if an NMED value was not available (Section 2.2.4). The cancer-based EPA RSLs were multiplied by 10 to adjust them to a cancer risk level of $1x10^{-5}$, consistent with the NMSSLs. The NMSSLs for carcinogens are equivalent to a 1×10^{-5} cancer risk, and for noncarcinogens the NMSSLs correlate to a ratio or HQ of 1. Any detected organic analytes that exceeded the SLs were considered

COPCs. Any inorganic analytes that exceeded both background and the NMSSL were also considered COPCs.

2.2.3.1. Results Based on Maximum EPC for Inorganics

Maximum concentrations in the soil samples analyzed for inorganics were compared to the established soil BVs (LANL 1998) as described in Section 2.4.2. The results indicate that there were no noncancer HQs above 1 for inorganics (Table 2-3). Only cadmium is also assessed as a carcinogen, and the cancer risk was below the NMED target of $1x10^{-5}$ for all receptors (Table 2-3).

2.2.3.2. Results Based on Maximum EPC for Organics

No individual constituents exceeded NMSSLs (NMED 2021).

2.2.3.3. Dioxin/Furans

The dioxin/furans are organics but are evaluated in the analysis differently than other organics. Some dioxins/furan congeners were detected in the surface soil samples, although most were not (Table 2-1). The evaluation of the dioxin/furans is summarized in Table 2-4. The measured detected concentration or the MDL for nondetects is shown for each congener in each sample. The detection status is indicated by a zero for nondetect, and a 1 for a detected value. The TEFs are shown for each congener, and multiplying the TEF by the measured concentration (or MDL for nondetects) produces the TECi. Summing the TECi yields the TEQ. Dividing the maximum TEQ by the residential or worker NMSSLs for TCDD (Tables 2-3 and 2-4) produces a HI less than 1 and a cancer risk less than $1x10^{-5}$. Therefore, the dioxins and furans do not exceed risk-based SLs.

2.2.3.4. Hazard Indices and Cumulative Cancer Risk

The HI for the evaluation of maximum detected soil concentrations of inorganics for noncancer-based health effects was 0.2 for residents, and 0.01 for industrial workers, and 0.06 for construction workers (Table 2-5). The HI for the evaluation of maximum detected soil concentrations of organics for noncancer-based health effects was 0.04 for residents, 0.002 for industrial workers, and 0.008 for construction workers (Table 2-5). The HI for the evaluation of maximum detected soil concentrations of dioxins/furans as represented by the TCDD TEQ for noncancer-based health effects was 0.1 for residents, and 0.006 for industrial workers, and 0.02 for construction workers (Table 2-5). The total HI for noncancer-based health effects was 0.3 for residents, 0.02 for industrial workers, and 0.1 for construction workers (Table 2-5).

Cancer risk due to inorganics was $5x10^{-11}$ for residents, $1x10^{-11}$ for industrial workers, and $1x10^{-9}$ for construction workers (Table 2-5). The cancer risk for maximum detected soil concentrations of organics was $2x10^{-6}$ for residents, $2x10^{-7}$ for industrial workers, and $3x10^{-8}$ for construction workers (Table 2-5). For TCDD the cancer risk was $8x10^{-7}$ for residents, $2x10^{-7}$ for industrial workers, and $2x10^{-8}$ for construction workers (Table 2-5). Total cumulative cancer risk was $3x10^{-6}$ for residents, $4x10^{-7}$ for industrial workers, and $6x10^{-8}$ for construction workers (Table 2-5).

2.2.1. **Lead**

Risk evaluation of lead is separate from the other inorganics. Lead was not evaluated because the hypothesis testing indicated that site concentrations were equal to or below background (Table 2-2). Maximum lead concentrations are only 35.2 mg/kg, which is below the NMSSL of 400 mg/kg protective of residential use and the NMSSL of 800 mg/kg protective of industrial use.

2.2.2. **Migration to Groundwater**

Maximum concentrations were compared to NMED migration to groundwater SL-SSLs based on a DAF of 20. Where SL-SSLs were unavailable, the EPA RSL (DAF of 1) was multiplied by 20 and used as a proxy value (Section 2.2.4). All maxima with the exception of RDX were below the SL-SSL indicating there is little chance of potential migration to groundwater for nearly all constituents.

The RDX maximum is 80 times higher than the SL-SSL. For this reason, RDX was carried forward for further evaluation by use of refined EPCs based on the UCL95.

2.2.3. **Refined EPCs**

RDX is further evaluated because it exceeds the groundwater SL-SSL. The site data for RDX follow a normal distribution. The UCL95 statistic used as the refined EPC is a 95% Kaplan Meier (KM) (t) UCL of 1.48 mg/kg. The SL-SSL is 5.93E-02 mg/kg. Dividing the refined EPC by the SL-SSL results in a ratio of $2x10^1$, indicating the refined EPC is still 20 times higher than the SL-SSL.

Hydrologic information for the area north of the TA-36-8 open detonation unit is presented in the Pajarito Canyon Investigation Report, Revision 1 (LANL, 2009). Groundwater in the unit is not utilized for potable purposes. The closest water supply wells into the regional aquifer are over a mile northeast and upgradient with respect to groundwater flow direction. The depth to groundwater is approximately 1000 feet, suggesting percolation to groundwater is unlikely to occur. Furthermore, evapotranspiration exceeds precipitation, resulting in infiltration rates of less than 10 milliliters per year. The physical information combined with the low concentrations of RDX and the small spatial extent of the Unit suggests that it is unlikely that the Unit would impact groundwater significantly.

2.3. UNCERTAINTY ANALYSIS

The human health risk assessment has inherent uncertainties associated with data and data evaluation, exposure assessment, and the toxicity values on which the SLs are based. Each or all of these uncertainties may affect the assessment results, biasing the risk assessment results high or low.

2.3.1. **Data and Data Analysis**

Uncertainties in the data or its analysis may include errors in sampling, laboratory analysis, and data analysis. Data evaluation uncertainties are expected to have little effect on the assessment results because the data have undergone validation to minimize errors, and any errors are not expected to bias the results high or low. The J-flagged (estimated) qualification of detected concentrations of some organic COPCs does not affect the assessment. The data represent deposition from more than 60 years of operation into 2018. Therefore, the data and subsequently the screening assessment results represent current baseline conditions.

The use of a judgmental sampling design biases the risk results high since samples were targeted to locations where contamination was most likely to occur or known to occur from past sampling events.

The use of the maximum or a UCL95 as the COPC EPC for each COPC is also expected to bias risk estimates high, erring towards being conservative. Use of the maximum as the EPC overestimates exposure, as by definition all other concentrations are below this value. Use of the UCL95 may also result in an overestimation of risk since by definition true mean values are nearly always going to be less than this value.

2.3.2. **Comparison of MDLs to NMSSLs**

The MDLs were used for nondetects as the basis of comparing to NMSSLs to verify that detection limits were low enough to detect potential risk that might exist. Only one nondetected analyte had elevated MDLs. The maximum MDL for nitrosodimethylamine[N-] exceeds the cancer-based NMSSL for residential use resulting in a $4x10^{-5}$ cancer risk. NMSSLs for workers did not exceed $1x10^{-5}$, and there were no HQs above 1. All the MDLs are the same indicating that the laboratory cannot achieve lower results with typical laboratory practices. N-Nitrosodimethylamine is volatile and combustible and decomposes when exposed to light (PubChem 2022). It may be formed during cooking meat or fish containing sodium nitrite as a preservative, but is also found in other foods including vegetables, cheeses, alcoholic beverages, and fruits. It is a known contaminant associated with hydrazine manufacturing. Given that volatiles are not expected to remain in surface soils over time, that it is likely to break down under UV light, that residential use is not considered likely at the site, and that there are no statistical approaches that would alter the EPC, this analyte is not addressed further. The MDLs for nondetected analytes are not expected to bias the risk assessment results high or low.

2.3.3. **Exposure Assessment**

The exposure assessment assumptions bias the risk results high (i.e., overestimate risk). Assumptions for the industrial SLs are that the potentially exposed individual is a Laboratory worker who is outside at the site for 8 hours per day for 225 days per year (NMED 2019), and who spends the entire 8 hours on-site within the contaminated area. Assumptions for the residential SLs are that the potentially exposed individual is a resident who is present 24 hours per day for 350 days per year (NMED 2019) and spends the entire 24 hours on-site within the contaminated area. Because it is unlikely the worker or resident would be within the contaminated area for the entire time, the screening assessments overestimate the exposure. As a result, risks may be overestimated.

Assumptions underlying the exposure parameters, routes of exposure, and intake rates for routes of exposure are consistent with NMED parameters and default values (NMED 2019). In the absence of site-specific data, several upper-bound values for the assumptions may be combined to estimate exposure for any one pathway, and the resulting risk estimate can exceed the 99th percentile. Therefore, uncertainties in the assumptions underlying the exposure pathways may contribute to risk assessments that overestimate the reasonably expected risk levels.

2.3.4. **Toxicity Values**

The primary uncertainty associated with the screening values is related to the derivation of toxicity values used in their calculation. Toxicity values (slope factors [SFs] and reference doses [RfDs]) were used to derive the risk-based screening values used in the screening evaluation (NMED 2019). Uncertainties were identified in four areas with respect to the toxicity values: (1) extrapolation from animals to humans, (2) variability between individuals in the human population, (3) the derivation of RfDs and SFs, and (4) the chemical form of the COPC.

The SFs and RfDs are often determined by extrapolation from animal data to humans, which may result in uncertainties in toxicity values because differences exist between animals and humans in chemical absorption, metabolism, excretion, and toxic responses. Differences in body weight, surface area, and pharmacokinetic relationships between animals and humans are taken into account to address these uncertainties in the dose-response relationship. However, conservatism is usually incorporated in each of these steps, potentially biasing the estimate high and resulting in the overestimation of potential risk.

For noncarcinogenic effects, the degree of variability in human physical characteristics is important both in determining the risks that can be expected at low exposures and in defining the no observed adverse effect level (NOAEL). The NOAEL uncertainty factor approach incorporates a 10-fold factor to reflect individual variability within the human population that can contribute to uncertainty in the risk assessment. This factor of 10 is generally considered to result in a conservative estimate of risk for noncarcinogenic COPCs.

The RfDs and SFs for different chemicals are derived from experiments conducted by different laboratories that may have different accuracy and precision that could lead to an over- or underestimation of risk. The uncertainty associated with the toxicity factors for noncarcinogens is measured by the uncertainty factor, the modifying factor, and the confidence level. For carcinogens, the weight of evidence classification indicates the likelihood that a contaminant is a human carcinogen.

COPCs may be bound to the environmental matrix and not be available for absorption into the human body following ingestion. However, the exposure scenarios typically default to the assumption that the COPCs are bioavailable. This assumption can lead to an overestimation of toxicity, total exposure, and overestimate risk.

2.3.5. Additive Approach

For noncarcinogens, the effects of exposure to multiple chemicals are generally unknown and possible interactions could be synergistic or antagonistic, resulting in either an underestimation or overestimation of the potential risk by assuming additivity. Additionally, RfDs used in the risk calculations typically are not based on the same endpoints with respect to severity, effects, or target organs. Therefore, the potential for noncarcinogenic effects may be overestimated by the HI considering individual COPCs act by different mechanisms and on different target organs but are addressed additively. Cancer risks are typically assumed to be additive.

2.4. CONCLUSIONS

Inorganics were compared to BVs and risk-based SLs. Eight inorganics exceeded background to some extent. Hypothesis testing reduced the inorganics for risk screening to cadmium, copper, mercury, and silver. Perchlorate was also retained because there was no BV.

Organics were compared to risk-based NMSSLs. There were numerous organics detected, including some energetics, some SVOCs, and dioxin/furans. However, maximum concentrations of all of the detected analytes were below cancer- and noncancer-based NMSSLs for all constituents. None of the TEQs for dioxin/furans exceeded the TCDD SL. The Unit does not present an elevated cancer risk or noncancer hazard to human health due to exposure to surficial soils. The following interpretation can be made from the analysis, where the total HI or cancer risk is the sum of the inorganics, organics, and dioxin/furan values (excluding lead):

- For the residential scenario, inorganics above background, and maximum detected concentrations for each analyte, the total noncancer HI (0.3) and cancer risk ($3x10^{-6}$) are less than the NMED target levels of 1 and $1x10^{-5}$, respectively.
- Based on an industrial scenario, inorganics above background, and maximum detected concentrations for each analyte, the total noncancer HI (0.02) and cancer risk ($4x10^{-7}$) are less than the NMED target levels of 1 and $1x10^{-5}$, respectively.

- Based on a construction worker scenario, inorganics above background, and maximum detected concentrations for each analyte, the noncancer HI (0.09) and cancer risk ($6x10^{-8}$) are less than the NMED target levels of 1 and $1x10^{-5}$, respectively.
- The TEC concentration of each dioxin/furan congener was summed to obtain a TEQ which was compared to the NMED NMSSLs for each receptor for TCDD. The noncancer HI and cancer risk are less than the NMED target levels of 1 and $1x10^{-5}$, respectively.
- The maximum lead concentration of 35.2 mg/kg at the Unit is just slightly above the background value of 22.3 mg/kg, and is much less than the residential SSL (400 mg/kg). Lead is not significantly different from background based on hypothesis testing.
- RDX exceeded migration to groundwater SL-SSLs. The ratio was 80 based on the maximum RDX concentration, and 20 based on the refined EPC.
- There are no elevated human health risks for exposure to soils based on this evaluation. Risks to groundwater are considered minimal because depth to the regional aquifer is approximately 1000 ft bgs with little potential for infiltration. Runoff into surface water from the Unit is considered unlikely due to distance and existing erosion controls.

3. ECOLOGICAL RISK ASSESSMENT

3.1. INTRODUCTION

The ecological risk assessment (ERA) for the Unit is presented in the following sections. The ecological risk-screening evaluation identifies chemicals of potential ecological concern (COPECs) and is based on the comparison of EPCs with Ecological Screening Levels (ESLs) in accordance with Laboratory guidance (LANL 2012a) and NMED (2017) guidance.

Site information including ESLs, biological studies, and historical information were reviewed and a site visit was conducted. A preliminary conceptual site exposure model (CSEM) was prepared.

The ESLs obtained from the ECORISK Database, Version 4.2 (LANL 2020), updated November 11, 2020), are presented in Table 3-1. The ESLs are based on toxicity data for laboratory species similar to those expected to occur at the site, and are derived from experimentally determined NOAELs, lowest observed adverse effect levels (LOAELs), or doses determined to be lethal to 50% of the test population (LD50). Information relevant to the calculation of ESLs, including concentration equations, dose equations, bioconcentration factors, transfer factors, and toxicity reference values, are presented in the ECORISK Database, Versions 2.0, 3.1, and 4.1 (LANL 2003; LANL 2012b; LANL 2017; LANL 2020).

The screening evaluation is conducted by dividing the EPCs by the ESLs to obtain a HQ calculated for each COPEC and screening receptor. As a generalization, the higher the contaminant levels relative to the ESLs, the higher the potential risk to receptors; conversely, the higher the ESLs relative to the contaminant levels, the lower the potential risk to receptors. The analysis begins with a comparison of the No Effect (NE) ESL for each receptor and COPEC to the maximum EPC. HQs greater than 0.1 are used to identify COPECs requiring additional evaluation.

Individual HQs for a receptor are summed to derive a HI. An HI greater than 1 indicates that further assessment may be needed to ensure exposure to multiple COPECs at a site will not lead to potential adverse impacts to a given receptor population. The HQ and HI analysis is a conservative indication of potential adverse effects and is designed to minimize the potential of overlooking possible COPECs at the site.

3.2. PROBLEM FORMULATION AND CONCEPTUAL SITE EXPOSURE MODEL

The Unit is a terrestrial ecosystem. The area is disturbed with little to no vegetation present. Vegetation increases with distance from the OD area and consists of grasses and shrubs. There are likely terrestrial birds and small mammals including deer mice or ground squirrels using the area, although intermittently due to the lack of food or cover. There is not enough vegetation within the 1.44-acre Unit to support large herbivores.

Due to the site history, there is the potential for energetic compounds or their breakdown products to be present in surface soils, where terrestrial animals and plants may contact surface soils and potentially be exposed. This possibility led to the collection of data and ecological risk assessment.

3.2.1. Data Summary

Soil samples used in this analysis were collected in September 2018. Surface soil samples were collected as grab samples (independent, discrete samples) from a depth of 0 - 2 inches below ground surface. Each sample set was analyzed for the following:

- VOCs –15 samples and one duplicate
- SVOCs –15 samples and one duplicate
- Total Metals –15 samples and one duplicate
- Dioxins/Furans –15 samples and one duplicate
- High Explosives –15 samples and one duplicate

In addition, two samples were resampled for SVOCs, and some organics were analyzed by more than one method, resulting in an apparently higher sample count (i.e., 2,4 and 2,6 dinitrotoluene, nitrobenzene, dinitrobenzenes) (Table 2-1). Figure 1-1 shows a map of the site including the current sampling locations from which data were obtained for use in the risk assessment, and habitat in the immediate site vicinity is also shown in Figure 1-1.

3.2.2. Site Visit Summary

A site visit was conducted in March 2019. The area is disturbed by human activity with buildings, roads, and maintained cleared areas to minimize fire danger. The vicinity around the Unit is a terrestrial ecosystem, although within the Unit it is largely bare ground (Figure 1-1). There are likely terrestrial birds and small mammals including deer mice or ground squirrels using the area; however, there is not enough vegetation within the Unit to support birds or mammals or their prey items.

3.2.3. Receptors and Pathways

Exposure pathways are considered complete if all of the following components are present (EPA, 1989; NMED, 2017):

•A source and mechanism for hazardous waste/constituent release into the environment;

•An environmental transport medium or mechanism;

•A point of contact directly between the receptor and site-related contaminated media, or indirectly via dietary ingestion of prey or forage items contaminated by contact with site related contaminants; and

- An exposure route leading to interaction of the contaminant with target organs within the receptor.

If any of the above components are missing from the exposure pathway, it is not a complete pathway for the site.

A CSEM was developed for the site (Figure 3-1). The primary contaminant source is the testing of explosives and detonation of explosives debris at the site. Any uncombusted material, if present, could remain in soil or be released to air as fugitive dust. Materials in surface soil could be carried by overland flow or percolate into the subsurface with rain, whereas material in air could be transported by wind. Receptors could contact contaminants within the immediate site area, up to the site boundary, or slightly beyond. The use of stormwater BMPs and earthen berms reduces the potential for migration beyond the Unit.

Ingestion of soil, plants, or animals are all potential exposure routes to ecological receptors. Although inhalation is recognized to occur, it is typically considered insignificant relative to ingestion and only quantified for burrowing animals where volatile organics are present in the subsurface. Respirable dust particles are likely ingested rather than inhaled by ecological receptors, and this pathway is considered negligible (EPA 1997; EPA 2003), while non-respirable dust is ingested and accounted for in incidental soil ingestion values for wildlife species (EPA 1993; EPA 2003). Therefore, the exposure pathways considered in the development of the ESLs used in the risk-screening assessment capture the primary exposure for wildlife receptors.

Terrestrial flora (i.e., plants) and fauna (e.g., invertebrates, birds, and mammals) are the general categories of ecological receptors that could be exposed. The primary ecological exposure pathways are based on direct or indirect contact with surface soils. These include root uptake, incidental ingestion of soil, and biotic uptake leading to food-web transport. Exposure of plants and soil invertebrates is not evaluated as related to dietary pathways but as the result of direct contact with, and uptake from, the surrounding medium. For terrestrial wildlife, most exposure is considered to be through the oral pathway from the diet and incidental soil ingestion (Sample et al. 1998). The dermal contact and inhalation pathways are not typically assessed quantitatively in ecological risk assessments, based on guidance indicating the ingestion route is most important to terrestrial animals (EPA 1997; EPA 2003). Dermal exposure to wildlife is mitigated by the fur or feathers covering the bodies of most vertebrates and the incidental soil consumption during grooming is included in the direct soil ingestion estimates. Due to lack of its preferred riparian habitat and lack of dense cover, the montane shrew (*Sorex monticolus*) is not expected to occur and is not evaluated in this analysis.

3.2.4. **Technical Decision Point and Recommendations**

Because of the ecological habitat near the Unit boundaries, and because of the potential for exposure, the data were used to perform a quantitative screening level ecological evaluation.

3.3. ECOLOGICAL SCREENING EVALUATION

The summary statistics for the data were presented in Table 2-1. Maximum detected concentrations of each analyte are used as the initial EPC. The EPCs and the screening results for the ecological screening assessment are presented in Table 3-2. Any analytes for which the measured maximum detected value exceeded the NE ESLs were considered COPECs and were evaluated further by calculating UCL95s and comparing the UCL95s to the Low Effect (LE) ESLs. The approach used to evaluate the data for ecological risk was as follows:

- An attribution analysis (NMED 2019) was conducted by comparing the inorganic site data to BVs. Analytes less than BVs were eliminated from further evaluation. The remaining inorganics were tested with Wilcoxon-Mann Whitney or Gehan hypothesis tests to determine if site data exceeded or were similar to background. Analytes that exceeded background were carried forward. Cadmium, copper, mercury, perchlorate, and silver are carried forward (Section 2.1.3.4).
- The screening approach then used the maximum of all data, including the duplicate pair, for the initial screening evaluation. The maximum concentration of each analyte was divided by its NE ESL for each receptor.
- All analytes that exceeded the NE ESLs with a HQ greater than 0.1 were considered to have “failed” the initial screen. These are considered to be COPECs.
- A refinement of the EPCs was performed. The minimum of the duplicate pair was removed from the dataset prior to estimating UCL95 values to use as the refined EPC. The refined EPCs based on UCL95 concentrations were compared to LE ESLs, and any analytes above the LE ESLs with a HQ greater than 0.1 were evaluated further by comparison to population area use factors.

3.3.1. **Inorganics**

There are four inorganics that exceed site BVs, and perchlorate is retained because there is no BV (Section 2.2.2). The maximum concentration of each of these was compared to the NE ESL, if one was available, to determine if the resulting HQ >0.1. The inorganic analytes that exceed ecological NE SLs for one or more receptors are as follows (Table 3-2):

- Cadmium
- Copper
- Mercury
- Perchlorate
- Silver

If an inorganic analyte maximum exceeded the BV and the ratio of the maximum to the risk-based SL was greater than 0.1, a UCL95 was calculated with the EPA ProUCL 5.1.002 software (EPA 2015). This UCL95 was then compared to the LE ESLs found in Table 3-1 consistent with the NMED (2017) Tier II approach. Note that comparison to the UCL95s was made prior to incorporating population area use factors (PAUFs) into the analysis. Receptor-specific dietary composition is built into the receptor-specific ESLs. The minimum concentrations for each of the samples in the duplicate pair, site location point #1 in Figure 1-1, were removed and the UCL95 calculated with a sample size of 15. Table 3-3 presents the UCL95s used to represent refined EPCs. The ProUCL output is found in Attachment A.

UCL95 values for copper and mercury produced HQs greater than 0.1 when compared to the LE ESL with UCL95/ESL (Table 3-4). This suggests some limited potential for adverse ecological effects at the Unit, and therefore these COPECs are evaluated in more detail in the uncertainty analysis in Section 3.4.8.

3.3.2. **Dioxin and Furans**

Dioxin and furans were detected in multiple samples in the September 2018 data set. Dioxins and furans are evaluated in a multi-step process that takes the concentration of each congener and multiplies it by a TEF for mammals or birds (Table 3-5). The TEFs for mammals and birds were applied to calculate a TECi for each congener in a sample. The resulting TECi values are summed to obtain a TEQ specific to mammalian (Table 3-6) or avian (Table 3-7) receptors for each sample.

TEFs for plants and invertebrates are not available. Therefore, the TEFs for mammals were applied to represent these taxa in order to calculate TEQs. In general, mammalian TEFs are the same or higher than avian TEFs, and this results in a higher, more conservative, TEQ.

The maximum avian and mammalian TEQs were compared to the NE ESLs reported in Table 3-1. The results of the comparison to maximum EPCs is reported in Table 3-2. The UCL95 TEQ was used as the refined EPC and compared to the LE ESLs (Table 3-1) with the results reported in Table 3-4. There are no LE ESLs for birds for TCDD. The MDLs were used as the reported value for nondetected data.

The dioxin/furans produced HQs greater than 0.1 when compared to the NE ESL for birds. There is no LE ESL and further evaluation for avian species was not performed. The HQ based on the LE ESL for the deer mouse was 1; no other mammals or other ecological receptors are potentially negatively affected by dioxin/furans..

3.3.3. Other Organics

Maximum concentrations of six other organics produced HQs greater than 0.1 when compared to NE ESLs (Table 3-2). These were benzoic acid, bis(2-ethylhexyl)phthalate, di-n-butylphthalate, HMX, RDX, and TATB. UCL95 values were calculated (Table 3-3) and compared to the LE ESLs (Table 3-4).

There were only two detections of benzoic acid, and four detections of di-n-butylphthalate. The low detection frequency for these two constituents means that a robust UCL95 cannot be calculated. Therefore, a median of the measured concentrations and the reported MDL values was calculated and used as the estimate of the EPC. This approach is consistent with ProUCL guidance (EPA 2015) that recommends use of alternative statistics when detection frequency is low.

Refined EPC values for bis(2-ethylhexyl)phthalate produced HQs greater than 0.1 when compared to the LE ESLs (Table 3-4) for the American kestrel and robin. RDX and TATB also produced HQs greater than 0.1 when compared to the LE ESLs (Table 3-4). These organics are further evaluated in the risk analysis in Section 3.4.8.

3.3.4. Hazard Indices

The HIs ranged from less than 1 for plants, mammalian herbivores, and top avian and mammalian carnivores to 10 for the robin modeled as an insectivore (Table 3-4). Section 3.4.8 addresses all COPECs with HQs greater than 0.1.

3.4. UNCERTAINTY ANALYSIS

3.4.1. Chemical Form

Inorganic analytes can speciate into different forms with varying degrees of toxicity. The assumptions used in the ESL derivations are conservative and not necessarily representative of actual conditions. These assumptions include maximum chemical bioavailability, maximum receptor ingestion rates, minimum bodyweight, and additive effects of multiple COPECs. These factors tend to result in conservative ESL estimates, which may lead to an overestimation of the potential risk. Toxicological data are typically based on the most toxic and bioavailable chemical species, which may or may not be found in the environment. The ESLs were calculated to ensure a conservative indication of potential risk (LANL 2012a), and the values are biased toward overestimating the potential risk to receptors.

The chemical form of the individual COPECs was not determined as part of the investigation. COPECs are generally not 100% bioavailable to receptors in the natural environment because of interference from other natural processes, such as the adsorption of chemical constituents to matrix surfaces (e.g., soil) or rapid oxidation or reduction changes that render harmful chemical forms unavailable to biotic processes.

3.4.2. **Reporting Limits**

Reporting limits were adequate (i.e., below NE ESLs) for ecological receptors for all analytes with few exceptions, indicating that the data were adequate for use in the risk assessment:

Thallium –

- Thallium MDLs exceeded the NE ESL for plants.
- Thallium was below background by hypothesis testing.
- Reporting limits were below the minimum LE ESL.
- This analyte is not considered further. This is not expected to bias the risk assessment results high or low.

Dinitrobenzene[1,3-]–

- This analyte was not detected in any sample. Reporting limits were less than the non-cancer based NMSSL for residents or workers.
- The reporting limits were two times higher than the minimum NE ESL for the robin modeled as an herbivore, the deer mouse, and the mountain cottontail.
- Reporting limits were below the minimum LE ESL.
- This analyte is not considered further. This is not expected to bias the risk assessment results high or low.

Hexachlorobenzene –

- This analyte was not detected in any sample. Reporting limits were less than the non-cancer based NMSSL for residents or workers.
- The reporting limits were slightly over 1 times higher than the minimum NE ESL for the robin modeled as an insectivore.
- Reporting limits were below the minimum LE ESL.
- This analyte is not considered further. This is not expected to bias the risk assessment results high or low.

3.4.3. **Exposure and Risk Estimates**

Exposure parameters including the EPC and the intakes likely bias risk estimates high because they presume no movement of receptors in and out of source areas. Sampling focused on areas of known or expected contamination, which biases the EPC high. Receptors are assumed to spend 100% of their time in the contaminated area which results in conservative estimates of exposure.

Another source of uncertainty is inherent in the calculation of exposure and risk estimates. Although the toxicity values are expressed to more than one significant figure, it is unlikely that the toxicity data are this accurate, especially given that the data are extrapolated from laboratory animal studies to wildlife receptors that are mobile in the environment. Likewise, given all the variables inherent in assessing exposure, exposure intakes by ecological receptors also should not be considered more accurate than one significant figure. This means that an HQ identified as 0.8 or 1.2 is actually 1, and an HQ identified as 1.5 is actually 2.

Calculating risk for dioxins is a multi-step process that involves multiplying the measured concentration by a TEF to obtain a value called the TECi that when summed adjusts the measured congener concentrations to that relative to TCDD, where the sum of all TECi is called the TEQ. TEQs were calculated for each sample to obtain a sample concentration, then a UCL95 calculated across all samples. This is consistent with how other analytes are evaluated statistically. It is not expected to bias the risk results high or low.

3.4.4. Mixture Toxicity

The assumption of additive effects for multiple COPECs may result in an over- or under-estimation of the potential risk to receptors. Exposure to multiple contaminants may result in other than additive effects. Conservative assumptions made with regards to EPCs would tend to overestimate exposure to any given constituent, and this would suggest that the toxicity of multiple constituents would not be underestimated. Therefore, mixture toxicity is not likely to bias the risk results high or low.

3.4.5. Toxicity Information

ESLs are based on toxicity information, and if toxicity data are not available an ESL is missing from the database. ESLs were not available for the cations and anions generally regarded as nutrients (i.e., calcium, magnesium, nitrate, potassium, and sodium). Human health risk was below targets for these nutrients. These inorganics were also below background. ESLs were also not available for iron, but iron was less than its BV and human health risk ratios for residents were 0.2 or lower. Lack of ESLs for these inorganics is not expected to underestimate ecological risk at the site.

Several organic chemicals (Table 3-1) do not have ESLs for any receptor in release 4.2 of the ECORISK Database (LANL 2017; LANL 2020). Predominantly, the constituents lacking ESLs are nondetected organics. In the absence of a chemical-specific ESL, concentrations can be compared with the ESLs for a surrogate chemical, if available. Comparison to surrogate ESLs provides an estimate of potential effects of a chemically related compound and a line of evidence to indicate the likelihood that ecological receptors are potentially impacted. Some chemicals without ESLs do not have chemical-specific toxicity data or surrogate chemicals to be used in the screening assessments and cannot be assessed quantitatively for potential ecological risk.

Chemicals lacking ESLs (Table 3-1) are often infrequently detected across the site. In these cases, comparisons with human health SLs are presented as part of a qualitative assessment, if human health SLs are available. The comparison of concentrations to human health SLs is a viable alternative for several reasons. Animal studies are used as the basis of toxicity values for human health risk assessments, and are the basic premise of modern toxicology (EPA 1989). In addition, toxicity values derived for the calculation of human health SLs (e.g., histopathology or biochemical changes) may be based on potential adverse effects more sensitive than the ones typically used to derive ESLs (e.g., survival, growth, or reproductive effects). EPA also applies uncertainty factors or modifying factors to ensure the toxicity values are protective (i.e., toxicity values are divided by uncertainty factors resulting in values much lower than initial study results). Since there were no predicted adverse effects on human health, chemicals lacking ESLs are unlikely to pose an ecological risk (Table 3-2). Some of the analytes for which ESLs are not available are addressed below:

- Isophorone had no ESLs. It was detected in one sample. The human health cancer risk and noncancer HQs were below targets. It is likely that this analyte will have no negative effect on ecological receptors.

- There were no ESLs for 3,5-dinitroaniline, which was not detected in any sample. The ESLs for amino-2,6-dinitrotoluene[4-] were used (Attachment B) to evaluate MDLs. HQs were less than 0.1.
- There are no avian LE ESLs for TCDD in the current (LANL 2020) LANL EcoRisk database. However, there is a NE ESL and there were no HQs greater than 1.
- There are no avian NE ESLs for most of the PAHs. However, the HQs for benzo(a)anthracene are all less than 0.1, suggesting other PAHs also might not produce adverse effects.
- There are no avian values for benzoic acid or benzyl alcohol. These did not produce adverse human health effects. There are values for mammals and so some ecological receptors are quantitatively addressed.
- There are no ESLS for isopropyltoluene[4-]. Values for toluene were used; avian values not available.
- There are no avian values for diethylphthalate. This did not produce adverse human health effects. There are values for mammals and so some ecological receptors are quantitatively addressed, and there are avian ESLs for other phthalates which are evaluated in the analysis.
- There are no NE ESLs for birds for HMX or TATB. These did not produce adverse human health effects. There are values for HMX for mammals and so some ecological receptors are quantitatively addressed, and there are avian NE ESLs for a similar compound, RDX, which is evaluated in the analysis. Values for 1,3,5-trinitrobenzene were used to represent TATB.
- There are no NE ESLs for birds for methylene chloride or toluene. These did not produce adverse human health effects. There are values for mammals and so some ecological receptors are quantitatively addressed.
- There are no NE ESLs for birds for aluminum, antimony, or beryllium. Antimony was never detected, and the other inorganics were below BVs.
- There are no avian, invertebrate, or plant NE ESLs for 2-butanone. This analyte was not detected. Mammals are evaluated and so some ecological receptors are quantitatively addressed.
- 1,3-Dintrobenzene MDL exceeded NE ESLs for robin (herbivore), deer mouse (omnivore), and cottontail (herbivore), but did not exceed any LE ESLs. This was not detected and the maximum was less than human health SLs.

TEFs reflect the toxicity of the different dioxin/furan congeners. TEFs for plants and invertebrates are not available. Therefore, the TEFs for mammals were applied to represent these taxa in order to calculate TEQs. In general, mammalian TEFs are the same or higher than avian TEFs, and this results in a higher, more conservative, TEQ. Therefore, applying mammalian TEFs for plants and earthworms is more likely to overestimate than underestimate risk.

3.4.6. **Small-Mammal Field Investigations**

Small mammal trapping and analysis of whole organisms were conducted in the area around the Unit in 2010. This information was considered useful for the current analysis as an additional line of evidence. Field mice were collected around the site and analyzed for dioxins and furans as well as metals, and for polychlorinated biphenyls (PCBs) (Fresquez 2011). Small-mammal community and population parameters were also measured across the site (Bennett and Robinson 2011).

Small mammals expected at the Unit are the deer mouse (*Peromyscus maniculatus*), brush mouse (*Peromyscus boylii*), pinyon mouse (*Peromyscus truei*), silky pocket mouse (*Perognathus flavescens*), western harvest mouse (*Reithrodontomys megalotis*), white-throated woodrat (*Neotoma albigula*), and the Mexican woodrat (*Neotoma mexicana*) (Bennett and Robinson 2011). The vegetation community consists of piñon (*Pinus edulis Engelm*.), juniper (*Juniperus monosperma [Englem.] Sarg*.) with scattered ponderosa pine (*Pinus ponderosa C. Lawson*) and gambel oak (*Quercus gambelii Nutt*.) (Bennett and Robinson 2011). The capture rate and species diversity were highest at the Unit relative to the control area, and five species were captured. There were no differences in deer mouse sex ratios between the Unit and the control area. Average body weight of adult male deer mice was slightly higher at the Unit than at the control area. The authors of the study concluded that there was no apparent adverse effects on small mammal populations at the Unit relative to controls.

Radionuclides and chemical concentrations in biota were compared to regional statistical reference levels (RSRLs). RSRLs represent natural and fallout levels, and are the upper-level background concentrations (mean plus three standard deviations = 99% confidence level) for radionuclides and chemicals calculated from biota that was collected from regional locations away from the influence of the Laboratory (over nine miles away) (Fresquez 2011). The only analytes that exceeded RSRLs were barium (two out of three samples) and lead (three out of three samples). Dioxins/furans and explosives were not detected. These data suggest that there are no impacts to small mammal populations at the Unit.

3.4.7. **Avian Field Investigations**

Two western bluebird (*Sialia mexicana*) egg samples were obtained in 2018 from the Unit and analyzed for inorganic elements (Gaukler and Stanek 2019).

Concentrations of inorganic elements were compared with the upper-level bounds of background concentrations in bird eggs. The data indicated aluminum, antimony, arsenic, beryllium, cadmium, lead, nickel, silver, or vanadium were not detected in eggs (Gaukler and Stanec 2019). Barium, calcium, chromium, cobalt, iron, magnesium, manganese, mercury, potassium, selenium, sodium, thallium, and zinc were detected but were all below the RSRL for avian eggs. Copper at 4.1 mg/kg in one egg exceeded the RSRL of 3.6 mg/kg. Copper EPCs based on the UCL95 were compared to the ESLs for birds and were all below ESLs, suggesting that there would be no impact to bird populations due to copper. One sample of mountain bluebird (*Sialia currucoides*) eggs was collected in 2019, and no analytes were above the RSRLs (Gaukler and Stanek 2020).

Avian population metrics also do not suggest that birds in the vicinity are being negatively impacted (Hathcock et al 2018). Metrics including species richness and diversity were not statistically different from the Unit than at the control area. Species diversity was higher than at the control area in 2014, and afterwards was similar. Abundance varied in the Unit and control area annually, but abundance in the Unit compared to controls were similar over time, and just slightly lower than controls in 2016 and 2017. Species composition appears more influenced by habitat type, and indicates little difference between the Unit and control sites.

Combined, the egg concentration data and population metrics suggest that adverse health effects are not expected at the observed concentrations.

3.4.8. **Area Use Factors**

The Unit is very small with an areal extent of 1.44 acres (0.58 hectares (ha)). This is approximately the size of the home range (HR) of an individual robin as shown in Table 3-8. The HR is used to calculate area use factors (AUFs) that are used in the EcoPRG equations (LANL 2017). Individual AUFs and population area use factors (PAUFs) may be used to modify the estimate of risk to wildlife receptors to allow estimates to be more site-specific. The application of AUFs or PAUFs reduces potential overestimation of risks for those receptors with HRs larger than the area of contamination being evaluated. The estimated ecological risk as indicated by the HQ or HI is multiplied by the AUF or PAUF. HQs for plants or invertebrates are not adjusted by area use.

Table 3-8 presents the area use hazard analysis based on NE ESLs. The NE ESLs for each COPC that failed the screening evaluation (i.e., because refined EPCs exceeded the LE ESLs with HQs greater than 0.1) are shown for each receptor. The site specific AUF and PAUFs are shown for an area equivalent to the Unit. The UCL95 EPC is divided by the ESL and multiplied by the PAUF to obtain revised HQs. The habitat is not suitable for Mexican Spotted Owls or other special status species, and so an AUF evaluation was not conducted.

The mercury HQ is above 1 for robin modeled as an insectivore based on comparison of UCL95 values as the refined EPC to the NE ESL for each receptor (Table 3-8). The HQs for copper for plants and earthworms, and the HQ for mercury for earthworms, were greater than 1. No organics produced HQs above 1 (Table 3-8).

Table 3-9 presents the area use hazard analysis based on comparison of the UCL95 values as the EPC to the LE ESLs for each receptor. There are no HQs above 1. Table 3-9 presents HIs for LE ESLs calculated by summing the HQs. HIs are above 1 only for earthworms (HI =2) for the LE ESL comparison. Summing the HQs presumes effects will be additive, when effects may occur on different target organs and not be additive.

3.5. CONCLUSIONS

The ecological risk assessment used a tiered approach for determining if the Unit would present an ecological risk. The results of the initial and highly conservative screening step indicated several inorganics occurred above background concentrations, and several detected organics, would present a potential ecological risk. Maximum concentrations of five detected inorganics (i.e., cadmium, copper, mercury, perchlorate, and silver) exceeded background. Maximum concentrations of these inorganics also exceeded NE ESLs.

Dioxin/furans, some polynuclear aromatic hydrocarbons (PAHs), phthalates, benzoic acid, benzyl alcohol, and explosives were among the organics detected in the unit. Five inorganics (cadmium copper, mercury, perchlorate, and silver) and seven detected organics (benzoic acid, bis(2-ethylhexyl)phthalate, di-n-butylphthalate, HMX, RDX, TCDD TEQ, and TATB) exceeded NE ESLs in the initial screening level evaluation which compared maximum soil concentrations as EPCs to the NE ESLs.

Further evaluation by statistically estimating UCL95's to use as refined EPCs suggested few inorganics or organics would occur at concentrations hazardous to ecological receptors. Use of the UCL95 as the EPC provides a conservative estimate of average exposure across the Unit. Copper and mercury were the only inorganics with an HQ above 0.1 based on dividing the UCL95 by the LE ESL. UCL95's for bis(2-ethylhexyl)phthalate, RDX, TCDD TEQ, and TATB exceeded one or more LE ESLs.

Additional consideration of site ecology and receptor-specific adjustments to exposure by considering home range and site area further reduced the analytes exceeding NE ESLs. Only HQs for copper for earthworms and plants, and mercury for earthworms and robins, were above 1 based on a site-specific hazard analysis and NE ESLs. The HQs above 1 occurred for robins modeled as insectivores, and for plants and earthworms for which the area use evaluation is not relevant as they are largely immobile in the environment. However, the Unit is not vegetated because of its designated use as an OD area, and so plants and invertebrates have no habitat in the Unit. Robins would be unable to forage totally within the unit due to lack of prey and forage items. The LE ESLs are not exceeded for any receptor for any individual constituents, but the HI for earthworms is 2. This indicates that there is a very low potential for ecological risk at the Unit.

Finally, there is no suggestion of human health risk at the Unit, and the Unit is small relative to surrounding habitat, being only 1.44 acres. Due to human disturbance, ecological receptors are unlikely to remain within the Unit on a regular basis. The Unit is not likely to present an ecological risk to any receptor evaluated.

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Tables

Table 2-1. Summary Statistics for Fall 2018 Data

Analyte Name	Sample Size	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	SD (mg/kg)	Minimum MDL (mg/kg)	Maximum MDL (mg/kg)	Number of Detected Values
Inorganics								
Aluminum	16	1.77E+03	4.14E+03	2.89E+03	7.00E+02	6.24E+00	6.84E+00	16
Antimony	16	3.03E-01	3.32E-01	3.25E-01	2.94E-02	3.03E-01	3.32E-01	0
Arsenic	16	8.44E-01	2.28E+00	1.41E+00	3.37E-01	3.12E-01	3.42E-01	16
Barium	16	2.58E+01	1.15E+02	5.80E+01	2.53E+01	9.18E-02	1.01E-01	16
Beryllium	16	2.08E-01	5.88E-01	3.48E-01	1.19E-01	1.85E-02	2.02E-02	16
Cadmium	16	9.18E-02	4.67E-01	1.41E-01	1.05E-01	9.18E-02	1.01E-01	3
Calcium	16	1.68E+03	5.74E+03	2.99E+03	1.07E+03	7.34E+00	8.05E+00	16
Chromium	16	3.82E+00	4.92E+01	9.05E+00	1.08E+01	1.38E-01	1.51E-01	16
Cobalt	16	2.28E+00	8.44E+00	3.56E+00	1.43E+00	1.38E-01	1.51E-01	16
Copper	16	8.21E+00	5.97E+02	7.06E+01	1.43E+02	2.75E-01	3.02E-01	16
Iron	16	6.51E+03	1.29E+04	8.82E+03	1.77E+03	7.34E+00	8.05E+00	16
Lead	16	4.00E+00	3.52E+01	9.08E+00	7.56E+00	3.03E-01	3.32E-01	16
Magnesium	16	8.53E+02	2.58E+03	1.36E+03	3.90E+02	7.80E+00	8.55E+00	16
Manganese	16	1.19E+02	2.99E+02	1.70E+02	4.59E+01	1.84E-01	2.01E-01	16
Mercury	16	3.43E-03	7.75E-01	5.51E-02	1.92E-01	3.43E-03	3.44E-02	6
Nickel	16	3.35E+00	8.01E+00	6.28E+00	1.43E+00	9.24E-02	1.01E-01	16
Perchlorate	16	4.98E-04	2.96E-02	5.25E-03	8.52E-03	4.96E-04	1.01E-03	11
Potassium	16	3.58E+02	1.26E+03	6.89E+02	2.78E+02	5.87E+00	6.44E+00	16
Selenium	16	4.78E-01	9.37E-01	6.15E-01	1.29E-01	3.33E-01	3.64E-01	16
Silver	16	1.25E-01	2.19E+00	4.25E-01	5.20E-01	9.18E-02	1.01E-01	16
Sodium	16	3.73E+01	9.85E+01	5.33E+01	1.56E+01	6.43E+00	7.04E+00	16
Thallium	16	1.29E-01	2.22E+00	2.77E-01	5.19E-01	1.29E-01	1.42E-01	3
Vanadium	16	9.50E+00	2.90E+01	1.73E+01	4.96E+00	9.18E-02	1.01E-01	16
Zinc	16	1.85E+01	5.32E+01	2.89E+01	1.11E+01	3.67E-01	4.02E-01	16
Organics								
2,4-Diamino-6-nitrotoluene	16	4.93E-01	5.00E-01	4.96E-01	2.93E-03	4.93E-01	5.00E-01	0
2,6-Diamino-4-nitrotoluene	16	6.50E-01	6.60E-01	6.54E-01	4.15E-03	6.50E-01	6.60E-01	0
3,5-Dinitroaniline	16	2.96E-01	3.00E-01	2.98E-01	1.71E-03	2.96E-01	3.00E-01	0
Acenaphthene	18	1.00E-02	1.02E-02	1.01E-02	4.16E-05	1.00E-02	1.02E-02	0
Acenaphthylene	18	1.00E-02	1.02E-02	1.01E-02	4.16E-05	1.00E-02	1.02E-02	0
Acetone	16	1.55E-03	1.69E-03	1.63E-03	3.54E-05	1.55E-03	1.69E-03	0

Table 2-1. Summary Statistics for Fall 2018 Data

Analyte Name	Sample Size	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	SD (mg/kg)	Minimum MDL (mg/kg)	Maximum MDL (mg/kg)	Number of Detected Values
Amino-2,6-dinitrotoluene[4-]	16	1.48E-01	1.50E-01	1.49E-01	7.75E-04	1.48E-01	1.50E-01	0
Amino-4,6-dinitrotoluene[2-]	16	1.48E-01	1.50E-01	1.49E-01	7.75E-04	1.48E-01	1.50E-01	0
Aniline	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Anthracene	18	1.00E-02	1.02E-02	1.01E-02	4.16E-05	1.00E-02	1.02E-02	0
Azobenzene	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Benzene	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Benzo(a)anthracene	18	1.00E-02	2.95E-02	1.21E-02	5.04E-03	1.00E-02	1.02E-02	5
Benzo(a)pyrene	18	1.00E-02	2.72E-02	1.19E-02	4.75E-03	1.00E-02	1.02E-02	4
Benzo(b)fluoranthene	18	1.00E-02	3.25E-02	1.33E-02	7.20E-03	1.00E-02	1.02E-02	4
Benzo(g,h,i)perylene	18	1.00E-02	2.21E-02	1.09E-02	2.88E-03	1.00E-02	1.02E-02	2
Benzo(k)fluoranthene	18	1.00E-02	1.48E-02	1.04E-02	1.12E-03	1.00E-02	1.02E-02	2
Benzoic Acid	18	1.67E-01	4.97E-01	2.03E-01	1.00E-01	1.67E-01	1.70E-01	2
Benzyl Alcohol	18	1.00E-01	4.98E-01	1.38E-01	1.03E-01	1.00E-01	1.02E-01	4
Bis(2-chloroethoxy)methane	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Bis(2-chloroethyl)ether	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Bis(2-ethylhexyl)phthalate	18	1.00E-02	1.32E+00	2.25E-01	4.36E-01	1.00E-02	1.02E-02	6
Bromobenzene	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Bromochloromethane	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Bromodichloromethane	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Bromoform	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Bromomethane	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Bromophenyl-phenylether[4-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Butanone[2-]	16	1.55E-03	1.69E-03	1.63E-03	3.54E-05	1.55E-03	1.69E-03	0
Butylbenzene[n-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Butylbenzene[sec-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Butylbenzene[tert-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Butylbenzylphthalate	18	1.00E-02	1.02E-02	1.01E-02	4.16E-05	1.00E-02	1.02E-02	0
Carbon Disulfide	16	1.55E-03	1.69E-03	1.63E-03	3.54E-05	1.55E-03	1.69E-03	0
Carbon Tetrachloride	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Chloro-3-methylphenol[4-]	18	1.34E-01	1.36E-01	1.34E-01	6.16E-04	1.34E-01	1.36E-01	0
Chloroaniline[4-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Chlorobenzene	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Chlorodibromomethane	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0

Table 2-1. Summary Statistics for Fall 2018 Data

Analyte Name	Sample Size	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	SD (mg/kg)	Minimum MDL (mg/kg)	Maximum MDL (mg/kg)	Number of Detected Values
Chloroethane	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Chloroform	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Chloromethane	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Chloronaphthalene[2-]	18	1.00E-02	1.02E-02	1.01E-02	4.16E-05	1.00E-02	1.02E-02	0
Chlorophenol[2-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Chlorophenyl-phenyl[4-] Ether	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Chlorotoluene[2-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Chlorotoluene[4-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Chrysene	18	1.00E-02	2.95E-02	1.19E-02	4.91E-03	1.00E-02	1.02E-02	3
Dibenz(a,h)anthracene	18	1.00E-02	1.02E-02	1.01E-02	4.16E-05	1.00E-02	1.02E-02	0
Dibenzofuran	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Dibromo-3-Chloropropane[1,2-]	16	4.66E-04	5.06E-04	4.89E-04	1.05E-05	4.66E-04	5.06E-04	0
Dibromoethane[1,2-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Dibromomethane	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Dichlorobenzene[1,2-]	34	3.10E-04	1.02E-01	5.36E-02	5.10E-02	3.10E-04	1.02E-01	0
Dichlorobenzene[1,3-]	34	3.10E-04	1.02E-01	5.36E-02	5.10E-02	3.10E-04	1.02E-01	0
Dichlorobenzene[1,4-]	34	3.10E-04	1.02E-01	5.36E-02	5.10E-02	3.10E-04	1.02E-01	0
Dichlorobenzidine[3,3'-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Dichlorodifluoromethane	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Dichloroethane[1,1-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Dichloroethane[1,2-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Dichloroethene[1,1-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Dichloroethene[cis-1,2-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Dichloroethene[trans-1,2-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Dichlorophenol[2,4-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Dichloropropane[1,2-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Dichloropropane[1,3-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Dichloropropane[2,2-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Dichloropropene[1,1-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Dichloropropene[cis-1,3-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Dichloropropene[trans-1,3-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Diethylphthalate	18	1.00E-02	1.44E-02	1.03E-02	1.02E-03	1.00E-02	1.02E-02	1
Dimethyl Phthalate	18	1.00E-02	1.02E-02	1.01E-02	4.16E-05	1.00E-02	1.02E-02	0

Table 2-1. Summary Statistics for Fall 2018 Data

Analyte Name	Sample Size	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	SD (mg/kg)	Minimum MDL (mg/kg)	Maximum MDL (mg/kg)	Number of Detected Values
Dimethylphenol[2,4-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Di-n-butylphthalate	18	1.00E-02	7.44E-01	6.10E-02	1.74E-01	1.00E-02	1.02E-02	4
Dinitro-2-methylphenol[4,6-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Dinitrobenzene[1,3-]	16	1.48E-01	1.50E-01	1.49E-01	7.75E-04	1.48E-01	1.50E-01	0
Dinitrophenol[2,4-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Dinitrotoluene[2,4-]	34	1.00E-01	1.50E-01	1.23E-01	2.42E-02	1.00E-01	1.50E-01	0
Dinitrotoluene[2,6-]	34	1.00E-01	1.50E-01	1.23E-01	2.42E-02	1.00E-01	1.50E-01	0
Di-n-octylphthalate	18	1.00E-02	1.02E-02	1.01E-02	4.16E-05	1.00E-02	1.02E-02	0
Diphenylamine	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Ethylbenzene	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Fluoranthene	18	1.00E-02	5.33E-02	1.50E-02	1.16E-02	1.00E-02	1.02E-02	4
Fluorene	18	1.00E-02	1.02E-02	1.01E-02	4.16E-05	1.00E-02	1.02E-02	0
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	16	6.82E-07	1.13E-04	1.74E-05	2.99E-05	1.66E-06	1.68E-06	16
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	16	4.97E-07	4.02E-06	1.38E-06	1.28E-06	1.66E-06	1.68E-06	8
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	16	1.66E-06	1.68E-06	4.99E-07	1.67E-09	1.66E-06	1.68E-06	0
Hexachlorobenzene	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Hexachlorobutadiene	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Hexachlorocyclopentadiene	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	16	4.97E-07	6.79E-07	5.15E-07	4.87E-08	1.73E-06	1.75E-06	2
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	16	4.97E-07	1.45E-06	6.23E-07	2.74E-07	1.66E-06	1.68E-06	4
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	16	4.97E-07	1.11E-06	5.77E-07	1.90E-07	1.95E-06	1.97E-06	3
Hexachlorodibenzofuran[1,2,3,4,7,8-]	16	1.66E-06	1.68E-06	4.99E-07	1.67E-09	1.66E-06	1.68E-06	0
Hexachlorodibenzofuran[1,2,3,6,7,8-]	16	1.66E-06	1.68E-06	4.99E-07	1.67E-09	1.66E-06	1.68E-06	0
Hexachlorodibenzofuran[1,2,3,7,8,9-]	16	1.71E-06	1.74E-06	4.99E-07	1.67E-09	1.71E-06	1.74E-06	0
Hexachlorodibenzofuran[2,3,4,6,7,8-]	16	1.66E-06	1.68E-06	4.99E-07	1.67E-09	1.66E-06	1.68E-06	0
Hexachloroethane	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Hexanone[2-]	16	1.55E-03	1.69E-03	1.63E-03	3.54E-05	1.55E-03	1.69E-03	0
HMX	16	1.48E-01	3.87E+00	8.78E-01	9.83E-01	1.48E-01	1.50E-01	11
Indeno(1,2,3-cd)pyrene	18	1.00E-02	2.05E-02	1.08E-02	2.51E-03	1.00E-02	1.02E-02	2
Iodomethane	16	1.55E-03	1.69E-03	1.63E-03	3.54E-05	1.55E-03	1.69E-03	0
Isophorone	18	1.00E-01	3.24E-01	1.13E-01	5.26E-02	1.00E-01	1.02E-01	1
Isopropylbenzene	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Isopropyltoluene[4-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0

Table 2-1. Summary Statistics for Fall 2018 Data

Analyte Name	Sample Size	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	SD (mg/kg)	Minimum MDL (mg/kg)	Maximum MDL (mg/kg)	Number of Detected Values
Methyl-2-pentanone[4-]	16	1.55E-03	1.69E-03	1.63E-03	3.54E-05	1.55E-03	1.69E-03	0
Methylene Chloride	16	1.55E-03	5.73E-03	2.55E-03	1.46E-03	1.55E-03	1.69E-03	5
Methylnaphthalene[2-]	18	1.00E-02	1.02E-02	1.01E-02	4.16E-05	1.00E-02	1.02E-02	0
Methylphenol[2-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Methylphenol[3-,4-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Naphthalene	18	1.00E-02	1.51E-02	1.04E-02	1.18E-03	1.00E-02	1.02E-02	1
Nitroaniline[2-]	18	1.10E-01	1.12E-01	1.11E-01	4.16E-04	1.10E-01	1.12E-01	0
Nitroaniline[3-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Nitroaniline[4-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Nitrobenzene	34	1.00E-01	1.50E-01	1.23E-01	2.42E-02	1.00E-01	1.50E-01	0
Nitrophenol[2-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Nitrophenol[4-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Nitrosodimethylamine[N-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Nitroso-di-n-propylamine[N-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Nitrotoluene[2-]	16	1.48E-01	1.50E-01	1.49E-01	7.75E-04	1.48E-01	1.50E-01	0
Nitrotoluene[3-]	16	1.48E-01	1.50E-01	1.49E-01	7.75E-04	1.48E-01	1.50E-01	0
Nitrotoluene[4-]	16	1.48E-01	1.50E-01	1.49E-01	7.75E-04	1.48E-01	1.50E-01	0
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	16	4.56E-06	9.20E-04	1.39E-04	2.40E-04	3.31E-06	3.36E-06	16
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	16	9.93E-07	1.63E-05	4.50E-06	5.06E-06	3.31E-06	3.36E-06	9
Oxybis(1-chloropropane)[2,2'-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Pentachlorodibenzodioxin[1,2,3,7,8-]	16	1.66E-06	1.68E-06	4.99E-07	1.67E-09	1.66E-06	1.68E-06	0
Pentachlorodibenzofuran[1,2,3,7,8-]	16	1.66E-06	1.68E-06	4.99E-07	1.67E-09	1.66E-06	1.68E-06	0
Pentachlorodibenzofuran[2,3,4,7,8-]	16	1.75E-06	1.77E-06	4.99E-07	1.67E-09	1.75E-06	1.77E-06	0
Pentachlorophenol	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
PETN	16	2.46E-01	2.50E-01	2.48E-01	1.69E-03	2.46E-01	2.50E-01	0
Phenanthrene	18	1.00E-02	2.78E-02	1.17E-02	4.34E-03	1.00E-02	1.02E-02	4
Phenol	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Propylbenzene[1-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Pyrene	18	1.00E-02	5.57E-02	1.50E-02	1.18E-02	1.00E-02	1.02E-02	4
Pyridine	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
RDX	16	1.48E-01	4.76E+00	7.88E-01	1.33E+00	1.48E-01	1.50E-01	7
Styrene	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
TATB	16	3.33E+00	2.22E+01	1.22E+01	4.73E+00	2.96E-01	1.50E+00	16

Table 2-1. Summary Statistics for Fall 2018 Data

Analyte Name	Sample Size	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	SD (mg/kg)	Minimum MDL (mg/kg)	Maximum MDL (mg/kg)	Number of Detected Values
Tetrachlorodibenzodioxin[2,3,7,8-]	16	3.31E-07	3.36E-07	1.01E-07	3.28E-09	3.31E-07	3.36E-07	0
Tetrachlorodibenzofuran[2,3,7,8-]	16	1.10E-07	2.51E-07	1.83E-07	3.86E-08	3.31E-07	3.36E-07	8
Tetrachloroethane[1,1,1,2-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Tetrachloroethane[1,1,2,2-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Tetrachloroethene	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Tetryl	16	1.48E-01	1.50E-01	1.49E-01	7.75E-04	1.48E-01	1.50E-01	0
Toluene	16	3.10E-04	2.23E-03	5.75E-04	6.22E-04	3.10E-04	3.37E-04	4
Trichloro-1,2,2-trifluoroethane[1,1,2-]	16	1.55E-03	1.69E-03	1.63E-03	3.54E-05	1.55E-03	1.69E-03	0
Trichlorobenzene[1,2,4-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Trichloroethane[1,1,1-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Trichloroethane[1,1,2-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Trichloroethene	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Trichlorofluoromethane	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Trichlorophenol[2,4,5-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Trichlorophenol[2,4,6-]	18	1.00E-01	1.02E-01	1.01E-01	4.16E-04	1.00E-01	1.02E-01	0
Trichloropropane[1,2,3-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Trimethylbenzene[1,2,4-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Trimethylbenzene[1,3,5-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Trinitrobenzene[1,3,5-]	16	1.48E-01	1.50E-01	1.49E-01	7.75E-04	1.48E-01	1.50E-01	0
Trinitrotoluene[2,4,6-]	16	1.48E-01	1.50E-01	1.49E-01	7.75E-04	1.48E-01	1.50E-01	0
Tris (o-cresyl) phosphate	16	2.96E-01	3.00E-01	2.98E-01	1.71E-03	2.96E-01	3.00E-01	0
Vinyl Chloride	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Xylene[1,2-]	16	3.10E-04	3.37E-04	3.26E-04	7.01E-06	3.10E-04	3.37E-04	0
Xylene[1,3-]+Xylene[1,4-]	16	6.21E-04	6.75E-04	6.53E-04	1.41E-05	6.21E-04	6.75E-04	0

Notes: Sample size (n) includes duplicate of WST39-18-162834 (WST39-18-162985) and multiple analytical methods.
Abbreviations:
MDL – Method detection limit
mg/kg – milligram per kilogram
SD – Standard deviation

Table 2-2. Comparison of Maximum Detected Exposure Point Concentrations to Background

Parameter Name	Maximum (mg/kg)	Number of Detected Values	Background	
			BV (mg/kg)	Maximum /BV Ratio
Aluminum	4.14E+03	16	29200	0.1
Antimony	4.32E-01	0	0.83	0.5
Arsenic	2.28E+00	16	8.17	0.3
Barium	1.15E+02	16	295	0.4
Beryllium	5.88E-01	16	1.83	0.3
Cadmium	4.67E-01	3	0.4	1.2
Calcium	5.74E+03	16	6120	0.9
Chromium[1]	4.92E+01	16	19.3	2.5
Cobalt	8.44E+00	16	8.64	1.0
Copper	5.97E+02	16	14.7	41
Iron	1.29E+04	16	21500	0.6
Lead[1]	3.52E+01	16	22.3	1.6
Magnesium	2.58E+03	16	4610	0.6
Manganese	2.99E+02	16	671	0.4
Mercury	7.75E-01	6	0.1	7.8
Nickel	8.01E+00	16	15.4	0.5
Perchlorate	2.96E-02	11	--	NA
Potassium	1.26E+03	16	3460	0.4
Selenium	9.37E-01	16	1.52	0.6
Silver	2.19E+00	16	1	2.2
Sodium	9.85E+01	16	915	0.1
Thallium[1]	2.22E+00	3	0.73	3.0
Vanadium	2.90E+01	16	39.6	0.7
Zinc[1]	5.32E+01	16	48.8	1.1

Notes: All data in mg/kg
[1] – Site inorganic <= background by hypothesis testing; see Section 2.2.2
-- No value
Shaded Max/BV cells indicate the inorganic is carried forward; see Section 2.2.2.
If the maximum <BV or by hypothesis testing, no further evaluation is performed
Abbreviations:
BV – Background value
HQ – Noncancer hazard quotient
NA – Not applicable

Table 2- 3. Human Health Screening Assessment for Organics and Inorganics Above Background

Parameter Name	Maximum (mg/kg)	Cancer						**Noncancer**					
		Res Cancer NMSSL (mg/kg)	**Ind. Worker Cancer NMSSL (mg/kg)**	**Con. Worker Cancer NMSSL (mg/kg)**	**Max/ Res Cancer Risk**	**Max/ Ind. Worker Cancer Risk**	**Max/ Con. Worker Cancer Risk**	**Res NC NMSSL (mg/kg)**	**Worker NC NMSSL (mg/kg)**	**Con. Worker NC NMSSL (mg/kg)**	**Max/ Res HQ**	**Max/ Ind. Worker HQ**	**Max/ Con. Worker HQ**
Cadmium	4.67E-01	8.59E+04	4.17E+05	3.61E+03	5E-11	1E-11	1E-09	7.05E+01	1.11E+03	7.21E+01	7E-03	4E-04	6E-03
Copper	5.97E+02	--	--	--	--	--	--	3.13E+03	5.19E+04	1.42E+04	2E-01	1E-02	4E-02
Mercury	7.75E-01	--	--	--	--	--	--	2.35E+01	3.89E+02	7.71E+01	3E-02	2E-03	1E-02
Perchlorate	2.96E-02	--	--	--	--	--	--	5.48E+01	9.08E+02	2.48E+02	5E-04	3E-05	1E-04
Silver	2.19E+00	--	--	--	--	--	--	3.91E+02	6.49E+03	1.77E+03	6E-03	3E-04	1E-03
2,3,7,8-TCDD TEQ	5.03E-06	4.90E-05	2.38E-04	1.72E-03	1E-06	2E-07	3E-08	5.06E-05	8.08E-04	2.26E-04	1E-01	6E-03	2E-02
Benzo(a)anthracene	2.95E-02	1.53E+00	3.23E+01	2.40E+02	2E-07	9E-09	1E-09	--	--	--	--	--	--
Benzo(a)pyrene	2.72E-02	1.12E+00	2.36E+01	1.73E+02	2E-07	1E-08	2E-09	1.74E+01	2.51E+02	1.50E+01	2E-03	1E-04	2E-03
Benzo(b)fluoranthene	3.25E-02	1.53E+00	3.23E+01	2.40E+02	2E-07	1E-08	1E-09	--	--	--	--	--	--
Benzo(g,h,i)perylene	2.21E-02	***1.12E+00***	***2.36E+01***	***1.73E+02***	2E-07	9E-09	1E-09	***1.74E+01***	***2.51E+02***	***1.50E+01***	1E-03	9E-05	1E-03
Benzo(k)fluoranthene	1.48E-02	1.53E+01	3.23E+02	2.31E+03	1E-08	5E-10	6E-11	--	--	--	--	--	--
Benzoic Acid	4.97E-01	--	--	--	--	--	--	**2.50E+05**	**3.30E+06**	**3.30E+06**	2E-06	2E-07	2E-07
Benzyl Alcohol	4.98E-01	--	--	--	--	--	--	**6.30E+03**	**8.20E+04**	**8.20E+04**	8E-05	6E-06	6E-06
Bis(2-ethylhexyl)phthalate	1.32E+00	3.80E+02	1.83E+03	1.34E+04	3E-08	7E-09	1E-09	1.23E+03	1.83E+04	5.38E+03	1E-03	7E-05	2E-04
Chrysene	2.95E-02	1.53E+02	3.23E+03	2.31E+04	2E-09	9E-11	1E-11	--	--	--	--	--	--
Diethylphthalate	1.44E-02	--	--	--	--	--	--	4.93E+04	7.33E+05	2.15E+05	3E-07	2E-08	7E-08
Di-n-butylphthalate	7.44E-01	--	--	--	--	--	--	6.16E+03	9.16E+04	2.69E+04	1E-04	8E-06	3E-05
Fluoranthene	5.33E-02	--	--	--	--	--	--	2.32E+03	3.37E+04	1.00E+04	2E-05	2E-06	5E-06
HMX	3.87E+00	--	--	--	--	--	--	3.85E+03	6.33E+04	1.74E+04	1E-03	6E-05	2E-04
Indeno(1,2,3-cd)pyrene	2.05E-02	1.53E+00	3.23E+01	2.40E+02	1E-07	6E-09	9E-10	--	--	--	--	--	--
Isophorone	3.24E-01	5.61E+03	2.70E+04	1.98E+05	6E-10	1E-10	2E-11	1.23E+04	1.83E+05	5.37E+04	3E-05	2E-06	6E-06
Methylene Chloride	5.73E-03	7.66E+02	1.44E+04	8.96E+04	7E-11	4E-12	6E-13	4.09E+02	5.13E+03	1.21E+03	1E-05	1E-06	5E-06
Naphthalene	1.51E-02	2.26E+01	1.34E+02	6.33E+02	7E-09	1E-09	2E-10	1.62E+02	8.43E+02	1.59E+02	9E-05	2E-05	1E-04
Phenanthrene	2.78E-02	--	--	--	--	--	--	1.74E+03	2.53E+04	7.53E+03	2E-05	1E-06	4E-06
Pyrene	5.57E-02	--	--	--	--	--	--	1.74E+03	2.53E+04	7.53E+03	3E-05	2E-06	7E-06
RDX	4.76E+00	8.31E+01	4.28E+02	2.96E+03	6E-07	1E-07	2E-08	3.01E+02	4.89E+03	1.35E+03	2E-02	1E-03	4E-03
TATB	2.22E+01	--	--	--	--	--	--	***2.20E+03***	***3.20E+04***	***3.20E+04***	1E-02	7E-04	7E-04
Toluene	2.23E-03	--	--	--	--	--	--	5.23E+03	6.13E+04	1.40E+04	4E-07	4E-08	2E-07
Cumulative Cancer Risk or Hazard Index		--	--	--	**3E-06**	**4E-07**	**6E-08**	**--**	**--**	**--**	**3E-01**	**2E-02**	**9E-02**

Notes:
All data in mg/kg
[1] – Site inorganic <= background by hypothesis testing
-- No value
Bolded NMSSL cells indicate the EPA RSL for an HQ of 1 is used. See Section 2.1.3.4.
Bold Italics – a surrogate is applied. See Section 2.1.3.4.
Cancer risk = Maximum/Cancer-based NMSSL x 1E-05
HQ = Maximum/Noncancer-based NMSSL

Abbreviations:
BV – Background value
Con – Construction
EPA – U.S. Environmental Protection Agency
HQ – Noncancer hazard quotient
Ind – Industrial
Max – Maximum
NC – Noncancer
NMSSL – New Mexico soil screening level
Res - Residential
RSL – Regional Screening level

Table 2-4. Dioxin/Furan Data, Human Health TEFs, and TEQs

Parameter Name	TEF	WST36-18-162834			WST36-18-162985			WST36-18-162986			WST36-18-162987		
		Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	0.01	8.40E-07	1	8.40E-09	6.82E-07	1	6.82E-09	3.68E-06	1	3.68E-08	7.96E-06	1	7.96E-08
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	0.01	5.00E-07	0	5.00E-09	4.97E-07	0	4.97E-09	8.20E-07	1	8.20E-09	1.49E-06	1	1.49E-08
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	0.01	5.00E-07	0	1.67E-08	4.97E-07	0	1.66E-08	4.98E-07	0	1.66E-08	5.03E-07	0	1.68E-08
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	0.1	5.00E-07	0	5.00E-08	4.97E-07	0	4.97E-08	4.98E-07	0	4.98E-08	5.03E-07	0	5.03E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	0.1	5.00E-07	0	5.00E-08	4.97E-07	0	4.97E-08	4.98E-07	0	4.98E-08	5.03E-07	0	5.03E-08
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	0.1	5.00E-07	0	5.00E-08	4.97E-07	0	4.97E-08	4.98E-07	0	4.98E-08	5.03E-07	0	5.03E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	0.1	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	5.03E-07	0	1.68E-07
Hexachlorodibenzofuran[1,2,3,6,7,8-]	0.1	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	5.03E-07	0	1.68E-07
Hexachlorodibenzofuran[1,2,3,7,8,9-]	0.1	5.00E-07	0	1.72E-07	4.97E-07	0	1.71E-07	4.98E-07	0	1.72E-07	5.03E-07	0	1.74E-07
Hexachlorodibenzofuran[2,3,4,6,7,8-]	0.1	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	5.03E-07	0	1.68E-07
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	0.0003	5.61E-06	1	1.68E-09	4.56E-06	1	1.37E-09	3.41E-05	1	1.02E-08	7.74E-05	1	2.32E-08
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	0.0003	9.99E-07	0	3.00E-10	9.94E-07	0	2.98E-10	2.54E-06	1	7.62E-10	5.55E-06	1	1.67E-09
Pentachlorodibenzodioxin[1,2,3,7,8-]	1	5.00E-07	0	1.67E-06	4.97E-07	0	1.66E-06	4.98E-07	0	1.66E-06	5.03E-07	0	1.68E-06
Pentachlorodibenzofuran[1,2,3,7,8-]	0.03	5.00E-07	0	5.01E-08	4.97E-07	0	4.98E-08	4.98E-07	0	4.98E-08	5.03E-07	0	5.04E-08
Pentachlorodibenzofuran[2,3,4,7,8-]	0.3	5.00E-07	0	5.28E-07	4.97E-07	0	5.25E-07	4.98E-07	0	5.28E-07	5.03E-07	0	5.31E-07
Tetrachlorodibenzodioxin[2,3,7,8-]	1	9.99E-08	0	3.33E-07	9.94E-08	0	3.31E-07	9.95E-08	0	3.32E-07	1.01E-07	0	3.36E-07
Tetrachlorodibenzofuran[2,3,7,8-]	0.1	1.10E-07	1	1.10E-08	1.75E-07	1	1.75E-08	1.31E-07	1	1.31E-08	2.27E-07	1	2.27E-08
TEQ				**3.45E-06**			**3.43E-06**			**3.47E-06**			**3.59E-06**

Notes:
The TECi are summed in each column to obtain the TEQ. The TEQs are used in ProUCL to obtain a UCL95 EPC.
All data in mg/kg
DC- Detect code (1 = detected, 0 = not detected)
WST36-18-162834 and WST36-18-162985 are the duplicate pair.

Table 2-4. Dioxin/Furan Data, Human Health TEFs, and TEQs, Cont.

Parameter Name	TEF	WST36-18-162988			WST36-18-162989			WST36-18-162990			WST36-18-162991		
		Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	0.01	1.74E-06	1	1.74E-08	1.06E-06	1	1.06E-08	1.11E-06	1	1.11E-08	4.67E-06	1	4.67E-08
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	0.01	4.97E-07	0	4.97E-09	4.97E-07	0	4.97E-09	4.98E-07	0	4.98E-09	4.99E-07	0	4.99E-09
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	0.01	4.97E-07	0	1.66E-08	4.97E-07	0	1.66E-08	4.98E-07	0	1.66E-08	4.99E-07	0	1.66E-08
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	0.1	4.97E-07	0	4.97E-08	4.97E-07	0	4.97E-08	4.98E-07	0	4.98E-08	4.99E-07	0	4.99E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	0.1	4.97E-07	0	4.97E-08	4.97E-07	0	4.97E-08	4.98E-07	0	4.98E-08	4.99E-07	0	4.99E-08
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	0.1	4.97E-07	0	4.97E-08	4.97E-07	0	4.97E-08	4.98E-07	0	4.98E-08	4.99E-07	0	4.99E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	0.1	4.97E-07	0	1.66E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.99E-07	0	1.66E-07
Hexachlorodibenzofuran[1,2,3,6,7,8-]	0.1	4.97E-07	0	1.66E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.99E-07	0	1.66E-07
Hexachlorodibenzofuran[1,2,3,7,8,9-]	0.1	4.97E-07	0	1.71E-07	4.97E-07	0	1.71E-07	4.98E-07	0	1.72E-07	4.99E-07	0	1.72E-07
Hexachlorodibenzofuran[2,3,4,6,7,8-]	0.1	4.97E-07	0	1.66E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.99E-07	0	1.66E-07
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	0.0003	1.40E-05	1	4.20E-09	1.02E-05	1	3.06E-09	1.01E-05	1	3.03E-09	4.30E-05	1	1.29E-08
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	0.0003	9.94E-07	0	2.98E-10	9.94E-07	0	2.98E-10	9.95E-07	0	2.99E-10	1.33E-06	1	3.99E-10
Pentachlorodibenzodioxin[1,2,3,7,8-]	1	4.97E-07	0	1.66E-06	4.97E-07	0	1.66E-06	4.98E-07	0	1.66E-06	4.99E-07	0	1.66E-06
Pentachlorodibenzofuran[1,2,3,7,8-]	0.03	4.97E-07	0	4.98E-08	4.97E-07	0	4.98E-08	4.98E-07	0	4.98E-08	4.99E-07	0	4.98E-08
Pentachlorodibenzofuran[2,3,4,7,8-]	0.3	4.97E-07	0	5.25E-07	4.97E-07	0	5.25E-07	4.98E-07	0	5.28E-07	4.99E-07	0	5.28E-07
Tetrachlorodibenzodioxin[2,3,7,8-]	1	9.94E-08	0	3.32E-07	9.94E-08	0	3.32E-07	9.95E-08	0	3.32E-07	9.99E-08	0	3.33E-07
Tetrachlorodibenzofuran[2,3,7,8-]	0.1	1.79E-07	1	1.79E-08	1.87E-07	1	1.87E-08	1.71E-07	1	1.71E-08	1.44E-07	1	1.44E-08
TEQ				**3.45E-06**			**3.44E-06**			**3.44E-06**			**3.49E-06**

Notes:
The TECi are summed in each column to obtain the TEQ. The TEQs are used in ProUCL to obtain a UCL95 EPC.
All data in mg/kg
DC- Detect code (1 = detected, 0 = not detected)

Table 2-4. Dioxin/Furan Data, Human Health TEFs, and TEQs, Cont.

Parameter Name	TEF	WST36-18-162992			WST36-18-162993			WST36-18-162994			WST36-18-162995		
		Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	0.01	2.20E-05	1	2.20E-07	8.35E-06	1	8.35E-08	4.84E-05	1	4.84E-07	1.13E-04	1	1.13E-06
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	0.01	3.44E-06	1	3.44E-08	1.29E-06	1	1.29E-08	4.02E-06	1	4.02E-08	3.66E-06	1	3.66E-08
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	0.01	4.98E-07	0	1.66E-08	4.98E-07	0	1.66E-08	4.98E-07	0	1.66E-08	4.98E-07	0	1.66E-08
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	0.1	4.98E-07	0	4.98E-08	4.98E-07	0	4.98E-08	5.85E-07	1	5.85E-08	6.79E-07	1	6.79E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	0.1	6.27E-07	1	6.27E-08	4.98E-07	0	4.98E-08	1.09E-06	1	1.09E-07	1.45E-06	1	1.45E-07
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	0.1	4.98E-07	0	4.98E-08	4.98E-07	0	4.98E-08	1.11E-06	1	1.11E-07	9.91E-07	1	9.91E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	0.1	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07
Hexachlorodibenzofuran[1,2,3,6,7,8-]	0.1	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07
Hexachlorodibenzofuran[1,2,3,7,8,9-]	0.1	4.98E-07	0	1.72E-07	4.98E-07	0	1.72E-07	4.98E-07	0	1.72E-07	4.98E-07	0	1.72E-07
Hexachlorodibenzofuran[2,3,4,6,7,8-]	0.1	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	0.0003	1.82E-04	1	5.46E-08	6.93E-05	1	2.08E-08	3.90E-04	1	1.17E-07	9.20E-04	1	2.76E-07
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	0.0003	1.01E-05	1	3.03E-09	3.95E-06	1	1.19E-09	1.39E-05	1	4.17E-09	1.63E-05	1	4.89E-09
Pentachlorodibenzodioxin[1,2,3,7,8-]	1	4.98E-07	0	1.66E-06	4.98E-07	0	1.66E-06	4.98E-07	0	1.66E-06	4.98E-07	0	1.66E-06
Pentachlorodibenzofuran[1,2,3,7,8-]	0.03	4.98E-07	0	4.98E-08	4.98E-07	0	4.98E-08	4.98E-07	0	4.98E-08	4.98E-07	0	4.98E-08
Pentachlorodibenzofuran[2,3,4,7,8-]	0.3	4.98E-07	0	5.28E-07	4.98E-07	0	5.28E-07	4.98E-07	0	5.28E-07	4.98E-07	0	5.28E-07
Tetrachlorodibenzodioxin[2,3,7,8-]	1	9.96E-08	0	3.32E-07	9.97E-08	0	3.32E-07	1.05E-07	0	3.32E-07	9.95E-08	0	3.32E-07
Tetrachlorodibenzofuran[2,3,7,8-]	0.1	1.73E-07	0	1.73E-08	1.67E-07	0	1.67E-08	2.19E-07	0	2.19E-08	1.59E-07	0	1.59E-08
TEQ				**3.75E-06**			**3.54E-06**			**4.20E-06**			**5.03E-06**

Notes:
Shaded cell is the maximum TEQ.
The TECi are summed in each column to obtain the TEQ. The TEQs are used in ProUCL to obtain a UCL95 EPC.
All data in mg/kg
DC- Detect code (1 = detected, 0 = not detected)

Table 2-4. Dioxin/Furan Data, Human Health TEFs, and TEQs, Cont.

Parameter Name	TEFs	WST36-18-162996			WST36-18-162997			WST36-18-162998			WST36-18-162999		
		Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	0.01	4.70E-05	1	4.70E-07	1.59E-05	1	1.59E-07	7.51E-07	1	7.51E-09	8.19E-07	1	8.19E-09
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	0.01	2.48E-06	1	2.48E-08	9.11E-07	1	9.11E-09	4.97E-07	0	4.97E-09	5.01E-07	0	5.01E-09
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	0.01	4.98E-07	0	1.66E-08	5.00E-07	0	1.67E-08	4.97E-07	0	1.66E-08	5.01E-07	0	1.67E-08
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	0.1	4.98E-07	0	4.98E-08	5.00E-07	0	5.00E-08	4.97E-07	0	4.97E-08	5.01E-07	0	5.01E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	0.1	8.22E-07	1	8.22E-08	5.00E-07	0	5.00E-08	4.97E-07	0	4.97E-08	5.01E-07	0	5.01E-08
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	0.1	6.55E-07	1	6.55E-08	5.00E-07	0	5.00E-08	4.97E-07	0	4.97E-08	5.01E-07	0	5.01E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	0.1	4.98E-07	0	1.66E-07	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	5.01E-07	0	1.67E-07
Hexachlorodibenzofuran[1,2,3,6,7,8-]	0.1	4.98E-07	0	1.66E-07	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	5.01E-07	0	1.67E-07
Hexachlorodibenzofuran[1,2,3,7,8,9-]	0.1	4.98E-07	0	1.72E-07	5.00E-07	0	1.72E-07	4.97E-07	0	1.71E-07	5.01E-07	0	1.73E-07
Hexachlorodibenzofuran[2,3,4,6,7,8-]	0.1	4.98E-07	0	1.66E-07	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	5.01E-07	0	1.67E-07
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	0.0003	3.40E-04	1	1.02E-07	1.14E-04	1	3.42E-08	5.49E-06	1	1.65E-09	8.29E-06	1	2.49E-09
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	0.0003	8.97E-06	1	2.69E-09	2.47E-06	1	7.41E-10	9.93E-07	0	2.98E-10	1.00E-06	0	3.00E-10
Pentachlorodibenzodioxin[1,2,3,7,8-]	1	4.98E-07	0	1.66E-06	5.00E-07	0	1.67E-06	4.97E-07	0	1.66E-06	5.01E-07	0	1.67E-06
Pentachlorodibenzofuran[1,2,3,7,8-]	0.03	4.98E-07	0	4.98E-08	5.00E-07	0	5.01E-08	4.97E-07	0	4.98E-08	5.01E-07	0	5.01E-08
Pentachlorodibenzofuran[2,3,4,7,8-]	0.3	4.98E-07	0	5.28E-07	5.00E-07	0	5.28E-07	4.97E-07	0	5.25E-07	5.01E-07	0	5.31E-07
Tetrachlorodibenzodioxin[2,3,7,8-]	1	9.95E-08	0	3.32E-07	9.99E-08	0	3.33E-07	1.12E-07	0	3.31E-07	1.00E-07	0	3.34E-07
Tetrachlorodibenzofuran[2,3,7,8-]	0.1	2.51E-07	0	2.51E-08	1.78E-07	0	1.78E-08	2.13E-07	0	2.13E-08	2.36E-07	0	2.36E-08
TEQs				**4.08E-06**			**3.64E-06**			**3.44E-06**			**3.47E-06**

Notes:
DC- Detect code (1 = detected, 0 = not detected)
Notes: The TECi are summed in each column to obtain the TEQ. The TEQs are used in ProUCL to obtain a UCL95 EPC.
All data in mg/kg

Table 2-5. Screening Level Risk Assessment Cumulative Cancer Risk and Hazard Index

Category	Cancer Risk			Hazard Index		
	Resident	Industrial Worker	Construction Worker	Resident	Industrial Worker	Construction Worker
Inorganics	5E-11	1E-11	1E-09	0.2	0.01	0.06
Organics	2E-06	2E-07	3E-08	0.04	0.002	0.008
TCDD TEQ	1E-06	2E-07	3E-08	0.1	0.006	0.02
Total	3E-06	4E-07	6E-08	0.3	0.02	0.09

Notes:
Risk and HI are based on maximum soil concentrations
Cancer risk = Sum of (Maximum/Cancer-based NMSSL x 1E-05) for each detected analyte above background
Hazard Index = Sum of (Maximum/Noncancer-based NMSSL) for each detected analyte above background
NMSSL – New Mexico soil screening level

Table 2-6. Migration to Groundwater Screening Evaluation for Maximum Soil Concentrations of Inorganics above Background and Detected Organics

Parameter Name	Parameter Code	Maximum Reported Result (mg/kg)	NMED Groundwater SSL (mg/kg)	Groundwater SSL Risk Ratio
Cadmium	Cd	4.67E-01	9.39E+00	5E-02
Copper	Cu	5.97E+02	9.15E+02	7E-01
Mercury	Hg	7.75E-01	5.13E+00	2E-01
Perchlorate	ClO4	2.96E-02	1.17E-01	3E-01
Silver	Ag	2.19E+00	1.38E+01	2E-01
Benzo(a)anthracene	56-55-3	2.95E-02	6.37E-01	5E-02
Benzo(a)pyrene	50-32-8	2.72E-02	4.42E+00	6E-03
Benzo(b)fluoranthene	205-99-2	3.25E-02	6.17E+00	5E-03
Benzo(g,h,i)perylene	191-24-2	2.21E-02	***4.42E+00***	5E-03
Benzo(k)fluoranthene	207-08-9	1.48E-02	6.05E+01	2E-04
Benzoic Acid	65-85-0	4.97E-01	**3.00E+02**	2E-03
Benzyl Alcohol	100-51-6	4.98E-01	**9.60E+00**	5E-02
Bis(2-ethylhexyl)phthalate	117-81-7	1.32E+00	2.00E+02	7E-03
Chrysene	218-01-9	2.95E-02	1.86E+02	2E-04
Diethylphthalate	84-66-2	1.44E-02	9.79E+01	1E-04
Di-n-butylphthalate	84-74-2	7.44E-01	3.38E+01	2E-02
Fluoranthene	206-44-0	5.33E-02	1.34E+03	4E-05
HMX	2691-41-0	3.87E+00	1.94E+01	2E-01
Indeno(1,2,3-cd)pyrene	193-39-5	2.05E-02	2.01E+01	1E-03
Isophorone	78-59-1	3.24E-01	4.23E+00	8E-02
Methylene Chloride	75-09-2	5.73E-03	4.71E-01	1E-02
Naphthalene	91-20-3	1.51E-02	5.83E-02	3E-01
Phenanthrene	85-01-8	2.78E-02	8.59E+01	3E-04
Pyrene	129-00-0	5.57E-02	1.92E+02	3E-04
RDX	121-82-4	4.76E+00	5.93E-02	8E+01
TATB	3058-38-6	2.22E+01	***4.20E+01***	5E-01
Toluene	108-88-3	2.23E-03	1.21E+01	2E-04

Notes: Shaded cell – maximum exceeds NMSSL
Bolded values – value is the EPA RSL multiplied by a DAF of 20 for consistency with NMED (2021)
Bold italics – value is a surrogate. See Section 2.2.4.
mg/kg – milligram per kilogram
SSL – soil screening level (NMED 2021)

Table 3-1. Ecological Screening Levels (ESLs)

Analyte Group	Analyte Name	No Effect ESL									
		American kestrel (Avian top carnivore)	**American kestrel (insectivore / carnivore)**	**American robin (Avian herbivore)**	**American robin (Avian insectivore)**	**American robin (Avian omnivore)**	**Deer mouse (Mammalian omnivore)**	**Earthworm (Soil-dwelling invertebrate)**	**Generic plant (Terrestrial autotroph - producer)**	**Gray fox (Mammalian top carnivore)**	**Mountain cottontail (Mammalian herbivore)**
Inorganic Compound	Cadmium	4.30E+02	1.30E+00	4.30E+00	2.90E-01	5.40E-01	5.00E-01	1.40E+02	3.20E+01	5.50E+02	1.00E+01
	Copper	1.10E+03	8.00E+01	3.40E+01	1.40E+01	2.00E+01	6.30E+01	8.00E+01	7.00E+01	4.00E+03	2.60E+02
	Mercury (inorganic)	3.20E-01	5.80E-02	6.70E-02	1.30E-02	2.20E-02	3.00E+00	5.00E-02	3.40E+01	7.60E+01	2.30E+01
	Perchlorate	2.00E+00	3.90E+00	1.20E-01	3.10E+01	2.40E-01	2.10E-01	3.50E+00	4.00E+01	3.30E+00	2.60E-01
	Silver	6.00E+02	1.30E+01	1.00E+01	2.60E+00	4.10E+00	2.40E+01	--	5.60E+02	4.40E+03	1.50E+02
Dioxin/ Furan	2,3,7,8 TCDD	4.10E-06	4.10E-06	4.10E-06	4.10E-06	4.10E-06	5.80E-07	5.00E+00	--	1.00E-04	4.00E-05
High Explosive	HMX	--	--	--	--	--	2.90E+02	1.60E+01	2.70E+03	5.90E+04	4.10E+02
	RDX	7.80E+02	1.10E+01	2.30E+00	2.40E+00	2.30E+00	1.60E+01	8.40E+00	--	7.00E+03	3.80E+01
	TATB	--	--	--	--	--	1.10E+02	1.00E+01	--	1.00E+04	1.50E+02
Polyaromatic Hydrocarbon	Benzo(a)anthracene	2.80E+01	6.40E+00	7.30E-01	8.80E-01	8.00E-01	3.40E+00	--	1.80E+01	1.10E+02	6.10E+00
	Benzo(a)pyrene	--	--	--	--	--	8.40E+01	--	--	3.40E+03	2.60E+02
	Benzo(b)fluoranthene	--	--	--	--	--	5.10E+01	--	1.80E+01	2.40E+03	1.30E+02
	Benzo(g,h,i)perylene	--	--	--	--	--	4.60E+01	--	--	3.60E+03	4.70E+02
	Benzo(k)fluoranthene	--	--	--	--	--	9.90E+01	--	--	4.30E+03	3.30E+02
	Chrysene	--	--	--	--	--	3.10E+00	--	--	1.10E+02	6.30E+00
	Fluoranthene	--	--	--	--	--	3.80E+01	1.00E+01	--	3.90E+03	2.70E+02
	Indeno(1,2,3-cd)pyrene	--	--	--	--	--	1.10E+02	--	--	4.60E+03	5.10E+02
	Naphthalene	2.10E+03	7.80E+01	3.40E+00	1.50E+01	5.70E+00	9.60E+00	--	1.00E+00	5.80E+03	1.40E+01
	Phenanthrene	--	--	--	--	--	1.50E+01	5.50E+00	--	1.90E+03	6.20E+01
	Pyrene	3.00E+03	1.60E+02	6.80E+01	3.30E+01	4.40E+01	3.10E+01	1.00E+01	--	3.10E+03	1.10E+02
Semivolatile Organic compound	Benzoic Acid	--	--	--	--	--	1.30E+00	--	--	2.00E+03	4.60E+00
	Bis(2-ethylhexyl)phthalate	9.30E+00	9.60E-02	1.60E+01	2.00E-02	4.00E-02	1.10E+00	--	--	5.00E+02	1.90E+03
	Diethyl Phthalate	--	--	--	--	--	3.60E+03	--	1.00E+02	2.50E+06	8.80E+03
	Di-n-Butyl Phthalate	2.00E+00	5.20E-02	3.80E-01	1.10E-02	2.10E-02	3.60E+02	--	1.60E+02	6.20E+04	1.70E+04
Volatile Organic Compound	Benzyl Alcohol	--	--	--	--	--	1.20E+02	--	--	1.10E+05	1.90E+02
	Isophorone	--	--	--	--	--	--	--	--	--	--
	Methylene Chloride	--	--	--	--	--	2.60E+00	--	1.60E+03	4.30E+03	3.80E+00
	Toluene	--	--	--	--	--	2.50E+01	--	2.00E+02	1.20E+04	6.60E+01

Table 3-1. Ecological Screening Levels, Cont.

Analyte Group	Analyte Name	Low Effect ESL									
		American kestrel (Avian top carnivore)	American kestrel (insectivore / carnivore)	American robin (Avian herbivore)	American robin (Avian insectivore)	American robin (Avian omnivore)	Deer mouse (Mammalian omnivore)	Earthworm (Soil-dwelling invertebrate)	Generic plant (Terrestrial autotroph -producer)	Gray fox (Mammalian top carnivore)	Mountain cottontail (Mammalian herbivore)
Inorganic Compound	Cadmium	2.30E+03	7.70E+00	2.30E+01	1.60E+00	3.00E+00	6.80E+00	7.60E+02	1.60E+02	7.40E+03	1.40E+02
	Copper	3.50E+03	2.40E+02	1.00E+02	4.30E+01	6.00E+01	1.00E+02	5.30E+02	4.90E+02	6.70E+03	4.30E+02
	Mercury (inorganic)	3.20E+00	5.80E-01	6.70E-01	1.30E-01	2.20E-01	3.00E+01	5.00E-01	6.40E+01	7.60E+02	2.30E+02
	Perchlorate	4.00E+00	8.00E+00	2.40E-01	6.40E+01	4.90E-01	1.00E+00	3.50E+01	8.00E+01	1.60E+01	1.30E+00
	Silver	6.00E+03	1.30E+02	1.00E+02	2.60E+01	4.10E+01	2.40E+02	--	2.80E+03	4.40E+04	1.50E+03
Dioxin/ Furan	2,3,7,8-TCDD	--	--	--	--	--	3.80E-06	1.00E+01	--	6.80E-04	2.70E-04
High Explosive	HMX	--	--	--	--	--	7.90E+02	1.60E+02	3.50E+03	1.50E+05	1.10E+03
	RDX	1.40E+03	2.20E+01	4.30E+00	4.50E+00	4.40E+00	5.10E+01	1.50E+01	--	2.20E+04	1.20E+02
	TATB	--	--	--	--	--	1.10E+03	2.80E+01	--	1.00E+05	1.50E+03
Polyaromatic Hydrocarbon	Benzo(a)anthracene	2.80E+02	6.40E+01	7.30E+00	8.80E+00	8.00E+00	3.40E+01	--	1.80E+02	1.10E+03	6.10E+01
	Benzo(a)pyrene	--	--	--	--	--	2.60E+02	--	--	1.10E+04	8.30E+02
	Benzo(b)fluoranthene	--	--	--	--	--	5.10E+02	--	1.80E+02	2.40E+04	1.30E+03
	Benzo(g,h,i)perylene	--	--	--	--	--	4.60E+02	--	--	3.60E+04	4.70E+03
	Benzo(k)fluoranthene	--	--	--	--	--	9.90E+02	--	--	4.30E+04	3.30E+03
	Chrysene	--	--	--	--	--	3.10E+01	--	--	1.10E+03	6.30E+01
	Fluoranthene	--	--	--	--	--	3.80E+02	2.30E+01	--	3.90E+04	2.70E+03
	Indeno(1,2,3-cd)pyrene	--	--	--	--	--	1.10E+03		--	4.60E+04	5.10E+03
	Naphthalene	2.10E+04	7.80E+02	3.40E+01	1.50E+02	5.70E+01	2.70E+01		1.00E+01	1.60E+04	4.00E+01
	Phenanthrene	--	--	--	--	--	1.50E+02	1.20E+01	--	1.90E+04	6.20E+02
	Pyrene	3.00E+04	1.60E+03	6.80E+02	3.30E+02	4.40E+02	3.10E+02	2.00E+01	--	3.10E+04	1.10E+03
Semivolatile Organic compound	Benzoic Acid	--	--	--	--	--	1.30E+01	--	--	2.00E+04	4.60E+01
	Bis(2-ethylhexyl)phthalate	9.30E+01	9.60E-01	1.60E+02	2.00E-01	4.00E-01	1.10E+01	--	--	5.00E+03	1.90E+04
	Diethyl Phthalate	--	--	--	--	--	3.60E+04	--	1.00E+03	2.50E+07	8.80E+04
	Di-n-Butyl Phthalate	2.00E+01	5.20E-01	3.80E+00	1.10E-01	2.10E-01	8.60E+02	--	6.00E+02	1.40E+05	4.00E+04
Volatile Organic Compound	Benzyl Alcohol	--	--	--	--	--	1.20E+03	--	--	1.10E+06	1.90E+03
	Isophorone	--	--	--	--	--	--	--	--	--	--
	Methylene Chloride	--	--	--	--	--	2.20E+01	--	1.60E+04	3.60E+04	3.20E+01
	Toluene	--	--	--	--	--	2.50E+02	--	2.00E+03	1.20E+05	6.60E+02

Notes: Source = ESL 4.2, LANL 2021.

Abbreviations:

ESL – Ecological Screening Value

Max– Maximum Exposure Point Concentration mg/kg – Milligram per kilogram

Table 3-2. Ecological Screening Evaluation for Maximum Soil Concentrations and No Effect ESLs

Category	Parameter Name	Max Result (mg/kg)	Number of Detects	American kestrel (Avian top carnivore)	American kestrel (insectivore / carnivore)	American robin (Avian herbivore)	American robin (Avian insectivore)	American robin (Avian omnivore)	Deer mouse (Mammalian omnivore)	Earthworm (Soil-dwelling invertebrate)	Generic plant (Terrestrial autotroph - producer)	Gray fox (Mammalian top carnivore)	Mountain cottontail (Mammalian herbivore)
Inorganic	Cadmium	0.467	3	1E-03	4E-01	1E-01	2E+00	9E-01	9E-01	3E-03	1E-02	8E-04	5E-02
	Copper	597	16	5E-01	7E+00	2E+01	4E+01	3E+01	9E+00	7E+00	9E+00	1E-01	2E+00
	Mercury	0.775	6	2E+00	1E+01	1E+01	6E+01	4E+01	3E-01	2E+01	2E-02	1E-02	3E-02
	Perchlorate	0.0296	11	1E-02	8E-03	2E-01	1E-03	1E-01	1E-01	8E-03	7E-04	9E-03	1E-01
	Silver	2.19	16	4E-03	2E-01	2E-01	8E-01	5E-01	9E-02	--	4E-03	5E-04	1E-02
Organic	2,3,7,8-TCDD TEQ mammal	5.03E-06	--	--	--	--	--	--	9E+00	1E-06	--	5E-02	1E-01
	2,3,7,8-TCDD TEQ bird	5.06E-06	--	1E+00	1E+00	1E+00	1E+00	1E+00	--	--	--	--	--
	Benzo(a)anthracene	0.0295	5	1E-03	5E-03	4E-02	3E-02	4E-02	9E-03	--	2E-03	3E-04	5E-03
	Benzo(a)pyrene	0.0272	4	--	--	--	--	--	3E-04	--	NA	8E-06	1E-04
	Benzo(b)fluoranthene	0.0325	4	--	--	--	--	--	6E-04	--	2E-03	1E-05	3E-04
	Benzo(g,h,i)perylene	0.0221	2	--	--	--	--	--	5E-04	--	--	6E-06	5E-05
	Benzo(k)fluoranthene	0.0148	2	--	--	--	--	--	1E-04	--	--	3E-06	4E-05
	Benzoic Acid	0.497	2	--	--	--	--	--	4E-01	--	--	2E-04	1E-01
	Benzyl Alcohol	0.498	4	--	--	--	--	--	4E-03	--	--	5E-06	3E-03
	Bis(2-ethylhexyl)phthalate	1.32	6	1E-01	1E+01	8E-02	7E+01	3E+01	1E+00	--	--	3E-03	7E-04
	Chrysene	0.0295	3	--	--	--	--	--	1E-02	--	--	3E-04	5E-03
	Diethylphthalate	0.0144	1	--	--	--	--	--	4E-06	--	1E-04	6E-09	2E-06
	Di-n-butylphthalate	0.744	4	4E-01	1E+01	2E+00	7E+01	4E+01	2E-03	--	5E-03	1E-05	4E-05
	Fluoranthene	0.0533	4	--	--	--	--	--	1E-03	5E-03	--	1E-05	2E-04
	HMX	3.87	11	--	--	--	--	--	1E-02	2E-01	1E-03	7E-05	9E-03
	Indeno(1,2,3-cd)pyrene	0.0205	2	--	--	--	--	--	2E-04	--	--	4E-06	4E-05
	Isophorone	0.324	1	--	--	--	--	--	--	--	--	--	--
	Methylene Chloride	0.0057	5	--	--	--	--	--	2E-03	--	4E-06	1E-06	2E-03
	Naphthalene	0.0151	1	7E-06	2E-04	4E-03	1E-03	3E-03	2E-03	--	2E-02	3E-06	1E-03
	Phenanthrene	0.0278	4	--	--	--	--	--	2E-03	5E-03	--	1E-05	4E-04
	Pyrene	0.0557	4	2E-05	3E-04	8E-04	2E-03	1E-03	2E-03	6E-03	--	2E-05	5E-04
	RDX	4.76	7	6E-03	4E-01	2E+00	2E+00	2E+00	3E-01	6E-01	--	7E-04	1E-01
	TATB	22.2	16	--	--	--	--	--	2E-01	2E+00	--	2E-03	1E-01
	Toluene	0.0022	4	--	--	--	--	--	9E-05	--	1E-05	2E-07	3E-05
Hazard Index (HI)				5E+00	5E+01	4E+01	2E+02	1E+02	2E+01	3E+01	9E+00	2E-01	3E+00

Notes:

Table 2-2 presents the comparison of maximum inorganic concentrations to BV. Only inorganics that exceeded BVs are shown in this table.
Shaded cells indicate the ratio > 0.1 for initial screening evaluation
Only detected data and inorganics above background are reported and evaluated in this table.
Abbreviations:

BV – Background Value
ESL – Ecological Screening Value
Max– Maximum Exposure Point Concentration
mg/kg – milligram per kilogram
-- - no value

Table 3-3. Refined Exposure Point Concentrations (EPCs)

COPC	UCL95 (mg/kg)	UCL Type	Distribution
Cadmium	0.096	Median all data	NA - 3 detect
Copper	240.3	95% Chebyshev (Mean, Sd) UCL	Lognormal
Mercury	0.598	99% KM (Chebyshev) UCL	NDD
Perchlorate	0.0144	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	Gamma
Silver	0.681	95% Jackknife UCL	Lognormal
Mammalian TCDD TEQ	3.91E-06	95% Modified-t UCL	NDD
Avian TCDD TEQ	4.89E-06	95% Student's-t UCL	Normal
Benzoic Acid	0.168	Median all data	NA - 2 detects
Bis(2-ethylhexyl)phthalate	0.493	95% KM (t) UCL	Normal
Di-n-butylphthalate	0.010	Median all data	NA - 4 detects
HMX	1.736	95% Gamma Adjusted KM-UCL (use when n<50)	Gamma
Isophorone	0.101	Median all data	NA - 1 detect
RDX	1.48	95% KM (t) UCL	Normal
TATB	14.52	95% Student's-t UCL	Normal

Notes:
Maximum of the duplicate pair retained
TEQ obtained by calculating TEQs by sample, then calculating UCL95
NDD – no discernable distribution
KM – Kaplan Meier
Sd – Standard deviation
UCL – upper confidence limit

Table 3-4. Ecological Screening Evaluation for Low Effect ESLs and Refined EPCs.

Analyte Name	Refined EPC (mg/kg)	Hazard Quotients for Refined EPCs and LE ESLs									
		American kestrel (Avian top carnivore)	American kestrel (insectivore / carnivore)	American robin (Avian herbivore)	American robin (Avian insectivore)	American robin (Avian omnivore)	Deer mouse (Mammalian omnivore)	Earthworm (Soil-dwelling invertebrate)	Generic plant (Terrestrial autotroph - producer)	Gray fox (Mammalian top carnivore)	Mountain cottontail (Mammalian herbivore)
Cadmium	0.096	4E-05	1E-02	4E-03	6E-02	3E-02	1E-02	1E-04	6E-04	1E-05	7E-04
Copper	240.30	7E-02	1E+00	2E+00	6E+00	4E+00	2E+00	5E-01	5E-01	4E-02	6E-01
Mercury	0.598	2E-01	1E+00	9E-01	5E+00	3E+00	2E-02	1E+00	9E-03	8E-04	3E-03
Perchlorate	0.014	4E-03	2E-03	6E-02	2E-04	3E-02	1E-02	4E-04	2E-04	9E-04	1E-02
Silver	0.681	1E-04	5E-03	7E-03	3E-02	2E-02	3E-03	No ESL	2E-04	2E-05	5E-04
Mammalian TEQ	3.91E-06	--	--	--	--	--	1E+00	4E-07	No ESL	6E-03	1E-02
Avian TEQ	4.89E-06	No ESL	No ESL	No ESL	No ESL	No ESL	--	--	--	--	--
Benzoic Acid	0.168	No ESL	No ESL	No ESL	No ESL	No ESL	1E-02	No ESL	No ESL	8E-06	4E-03
Bis(2-ethylhexyl)phthalate	0.493	5E-03	5E-01	3E-03	2E+00	1E+00	4E-02	No ESL	No ESL	1E-04	3E-05
Di-n-butylphthalate	0.010	5E-04	2E-02	3E-03	9E-02	5E-02	1E-05	No ESL	2E-05	7E-08	3E-07
HMX	1.736	No ESL	No ESL	No ESL	No ESL	No ESL	2E-03	1E-02	5E-04	1E-05	2E-03
Isophorone	0.101	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL
RDX	1.476	1E-03	7E-02	3E-01	3E-01	3E-01	3E-02	1E-01	No ESL	7E-05	1E-02
TATB	14.52	No ESL	No ESL	No ESL	No ESL	No ESL	1E-02	5E-01	No ESL	1E-04	1E-02
HI		**3E-01**	**3E+00**	**4E+00**	**1E+01**	**8E+00**	**4E+00**	**2E+00**	**5E-01**	**4E-02**	**6E-01**

Notes:
Shaded cells represent HQs>0.1
HI is the sum of all HQs
-- - no value
Abbreviations:
ESL – Ecological Screening Level
HI – Hazard Index
LE – Low Effect
mg/kg – milligram per kilogram

Table 3-5. Toxic Equivalency Factors (TEFs) Used for Calculating Ecological TCDD Equivalent Concentrations

Name	CAS	Mammalian TEF[a]	Avian TEF[b]
Chlorinated dibenzo-p-dioxins			
2,3,7,8-TCDD	1746-01-6	1	1
1,2,3,7,8-PeCDD	40321-76-4	1	1
1,2,3,4,7,8-HxCDD	39227-28-6	0.1	0.05
1,2,3,6,7,8-HxCDD	57653-85-7	0.1	0.01
1,2,3,7,8,9-HxCDD	19408-74-3	0.1	0.1
1,2,3,4,6,7,8-HpCDD	35822-46-9	0.01	0.001
OCDD	3268-87-9	0.0003	0.0001
Chlorinated dibenzofurans			
2,3,7,8-TCDF	51207-31-9	0.1	1
1,2,3,7,8-PeCDF	57117-41-6	0.03	0.1
2,3,4,7,8-PeCDF	57117-31-4	0.3	0.1
1,2,3,4,7,8-HxCDF	70648-26-9	0.1	1
1,2,3,6,7,8-HxCDF	57117-44-9	0.1	0.1
1,2,3,7,8,9-HxCDF	72918-21-9	0.1	0.1
2,3,4,6,7,8-HxCDF	60851-34-5	0.1	0.1
1,2,3,4,6,7,8-HpCDF	67562-39-4	0.01	0.01
1,2,3,4,7,8,9-HpCDF	55673-89-7	0.01	0.01
OCDF	39001-02-0	0.0003	0.0001

[a] EPA (2010a,b); WHO (2009)
[b] Van den Berg et al. (2006)

Table 3-6. Dioxin-Furan Concentrations, Mammalian TEFs, and TEQs,

Parameter Name	TEF	WST36-18-162834			WST36-18-162985			WST36-18-162986			WST36-18-162987		
		Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	0.01	8.40E-07	1	8.40E-09	6.82E-07	1	6.82E-09	3.68E-06	1	3.68E-08	7.96E-06	1	7.96E-08
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	0.01	5.00E-07	0	5.00E-09	4.97E-07	0	4.97E-09	8.20E-07	1	8.20E-09	1.49E-06	1	1.49E-08
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	0.01	5.00E-07	0	1.67E-08	4.97E-07	0	1.66E-08	4.98E-07	0	1.66E-08	5.03E-07	0	1.68E-08
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	0.1	5.00E-07	0	5.00E-08	4.97E-07	0	4.97E-08	4.98E-07	0	4.98E-08	5.03E-07	0	5.03E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	0.1	5.00E-07	0	5.00E-08	4.97E-07	0	4.97E-08	4.98E-07	0	4.98E-08	5.03E-07	0	5.03E-08
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	0.1	5.00E-07	0	5.00E-08	4.97E-07	0	4.97E-08	4.98E-07	0	4.98E-08	5.03E-07	0	5.03E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	0.1	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	5.03E-07	0	1.68E-07
Hexachlorodibenzofuran[1,2,3,6,7,8-]	0.1	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	5.03E-07	0	1.68E-07
Hexachlorodibenzofuran[1,2,3,7,8,9-]	0.1	5.00E-07	0	1.72E-07	4.97E-07	0	1.71E-07	4.98E-07	0	1.72E-07	5.03E-07	0	1.74E-07
Hexachlorodibenzofuran[2,3,4,6,7,8-]	0.1	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	5.03E-07	0	1.68E-07
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	0.0003	5.61E-06	1	1.68E-09	4.56E-06	1	1.37E-09	3.41E-05	1	1.02E-08	7.74E-05	1	2.32E-08
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	0.0003	9.99E-07	0	3.00E-10	9.94E-07	0	2.98E-10	2.54E-06	1	7.62E-10	5.55E-06	1	1.67E-09
Pentachlorodibenzodioxin[1,2,3,7,8-]	1	5.00E-07	0	1.67E-06	4.97E-07	0	1.66E-06	4.98E-07	0	1.66E-06	5.03E-07	0	1.68E-06
Pentachlorodibenzofuran[1,2,3,7,8-]	0.03	5.00E-07	0	5.01E-08	4.97E-07	0	4.98E-08	4.98E-07	0	4.98E-08	5.03E-07	0	5.04E-08
Pentachlorodibenzofuran[2,3,4,7,8-]	0.3	5.00E-07	0	5.28E-07	4.97E-07	0	5.25E-07	4.98E-07	0	5.28E-07	5.03E-07	0	5.31E-07
Tetrachlorodibenzodioxin[2,3,7,8-]	1	9.99E-08	0	3.33E-07	9.94E-08	0	3.31E-07	9.95E-08	0	3.32E-07	1.01E-07	0	3.36E-07
Tetrachlorodibenzofuran[2,3,7,8-]	0.1	1.10E-07	1	1.10E-08	1.75E-07	1	1.75E-08	1.31E-07	1	1.31E-08	2.27E-07	1	2.27E-08
TEQ				**3.45E-06**			**3.43E-06**			**3.47E-06**			**3.59E-06**

Notes:
The TECi are summed in each column to obtain the TEQ. The TEQs are used in ProUCL to obtain a UCL95 EPC.
All data in mg/kg
DC- Detect code (1 = detected, 0 = not detected)
WST36-18-162834 and WST36-18-162985 are the duplicate pair.

Table 3-6. Dioxin/Furan Concentrations, Mammalian TEFs, and TEQs, Cont.

Parameter Name	TEF	WST36-18-162988			WST36-18-162989			WST36-18-162990			WST36-18-162991		
		Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	0.01	1.74E-06	1	1.74E-08	1.06E-06	1	1.06E-08	1.11E-06	1	1.11E-08	4.67E-06	1	4.67E-08
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	0.01	4.97E-07	0	4.97E-09	4.97E-07	0	4.97E-09	4.98E-07	0	4.98E-09	4.99E-07	0	4.99E-09
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	0.01	4.97E-07	0	1.66E-08	4.97E-07	0	1.66E-08	4.98E-07	0	1.66E-08	4.99E-07	0	1.66E-08
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	0.1	4.97E-07	0	4.97E-08	4.97E-07	0	4.97E-08	4.98E-07	0	4.98E-08	4.99E-07	0	4.99E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	0.1	4.97E-07	0	4.97E-08	4.97E-07	0	4.97E-08	4.98E-07	0	4.98E-08	4.99E-07	0	4.99E-08
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	0.1	4.97E-07	0	4.97E-08	4.97E-07	0	4.97E-08	4.98E-07	0	4.98E-08	4.99E-07	0	4.99E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	0.1	4.97E-07	0	1.66E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.99E-07	0	1.66E-07
Hexachlorodibenzofuran[1,2,3,6,7,8-]	0.1	4.97E-07	0	1.66E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.99E-07	0	1.66E-07
Hexachlorodibenzofuran[1,2,3,7,8,9-]	0.1	4.97E-07	0	1.71E-07	4.97E-07	0	1.71E-07	4.98E-07	0	1.72E-07	4.99E-07	0	1.72E-07
Hexachlorodibenzofuran[2,3,4,6,7,8-]	0.1	4.97E-07	0	1.66E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.99E-07	0	1.66E-07
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	0.0003	1.40E-05	1	4.20E-09	1.02E-05	1	3.06E-09	1.01E-05	1	3.03E-09	4.30E-05	1	1.29E-08
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	0.0003	9.94E-07	0	2.98E-10	9.94E-07	0	2.98E-10	9.95E-07	0	2.99E-10	1.33E-06	1	3.99E-10
Pentachlorodibenzodioxin[1,2,3,7,8-]	1	4.97E-07	0	1.66E-06	4.97E-07	0	1.66E-06	4.98E-07	0	1.66E-06	4.99E-07	0	1.66E-06
Pentachlorodibenzofuran[1,2,3,7,8-]	0.03	4.97E-07	0	4.98E-08	4.97E-07	0	4.98E-08	4.98E-07	0	4.98E-08	4.99E-07	0	4.98E-08
Pentachlorodibenzofuran[2,3,4,7,8-]	0.3	4.97E-07	0	5.25E-07	4.97E-07	0	5.25E-07	4.98E-07	0	5.28E-07	4.99E-07	0	5.28E-07
Tetrachlorodibenzodioxin[2,3,7,8-]	1	9.94E-08	0	3.32E-07	9.94E-08	0	3.32E-07	9.95E-08	0	3.32E-07	9.99E-08	0	3.33E-07
Tetrachlorodibenzofuran[2,3,7,8-]	0.1	1.79E-07	1	1.79E-08	1.87E-07	1	1.87E-08	1.71E-07	1	1.71E-08	1.44E-07	1	1.44E-08
TEQ				**3.45E-06**			**3.44E-06**			**3.44E-06**			**3.49E-06**

Notes:
The TECi are summed in each column to obtain the TEQ. The TEQs are used in ProUCL to obtain a UCL95 EPC.
All data in mg/kg
DC- Detect code (1 = detected, 0 = not detected)

Table 3-6. Dioxin/Furan Concentrations, Mammalian TEFs, and TEQs, Cont.

Parameter Name	TEF	WST36-18-162992			WST36-18-162993			WST36-18-162994			WST36-18-162995		
		Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	0.01	2.20E-05	1	2.20E-07	8.35E-06	1	8.35E-08	4.84E-05	1	4.84E-07	1.13E-04	1	1.13E-06
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	0.01	3.44E-06	1	3.44E-08	1.29E-06	1	1.29E-08	4.02E-06	1	4.02E-08	3.66E-06	1	3.66E-08
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	0.01	4.98E-07	0	1.66E-08	4.98E-07	0	1.66E-08	4.98E-07	0	1.66E-08	4.98E-07	0	1.66E-08
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	0.1	4.98E-07	0	4.98E-08	4.98E-07	0	4.98E-08	5.85E-07	1	5.85E-08	6.79E-07	1	6.79E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	0.1	6.27E-07	1	6.27E-08	4.98E-07	0	4.98E-08	1.09E-06	1	1.09E-07	1.45E-06	1	1.45E-07
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	0.1	4.98E-07	0	4.98E-08	4.98E-07	0	4.98E-08	1.11E-06	1	1.11E-07	9.91E-07	1	9.91E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	0.1	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07
Hexachlorodibenzofuran[1,2,3,6,7,8-]	0.1	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07
Hexachlorodibenzofuran[1,2,3,7,8,9-]	0.1	4.98E-07	0	1.72E-07	4.98E-07	0	1.72E-07	4.98E-07	0	1.72E-07	4.98E-07	0	1.72E-07
Hexachlorodibenzofuran[2,3,4,6,7,8-]	0.1	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	0.0003	1.82E-04	1	5.46E-08	6.93E-05	1	2.08E-08	3.90E-04	1	1.17E-07	9.20E-04	1	2.76E-07
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	0.0003	1.01E-05	1	3.03E-09	3.95E-06	1	1.19E-09	1.39E-05	1	4.17E-09	1.63E-05	1	4.89E-09
Pentachlorodibenzodioxin[1,2,3,7,8-]	1	4.98E-07	0	1.66E-06	4.98E-07	0	1.66E-06	4.98E-07	0	1.66E-06	4.98E-07	0	1.66E-06
Pentachlorodibenzofuran[1,2,3,7,8-]	0.03	4.98E-07	0	4.98E-08	4.98E-07	0	4.98E-08	4.98E-07	0	4.98E-08	4.98E-07	0	4.98E-08
Pentachlorodibenzofuran[2,3,4,7,8-]	0.3	4.98E-07	0	5.28E-07	4.98E-07	0	5.28E-07	4.98E-07	0	5.28E-07	4.98E-07	0	5.28E-07
Tetrachlorodibenzodioxin[2,3,7,8-]	1	9.96E-08	0	3.32E-07	9.97E-08	0	3.32E-07	1.05E-07	0	3.32E-07	9.95E-08	0	3.32E-07
Tetrachlorodibenzofuran[2,3,7,8-]	0.1	1.73E-07	0	1.73E-08	1.67E-07	0	1.67E-08	2.19E-07	0	2.19E-08	1.59E-07	0	1.59E-08
TEQ				**3.75E-06**			**3.54E-06**			**4.20E-06**			**5.03E-06**

Notes:
The TECi are summed in each column to obtain the TEQ. The TEQs are used in ProUCL to obtain a UCL95 EPC.
All data in mg/kg
DC- Detect code (1 = detected, 0 = not detected)

Table 3-6. Dioxin/Furan Concentrations, Mammalian TEFs, and TEQs, Cont.

Parameter Name	TEFs	WST36-18-162996			WST36-18-162997			WST36-18-162998			WST36-18-162999		
		Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	0.01	4.70E-05	1	4.70E-07	1.59E-05	1	1.59E-07	7.51E-07	1	7.51E-09	8.19E-07	1	8.19E-09
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	0.01	2.48E-06	1	2.48E-08	9.11E-07	1	9.11E-09	4.97E-07	0	4.97E-09	5.01E-07	0	5.01E-09
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	0.01	4.98E-07	0	1.66E-08	5.00E-07	0	1.67E-08	4.97E-07	0	1.66E-08	5.01E-07	0	1.67E-08
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	0.1	4.98E-07	0	4.98E-08	5.00E-07	0	5.00E-08	4.97E-07	0	4.97E-08	5.01E-07	0	5.01E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	0.1	8.22E-07	1	8.22E-08	5.00E-07	0	5.00E-08	4.97E-07	0	4.97E-08	5.01E-07	0	5.01E-08
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	0.1	6.55E-07	1	6.55E-08	5.00E-07	0	5.00E-08	4.97E-07	0	4.97E-08	5.01E-07	0	5.01E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	0.1	4.98E-07	0	1.66E-07	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	5.01E-07	0	1.67E-07
Hexachlorodibenzofuran[1,2,3,6,7,8-]	0.1	4.98E-07	0	1.66E-07	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	5.01E-07	0	1.67E-07
Hexachlorodibenzofuran[1,2,3,7,8,9-]	0.1	4.98E-07	0	1.72E-07	5.00E-07	0	1.72E-07	4.97E-07	0	1.71E-07	5.01E-07	0	1.73E-07
Hexachlorodibenzofuran[2,3,4,6,7,8-]	0.1	4.98E-07	0	1.66E-07	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	5.01E-07	0	1.67E-07
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	0.0003	3.40E-04	1	1.02E-07	1.14E-04	1	3.42E-08	5.49E-06	1	1.65E-09	8.29E-06	1	2.49E-09
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	0.0003	8.97E-06	1	2.69E-09	2.47E-06	1	7.41E-10	9.93E-07	0	2.98E-10	1.00E-06	0	3.00E-10
Pentachlorodibenzodioxin[1,2,3,7,8-]	1	4.98E-07	0	1.66E-06	5.00E-07	0	1.67E-06	4.97E-07	0	1.66E-06	5.01E-07	0	1.67E-06
Pentachlorodibenzofuran[1,2,3,7,8-]	0.03	4.98E-07	0	4.98E-08	5.00E-07	0	5.01E-08	4.97E-07	0	4.98E-08	5.01E-07	0	5.01E-08
Pentachlorodibenzofuran[2,3,4,7,8-]	0.3	4.98E-07	0	5.28E-07	5.00E-07	0	5.28E-07	4.97E-07	0	5.25E-07	5.01E-07	0	5.31E-07
Tetrachlorodibenzodioxin[2,3,7,8-]	1	9.95E-08	0	3.32E-07	9.99E-08	0	3.33E-07	1.12E-07	0	3.31E-07	1.00E-07	0	3.34E-07
Tetrachlorodibenzofuran[2,3,7,8-]	0.1	2.51E-07	0	2.51E-08	1.78E-07	0	1.78E-08	2.13E-07	0	2.13E-08	2.36E-07	0	2.36E-08
TEQs				**4.08E-06**			**3.64E-06**			**3.44E-06**			**3.47E-06**

Notes:
DC- Detect code (1 = detected, 0 = not detected)
Notes: The result multiplied by the TEF (Table 3-3) is the TECi. The sum of the TECi values provides the TEQ. The TECi are summed in each column to obtain the TEQ. The TEQs are used in ProUCL to obtain a UCL95 EPC.
All data in mg/kg

Abbreviations:
TECi – Toxicity Equivalent Concentration for Congener i
TEF – Toxicity Equivalency Factor
TEQ – Toxicity Equivalent Quotient

Table 3-7. Dioxin-Furan Concentrations, Avian TEFs, and TEQs

Parameter Name	TEF	WST36-18-162834			WST36-18-162985			WST36-18-162986			WST36-18-162987		
		Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	0.001	8.40E-07	1	8.40E-10	6.82E-07	1	6.82E-10	3.68E-06	1	3.68E-09	7.96E-06	1	7.96E-09
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	0.01	5.00E-07	0	5.00E-09	4.97E-07	0	4.97E-09	8.20E-07	1	8.20E-09	1.49E-06	1	1.49E-08
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	0.01	5.00E-07	0	1.67E-08	4.97E-07	0	1.66E-08	4.98E-07	0	1.66E-08	5.03E-07	0	1.68E-08
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	0.05	5.00E-07	0	2.50E-08	4.97E-07	0	2.49E-08	4.98E-07	0	2.49E-08	5.03E-07	0	2.52E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	0.01	5.00E-07	0	5.00E-09	4.97E-07	0	4.97E-09	4.98E-07	0	4.98E-09	5.03E-07	0	5.03E-09
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	0.1	5.00E-07	0	5.00E-08	4.97E-07	0	4.97E-08	4.98E-07	0	4.98E-08	5.03E-07	0	5.03E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	1	5.00E-07	0	1.67E-06	4.97E-07	0	1.66E-06	4.98E-07	0	1.66E-06	5.03E-07	0	1.68E-06
Hexachlorodibenzofuran[1,2,3,6,7,8-]	0.1	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	5.03E-07	0	1.68E-07
Hexachlorodibenzofuran[1,2,3,7,8,9-]	0.1	5.00E-07	0	1.72E-07	4.97E-07	0	1.71E-07	4.98E-07	0	1.72E-07	5.03E-07	0	1.74E-07
Hexachlorodibenzofuran[2,3,4,6,7,8-]	0.1	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	5.03E-07	0	1.68E-07
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	0.0001	5.61E-06	1	5.61E-10	4.56E-06	1	4.56E-10	3.41E-05	1	3.41E-09	7.74E-05	1	7.74E-09
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	0.0001	9.99E-07	0	9.99E-11	9.94E-07	0	9.94E-11	2.54E-06	1	2.54E-10	5.55E-06	1	5.55E-10
Pentachlorodibenzodioxin[1,2,3,7,8-]	1	5.00E-07	0	1.67E-06	4.97E-07	0	1.66E-06	4.98E-07	0	1.66E-06	5.03E-07	0	1.68E-06
Pentachlorodibenzofuran[1,2,3,7,8-]	0.1	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	5.03E-07	0	1.68E-07
Pentachlorodibenzofuran[2,3,4,7,8-]	0.1	5.00E-07	0	1.76E-07	4.97E-07	0	1.75E-07	4.98E-07	0	1.76E-07	5.03E-07	0	1.77E-07
Tetrachlorodibenzodioxin[2,3,7,8-]	1	9.99E-08	0	3.33E-07	9.94E-08	0	3.31E-07	9.95E-08	0	3.32E-07	1.01E-07	0	3.36E-07
Tetrachlorodibenzofuran[2,3,7,8-]	1	1.10E-07	1	1.10E-07	1.75E-07	1	1.75E-07	1.31E-07	1	1.31E-07	2.27E-07	1	2.27E-07
TEQ				**4.74E-06**			**4.77E-06**			**4.74E-06**			**4.91E-06**

Notes:
The TECi are summed in each column to obtain the TEQ. The TEQs are used in ProUCL to obtain a UCL95 EPC.
All data in mg/kg
DC- Detect code (1 = detected, 0 = not detected)
WST36-18-162834 and WST36-18-162985 are the duplicate pair.

Table 3-7. Dioxin/Furan Concentrations, Avian TEFs, and TEQs, Cont.

Parameter Name	TEF	WST36-18-162988			WST36-18-162989			WST36-18-162990			WST36-18-162991		
		Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	0.001	1.74E-06	1	1.74E-09	1.06E-06	1	1.06E-09	1.11E-06	1	1.11E-09	4.67E-06	1	4.67E-09
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	0.01	4.97E-07	0	4.97E-09	4.97E-07	0	4.97E-09	4.98E-07	0	4.98E-09	4.99E-07	0	4.99E-09
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	0.01	4.97E-07	0	1.66E-08	4.97E-07	0	1.66E-08	4.98E-07	0	1.66E-08	4.99E-07	0	1.66E-08
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	0.05	4.97E-07	0	2.49E-08	4.97E-07	0	2.49E-08	4.98E-07	0	2.49E-08	4.99E-07	0	2.50E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	0.01	4.97E-07	0	4.97E-09	4.97E-07	0	4.97E-09	4.98E-07	0	4.98E-09	4.99E-07	0	4.99E-09
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	0.1	4.97E-07	0	4.97E-08	4.97E-07	0	4.97E-08	4.98E-07	0	4.98E-08	4.99E-07	0	4.99E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	1	4.97E-07	0	1.66E-06	4.97E-07	0	1.66E-06	4.98E-07	0	1.66E-06	4.99E-07	0	1.66E-06
Hexachlorodibenzofuran[1,2,3,6,7,8-]	0.1	4.97E-07	0	1.66E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.99E-07	0	1.66E-07
Hexachlorodibenzofuran[1,2,3,7,8,9-]	0.1	4.97E-07	0	1.71E-07	4.97E-07	0	1.71E-07	4.98E-07	0	1.72E-07	4.99E-07	0	1.72E-07
Hexachlorodibenzofuran[2,3,4,6,7,8-]	0.1	4.97E-07	0	1.66E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.99E-07	0	1.66E-07
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	0.0001	1.40E-05	1	1.40E-09	1.02E-05	1	1.02E-09	1.01E-05	1	1.01E-09	4.30E-05	1	4.30E-09
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	0.0001	9.94E-07	0	9.94E-11	9.94E-07	0	9.94E-11	9.95E-07	0	9.95E-11	1.33E-06	1	1.33E-10
Pentachlorodibenzodioxin[1,2,3,7,8-]	1	4.97E-07	0	1.66E-06	4.97E-07	0	1.66E-06	4.98E-07	0	1.66E-06	4.99E-07	0	1.66E-06
Pentachlorodibenzofuran[1,2,3,7,8-]	0.1	4.97E-07	0	1.66E-07	4.97E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.99E-07	0	1.66E-07
Pentachlorodibenzofuran[2,3,4,7,8-]	0.1	4.97E-07	0	1.75E-07	4.97E-07	0	1.75E-07	4.98E-07	0	1.76E-07	4.99E-07	0	1.76E-07
Tetrachlorodibenzodioxin[2,3,7,8-]	1	9.94E-08	0	3.32E-07	9.94E-08	0	3.32E-07	9.95E-08	0	3.32E-07	9.99E-08	0	3.33E-07
Tetrachlorodibenzofuran[2,3,7,8-]	1	1.79E-07	1	1.79E-07	1.87E-07	1	1.87E-07	1.71E-07	1	1.71E-07	1.44E-07	1	1.44E-07
TEQ				**4.78E-06**			**4.79E-06**			**4.77E-06**			**4.75E-06**

Notes:
The TECi are summed in each column to obtain the TEQ. The TEQs are used in ProUCL to obtain a UCL95 EPC.
All data in mg/kg
DC- Detect code (1 = detected, 0 = not detected)

Table 3-7. Dioxin/Furan Concentrations, Avian TEFs, and TEQs, Cont.

Parameter Name	TEF	WST36-18-162992			WST36-18-162993			WST36-18-162994			WST36-18-162995		
		Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	0.001	2.20E-05	1	2.20E-08	8.35E-06	1	8.35E-09	4.84E-05	1	4.84E-08	1.13E-04	1	1.13E-07
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	0.01	3.44E-06	1	3.44E-08	1.29E-06	1	1.29E-08	4.02E-06	1	4.02E-08	3.66E-06	1	3.66E-08
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	0.01	4.98E-07	0	1.66E-08	4.98E-07	0	1.66E-08	4.98E-07	0	1.66E-08	4.98E-07	0	1.66E-08
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	0.05	4.98E-07	0	2.49E-08	4.98E-07	0	2.49E-08	5.85E-07	1	2.93E-08	6.79E-07	1	3.40E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	0.01	6.27E-07	1	6.27E-09	4.98E-07	0	4.98E-09	1.09E-06	1	1.09E-08	1.45E-06	1	1.45E-08
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	0.1	4.98E-07	0	4.98E-08	4.98E-07	0	4.98E-08	1.11E-06	1	1.11E-07	9.91E-07	1	9.91E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	1	4.98E-07	0	1.66E-06	4.98E-07	0	1.66E-06	4.98E-07	0	1.66E-06	4.98E-07	0	1.66E-06
Hexachlorodibenzofuran[1,2,3,6,7,8-]	0.1	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07
Hexachlorodibenzofuran[1,2,3,7,8,9-]	0.1	4.98E-07	0	1.72E-07	4.98E-07	0	1.72E-07	4.98E-07	0	1.72E-07	4.98E-07	0	1.72E-07
Hexachlorodibenzofuran[2,3,4,6,7,8-]	0.1	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	0.0001	1.82E-04	1	1.82E-08	6.93E-05	1	6.93E-09	3.90E-04	1	3.90E-08	9.20E-04	1	9.20E-08
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	0.0001	1.01E-05	1	1.01E-09	3.95E-06	1	3.95E-10	1.39E-05	1	1.39E-09	1.63E-05	1	1.63E-09
Pentachlorodibenzodioxin[1,2,3,7,8-]	1	4.98E-07	0	1.66E-06	4.98E-07	0	1.66E-06	4.98E-07	0	1.66E-06	4.98E-07	0	1.66E-06
Pentachlorodibenzofuran[1,2,3,7,8-]	0.1	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07	4.98E-07	0	1.66E-07
Pentachlorodibenzofuran[2,3,4,7,8-]	0.1	4.98E-07	0	1.76E-07	4.98E-07	0	1.76E-07	4.98E-07	0	1.76E-07	4.98E-07	0	1.76E-07
Tetrachlorodibenzodioxin[2,3,7,8-]	1	9.96E-08	0	3.32E-07	9.97E-08	0	3.32E-07	1.05E-07	0	3.32E-07	9.95E-08	0	3.32E-07
Tetrachlorodibenzofuran[2,3,7,8-]	1	1.73E-07	0	1.73E-07	1.67E-07	0	1.67E-07	2.19E-07	0	2.19E-07	1.59E-07	0	1.59E-07
TEQ				**4.84E-06**			**4.79E-06**			**5.01E-06**			**5.06E-06**

Notes:
The TECi are summed in each column to obtain the TEQ. The TEQs are used in ProUCL to obtain a UCL95 EPC.
All data in mg/kg
DC- Detect code (1 = detected, 0 = not detected)

Table 3-7. Dioxin/Furan Concentrations, Avian TEFs, and TEQs, Cont.

Parameter Name	TEFs	WST36-18-162996			WST36-18-162997			WST36-18-162998			WST36-18-162999		
		Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi	Result (mg/kg)	DC	TECi
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	0.001	4.70E-05	1	4.70E-08	1.59E-05	1	1.59E-08	7.51E-07	1	7.51E-10	8.19E-07	1	8.19E-10
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	0.01	2.48E-06	1	2.48E-08	9.11E-07	1	9.11E-09	4.97E-07	0	4.97E-09	5.01E-07	0	5.01E-09
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	0.01	4.98E-07	0	1.66E-08	5.00E-07	0	1.67E-08	4.97E-07	0	1.66E-08	5.01E-07	0	1.67E-08
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	0.05	4.98E-07	0	2.49E-08	5.00E-07	0	2.50E-08	4.97E-07	0	2.49E-08	5.01E-07	0	2.51E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	0.01	8.22E-07	1	8.22E-09	5.00E-07	0	5.00E-09	4.97E-07	0	4.97E-09	5.01E-07	0	5.01E-09
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	0.1	6.55E-07	1	6.55E-08	5.00E-07	0	5.00E-08	4.97E-07	0	4.97E-08	5.01E-07	0	5.01E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	1	4.98E-07	0	1.66E-06	5.00E-07	0	1.67E-06	4.97E-07	0	1.66E-06	5.01E-07	0	1.67E-06
Hexachlorodibenzofuran[1,2,3,6,7,8-]	0.1	4.98E-07	0	1.66E-07	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	5.01E-07	0	1.67E-07
Hexachlorodibenzofuran[1,2,3,7,8,9-]	0.1	4.98E-07	0	1.72E-07	5.00E-07	0	1.72E-07	4.97E-07	0	1.71E-07	5.01E-07	0	1.73E-07
Hexachlorodibenzofuran[2,3,4,6,7,8-]	0.1	4.98E-07	0	1.66E-07	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	5.01E-07	0	1.67E-07
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	0.0001	3.40E-04	1	3.40E-08	1.14E-04	1	1.14E-08	5.49E-06	1	5.49E-10	8.29E-06	1	8.29E-10
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	0.0001	8.97E-06	1	8.97E-10	2.47E-06	1	2.47E-10	9.93E-07	0	9.93E-11	1.00E-06	0	1.00E-10
Pentachlorodibenzodioxin[1,2,3,7,8-]	1	4.98E-07	0	1.66E-06	5.00E-07	0	1.67E-06	4.97E-07	0	1.66E-06	5.01E-07	0	1.67E-06
Pentachlorodibenzofuran[1,2,3,7,8-]	0.1	4.98E-07	0	1.66E-07	5.00E-07	0	1.67E-07	4.97E-07	0	1.66E-07	5.01E-07	0	1.67E-07
Pentachlorodibenzofuran[2,3,4,7,8-]	0.1	4.98E-07	0	1.76E-07	5.00E-07	0	1.76E-07	4.97E-07	0	1.75E-07	5.01E-07	0	1.77E-07
Tetrachlorodibenzodioxin[2,3,7,8-]	1	9.95E-08	0	3.32E-07	9.99E-08	0	3.33E-07	1.12E-07	0	3.31E-07	1.00E-07	0	3.34E-07
Tetrachlorodibenzofuran[2,3,7,8-]	1	2.51E-07	0	2.51E-07	1.78E-07	0	1.78E-07	2.13E-07	0	2.13E-07	2.36E-07	0	2.36E-07
TEQs				4.97E-06			4.83E-06			4.81E-06			4.86E-06

Notes:
DC- Detect code (1 = detected, 0 = not detected)
Notes: The result multiplied by the TEF (Table 3-3) is the TECi. The sum of the TECi values provides the TEQ. The TECi are summed in each column to obtain the TEQ. The TEQs are used in ProUCL to obtain a UCL95 EPC.
All data in mg/kg

Abbreviations:
TECi – Toxicity Equivalent Concentration for Congener i
TEF – Toxicity Equivalency Factor
TEQ – Toxicity Equivalent Quotient

Table 3-8. Area Use Factor and Site-Specific Hazard Analysis for TA 36 Based on NE ESLs

COPC Name	CAS	No Effect Ecological Screening Levels (ESLs) for Terrestrial Receptors (mg/kg)									
		American kestrel (top carnivore)	American kestrel (insectivore / carnivore)	American robin (herbivore)	American robin (insectivore)	American robin (omnivore)	Deer mouse (omnivore)	Earthworm (invertebrate)	Generic plant (autotroph)	Gray fox (top carnivore)	Mountain cottontail (herbivore)
Inorganics											
Copper	7440-50-8	1.1E+03	8.0E+01	3.4E+01	1.4E+01	2.0E+01	6.3E+01	8.0E+01	7.0E+01	4.0E+03	2.6E+02
Mercury	7487-94-7	3.2E-01	5.8E-02	6.7E-02	1.3E-02	2.2E-02	3.0E+00	5.0E-02	3.4E+01	7.6E+01	2.3E+01
Organics											
2,3,7,8-TCDD	1746-01-6	4.1E-06	4.1E-06	4.1E-06	4.1E-06	4.1E-06	5.8E-07	5.0E+00	0.0E+00	1.0E-04	4.0E-05
Bis(2-ethylhexyl)phthalate	117-81-7	9.3E+00	9.6E-02	1.6E+01	2.0E-02	4.0E-02	1.1E+00	0.0E+00	0.0E+00	5.0E+02	1.9E+03
RDX	121-82-4	7.8E+02	1.1E+01	2.3E+00	2.4E+00	2.3E+00	1.6E+01	8.4E+00	0.0E+00	7.0E+03	3.8E+01
TATB	3058-38-6	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E+02	1.0E+01	0.0E+00	1.0E+04	1.5E+02

	American kestrel (top carnivore)	American kestrel (insectivore / carnivore)	American robin (herbivore)	American robin (insectivore)	American robin (omnivore)	Deer mouse (omnivore)	Earthworm (invertebrate)	Generic plant (autotroph)	Gray fox (top carnivore)	Mountain cottontail (herbivore)
HR (ha)[a]	106	106	0.42	0.42	0.42	0.077	NA	NA	1038	3.1
Population Area[b]	4240	4240	16.8	16.8	16.8	3.08	NA	NA	41520	124
PAUF[c]	0.00014	0.00014	0.035	0.035	0.035	0.19	NA	NA	0.000014	0.004677
AUF[d]	0.0055	0.0055	1.00	1.00	1.00	1.00	NA	NA	0.000559	0.1871

COPC Name	UCL95 EPC (mg/kg)	Population Area Use Adjusted NE ESL Hazard Quotients									
		American kestrel (top carnivore)	American kestrel (insectivore / carnivore)	American robin (herbivore)	American robin (insectivore)	American robin (omnivore)	Deer mouse (omnivore)	Earthworm (invertebrate)	Generic plant (autotroph)	Gray fox (top carnivore)	Mountain cottontail (herbivore)
Inorganics											
Copper	240.3	3E-05	4E-04	2E-01	6E-01	4E-01	7E-01	3E+00	3E+00	8E-07	4E-03
Mercury	0.598	3E-04	1E-03	3E-01	2E+00	9E-01	4E-02	1E+01	2E-02	1E-07	1E-04
Organics											
2,3,7,8-TCDD Mammal	3.91E-06	--	--	--	--	--	1E+00	8E-07	NA, No ESL	5E-07	5E-04
2,3,7,8-TCDD Bird	4.89E-06	2E-04	2E-04	4E-02	4E-02	4E-02	--	--	--	--	--
Bis(2-ethylhexyl)phthalate	0.493	7E-06	7E-04	1E-03	9E-01	4E-01	8E-02	NA, No ESL	NA, No ESL	1E-08	1E-06
RDX	1.48	3E-07	2E-05	2E-02	2E-02	2E-02	2E-02	2E-01	NA, No ESL	3E-09	2E-04
TATB	14.52	NA, No ESL	NA, No ESL	NA, No ESL	NA, No ESL	NA, No ESL	2E-02	1E+00	NA, No ESL	2E-08	5E-04
Hazard Index		5E-04	3E-03	6E-01	3E+00	2E+00	2E+00	2E+01	3E+00	2E-06	6E-03

Notes:
Area of Site (ha): 0.58

NA - Not applicable
ESLs - Ecological screening level
PAUF - Population area use factor
AUF - Area use factor
HR - Home range

a - Values from USEPA (1993)
b - Derived as 40*HR
c - PAUF is the area of site divided by the Population Area
d - AUF is the area of the site divided by the HR; AUF cannot exceed 1 and value is set to 1 if calculation results in a higher value

Table 3-9. Area Use Factors and Site-Specific Hazard Analysis for TA 36 Based on LE ESLs.

COPC Name	CAS	Low Effect Ecological Screening Levels (ESLs) for Terrestrial Receptors (mg/kg)										
		American kestrel (top carnivore)	American kestrel (insectivore / carnivore)	American robin (herbivore)	American robin (insectivore)	American robin (omnivore)	Deer mouse (omnivore)	Earthworm (invertebrate)	Generic plant (autotroph)	Gray fox (top carnivore)	Montane shrew (insectivore)	Mountain cottontail (herbivore)
Inorganics												
Copper	7440-50-8	3.5E+03	2.4E+02	1.0E+02	4.3E+01	6.0E+01	1.0E+02	5.3E+02	4.9E+02	6.7E+03	7.0E+01	4.3E+02
Mercury	7487-94-7	3.2E+00	5.8E-01	6.7E-01	1.3E-01	2.2E-01	3.0E+01	5.0E-01	6.4E+01	7.6E+02	1.7E+01	2.3E+02
Organics												
2,3,7,8-TCDD	1746-01-6	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.8E-06	1.0E+01	0.0E+00	6.8E-04	1.9E-06	2.7E-04
Bis(2-ethylhexyl)phthalate	117-81-7	9.3E+01	9.6E-01	1.6E+02	2.0E-01	4.0E-01	1.1E+01	0.0E+00	0.0E+00	5.0E+03	6.0E+00	1.9E+04
RDX	121-82-4	1.4E+03	2.2E+01	4.3E+00	4.5E+00	4.4E+00	5.1E+01	1.5E+01	0.0E+00	2.2E+04	5.3E+01	1.2E+02
TATB	3058-38-6	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E+03	2.8E+01	0.0E+00	1.0E+05	7.2E+03	1.5E+03

	American kestrel (top carnivore)	American kestrel (insectivore / carnivore)	American robin (herbivore)	American robin (insectivore)	American robin (omnivore)	Deer mouse (omnivore)	Earthworm (invertebrate)	Generic plant (autotroph)	Gray fox (top carnivore)	Montane shrew (insectivore)	Mountain cottontail (herbivore)
HR (ha)[a]	106	106	0.42	0.42	0.42	0.077	NA	NA	1038	0.39	3.1
Population Area[b]	4240	4240	16.8	16.8	16.8	3.08	NA	NA	41520	15.6	124
PAUF[c]	0.00014	0.00014	0.035	0.035	0.035	0.19	NA	NA	0.000014	0.037	0.004677
AUF[d]	0.0055	0.0055	1.00	1.00	1.00	1.00	NA	NA	0.000559	1.00	0.1871

COPC Name	UCL95 EPC (mg/kg)	Population Area Use Adjusted LE ESL Hazard Quotients										
		American kestrel (top carnivore)	American kestrel (insectivore / carnivore)	American robin (herbivore)	American robin (insectivore)	American robin (omnivore)	Deer mouse (omnivore)	Earthworm (invertebrate)	Generic plant (autotroph)	Gray fox (top carnivore)	Montane shrew (insectivore)	Mountain cottontail (herbivore)
Inorganics												
Copper	240.3	9E-06	1E-04	8E-02	2E-01	1E-01	5E-01	5E-01	5E-01	5E-07	1E-01	3E-03
Mercury	0.598	3E-05	1E-04	3E-02	2E-01	9E-02	4E-03	1E+00	9E-03	1E-08	1E-03	1E-05
Organics												
2,3,7,8-TCDD Mammal	3.91E-06	--	--	--	--	--	2E-01	4E-07	NA, No ESL	8E-08	8E-02	7E-05
2,3,7,8-TCDD Bird	4.89E-06	NA, No ESL	NA, No ESL	NA, No ESL	NA, No ESL	NA, No ESL	--	--	NA, No ESL	--	--	--
Bis(2-ethylhexyl)phthalate	0.493	7E-07	7E-05	1E-04	9E-02	4E-02	8E-03	3E-02	NA, No ESL	1E-09	3E-03	1E-07
RDX	1.48	1E-07	9E-06	1E-02	1E-02	1E-02	5E-03	5E-02	NA, No ESL	9E-10	1E-03	6E-05
TATB	14.52	NA, No ESL	NA, No ESL	NA, No ESL	NA, No ESL	NA, No ESL	2E-03	NA, No ESL	NA, No ESL	2E-09	7E-05	5E-05
Hazard Index		4E-05	3E-04	1E-01	4E-01	3E-01	5E-01	2E+00	5E-01	5E-07	1E-01	3E-03

Notes:

Area of Site (ha): 0.58

NA - Not applicable
ESLs - Ecological screening level
PAUF - Population area use factor
AUF - Area use factor
HR - Home range
LE - Low Effect

a - Values from USEPA (1993)
b - Derived as 40*HR
c - PAUF is the area of site divided by the Population Area
d - AUF is the area of the site divided by the HR; AUF cannot exceed 1 and value is set to 1 if calculation results in a higher value

Figures

Figure 1-1. Sample Location Map for the Unit OD Area

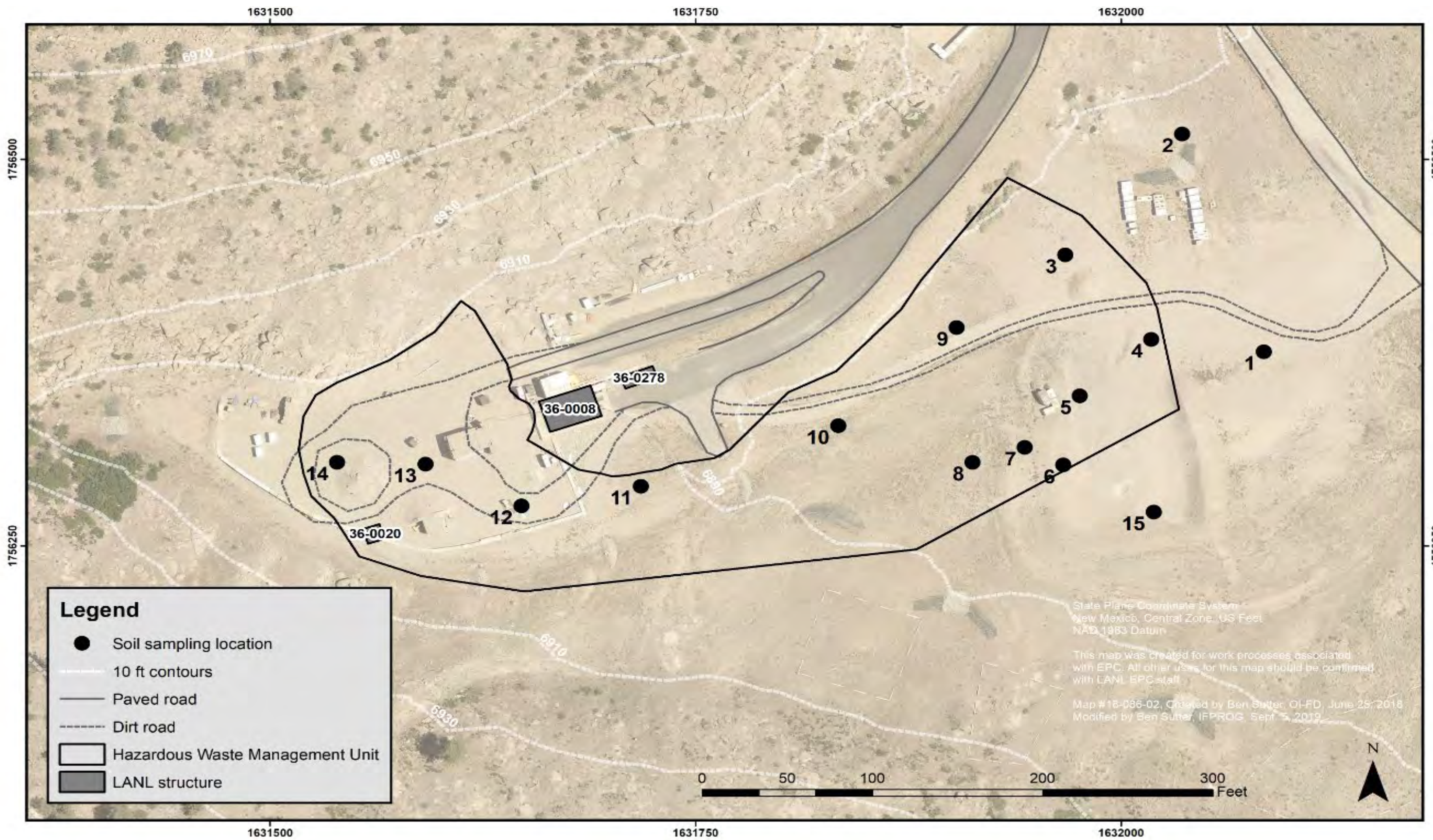
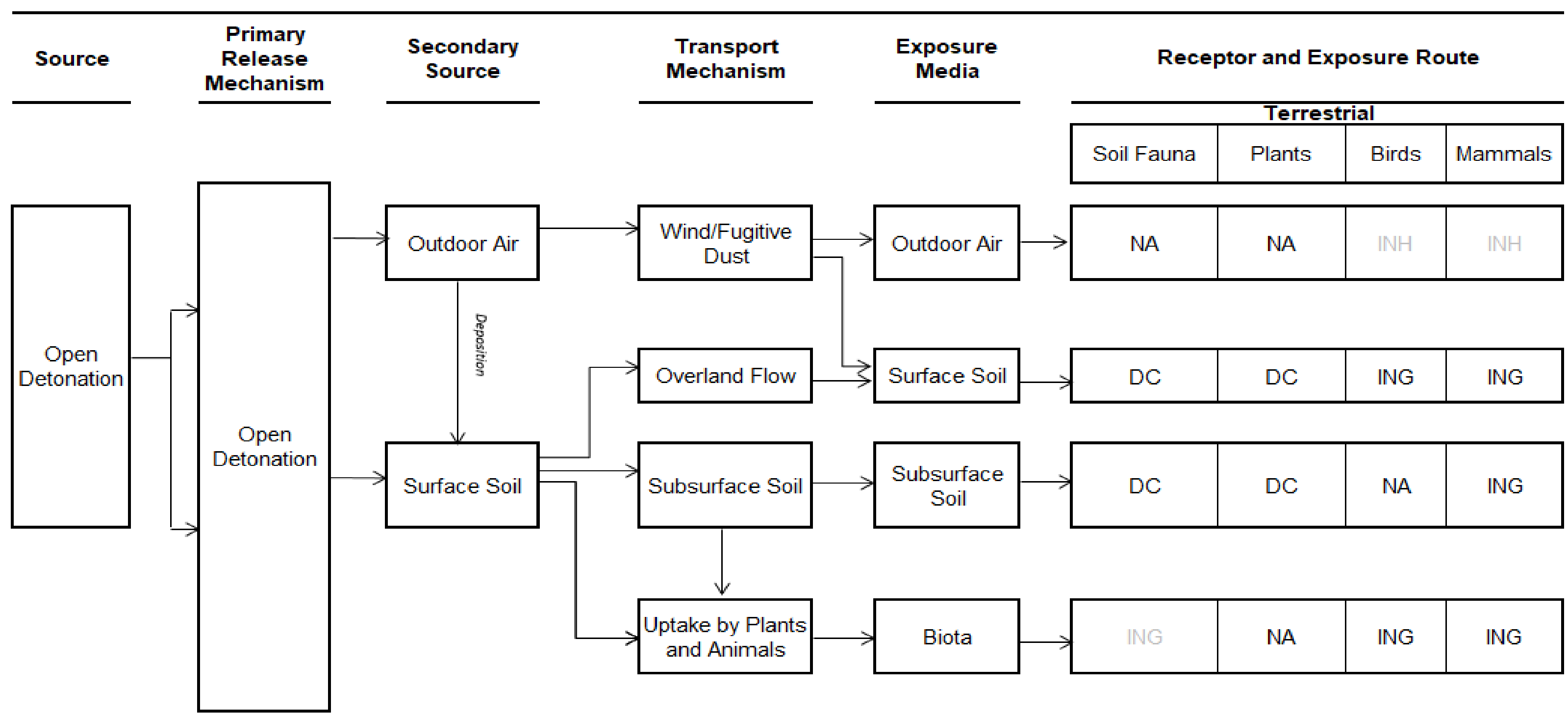


Figure 3-1. Conceptual Site Exposure Model (CSEM) for the Ecological Risk Assessment



Abbreviations

DC Direct contact; applies to receptors for which toxic effects are addressed by exposure concentration and not dose
ING Ingestion; typically quantified as dose for birds and mammals only
INH Inhalation; recognized to occur, but not typically quantified as standard practice with the exception of evaluating burrow air exposure by burrowing mammals
NA Pathway considered incomplete; not applicable

Notes:

Grayed text indicates pathways are recognized to potentially exist but are not quantified. Inhalation is considered minimal relative to dietary exposure. Ingestion by invertebrates is not typically quantified due to absence of accurate exposure parameters.

ATTACHMENT A. PROUCL OUTPUT FOR UPPER CONFIDENCE LIMITS AND HYPOTHESIS TESTS

UCL Statistics for Data Sets with Non-Detects			
User Selected Options			
Date/Time of Computation		**ProUCL 5.13/8/2022 9:53:21 AM**	
From File		**UCL Data TA 36 rev 1.xls**	
Full Precision		**OFF**	
Confidence Coefficient			**95%**
Number of Bootstrap Operations			**2000**
Cd			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	14
		Number of Missing Observations	1
Number of Detects	3	Number of Non-Detects	12
Number of Distinct Detects	3	Number of Distinct Non-Detects	11
Minimum Detect	0.252	Minimum Non-Detect	0.0918
Maximum Detect	0.467	Maximum Non-Detect	0.101
Variance Detects	0.0137	Percent Non-Detects	80%
Mean Detects	0.333	SD Detects	0.117
Median Detects	0.28	CV Detects	0.351
Skewness Detects	1.621	Kurtosis Detects	N/A
Mean of Logged Detects	-1.138	SD of Logged Detects	0.33
Warning: Data set has only 3 Detected Values. This is not enough to compute meaningful or reliable statistics and estimates.			
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.846	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.342	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.14	KM Standard Error of Mean	0.0334
KM SD	0.105	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.199	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.195	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.24	95% KM Chebyshev UCL	0.285
97.5% KM Chebyshev UCL	0.348	99% KM Chebyshev UCL	0.472
Gamma GOF Tests on Detected Observations Only			
Not Enough Data to Perform GOF Test			
Gamma Statistics on Detected Data Only			
k hat (MLE)	13.34	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.025	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	80.02	nu star (bias corrected)	N/A
Mean (detects)	0.333		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	0.0746
Maximum	0.467	Median	0.01
SD	0.141	CV	1.888
k hat (MLE)	0.485	k star (bias corrected MLE)	0.432
Theta hat (MLE)	0.154	Theta star (bias corrected MLE)	0.173
nu hat (MLE)	14.55	nu star (bias corrected)	12.97
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (12.97, α)	5.874	Adjusted Chi Square Value (12.97, β)	5.296
95% Gamma Approximate UCL (use when n>=50)	0.165	95% Gamma Adjusted UCL (use when n<50)	N/A
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.14	SD (KM)	0.105
Variance (KM)	0.0111	SE of Mean (KM)	0.0334
k hat (KM)	1.762	k star (KM)	1.454

nu hat (KM)	52.86	nu star (KM)	43.62
theta hat (KM)	0.0795	theta star (KM)	0.0963
80% gamma percentile (KM)	0.217	90% gamma percentile (KM)	0.294
95% gamma percentile (KM)	0.369	99% gamma percentile (KM)	0.537
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (43.62, α)	29.48	Adjusted Chi Square Value (43.62, β)	28.05
95% Gamma Approximate KM-UCL (use when n>=50)	0.207	95% Gamma Adjusted KM-UCL (use when n<50)	0.218
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.874	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.326	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.117	Mean in Log Scale	-2.455
SD in Original Scale	0.121	SD in Log Scale	0.707
95% t UCL (assumes normality of ROS data)	0.171	95% Percentile Bootstrap UCL	0.17
95% BCA Bootstrap UCL	0.189	95% Bootstrap t UCL	0.217
95% H-UCL (Log ROS)	0.171		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.138	KM Geo Mean	0.118
KM SD (logged)	0.515	95% Critical H Value (KM-Log)	2.084
KM Standard Error of Mean (logged)	0.163	95% H-UCL (KM -Log)	0.179
KM SD (logged)	0.515	95% Critical H Value (KM-Log)	2.084
KM Standard Error of Mean (logged)	0.163		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.105	Mean in Log Scale	-2.655
SD in Original Scale	0.126	SD in Log Scale	0.795
95% t UCL (Assumes normality)	0.162	95% H-Stat UCL	0.162
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.199		
Cu			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	15
		Number of Missing Observations	1
Minimum	8.21	Mean	74.49
Maximum	597	Median	27.7
SD	147.3	Std. Error of Mean	38.03
Coefficient of Variation	1.977	Skewness	3.638
Normal GOF Test			
Shapiro Wilk Test Statistic	0.441	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.357	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.22	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	141.5	95% Adjusted-CLT UCL (Chen-1995)	175.2
		95% Modified-t UCL (Johnson-1978)	147.4
Gamma GOF Test			
A-D Test Statistic	1.465	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.773	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.244	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.23	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.792	k star (bias corrected MLE)	0.678
Theta hat (MLE)	94.01	Theta star (bias corrected MLE)	109.8

nu hat (MLE)	23.77	nu star (bias corrected)	20.35
MLE Mean (bias corrected)	74.49	MLE Sd (bias corrected)	90.44
		Approximate Chi Square Value (0.05)	11.11
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	10.28
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	136.4	95% Adjusted Gamma UCL (use when n<50)	147.5
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.902	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.187	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.22	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	2.105	Mean of logged Data	3.561
Maximum of Logged Data	6.392	SD of logged Data	1.056
Assuming Lognormal Distribution			
95% H-UCL	136.7	90% Chebyshev (MVUE) UCL	110.7
95% Chebyshev (MVUE) UCL	134.4	97.5% Chebyshev (MVUE) UCL	167.3
99% Chebyshev (MVUE) UCL	232		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	137	95% Jackknife UCL	141.5
95% Standard Bootstrap UCL	135	95% Bootstrap-t UCL	398.4
95% Hall's Bootstrap UCL	350.1	95% Percentile Bootstrap UCL	148.5
95% BCA Bootstrap UCL	192.9		
90% Chebyshev(Mean, Sd) UCL	188.6	95% Chebyshev(Mean, Sd) UCL	240.3
97.5% Chebyshev(Mean, Sd) UCL	312	99% Chebyshev(Mean, Sd) UCL	452.9
Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	**240.3**		
Hg			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	14
		Number of Missing Observations	1
Number of Detects	6	Number of Non-Detects	9
Number of Distinct Detects	6	Number of Distinct Non-Detects	8
Minimum Detect	0.00476	Minimum Non-Detect	0.00343
Maximum Detect	0.775	Maximum Non-Detect	0.00396
Variance Detects	0.0968	Percent Non-Detects	60%
Mean Detects	0.141	SD Detects	0.311
Median Detects	0.0062	CV Detects	2.211
Skewness Detects	2.434	Kurtosis Detects	5.94
Mean of Logged Detects	-4.006	SD of Logged Detects	2.026
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.531	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.452	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.325	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.0583	KM Standard Error of Mean	0.0543
KM SD	0.192	95% KM (BCA) UCL	0.161
95% KM (t) UCL	0.154	95% KM (Percentile Bootstrap) UCL	0.161
95% KM (z) UCL	0.148	95% KM Bootstrap t UCL	9.152
90% KM Chebyshev UCL	0.221	95% KM Chebyshev UCL	0.295
97.5% KM Chebyshev UCL	0.397	99% KM Chebyshev UCL	0.598
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.083	Anderson-Darling GOF Test	
5% A-D Critical Value	0.762	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.388	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.355	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.332	k star (bias corrected MLE)	0.277
Theta hat (MLE)	0.424	Theta star (bias corrected MLE)	0.508
nu hat (MLE)	3.98	nu star (bias corrected)	3.324
Mean (detects)	0.141		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.00476	Mean	0.0623
Maximum	0.775	Median	0.01
SD	0.197	CV	3.169
k hat (MLE)	0.412	k star (bias corrected MLE)	0.374
Theta hat (MLE)	0.151	Theta star (bias corrected MLE)	0.167
nu hat (MLE)	12.36	nu star (bias corrected)	11.22
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (11.22, α)	4.719	Adjusted Chi Square Value (11.22, β)	4.211
95% Gamma Approximate UCL (use when n>=50)	0.148	95% Gamma Adjusted UCL (use when n<50)	0.166
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0583	SD (KM)	0.192
Variance (KM)	0.0368	SE of Mean (KM)	0.0543
k hat (KM)	0.0925	k star (KM)	0.118
nu hat (KM)	2.776	nu star (KM)	3.554
theta hat (KM)	0.631	theta star (KM)	0.493
80% gamma percentile (KM)	0.0504	90% gamma percentile (KM)	0.165
95% gamma percentile (KM)	0.333	99% gamma percentile (KM)	0.85
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (3.55, α)	0.554	Adjusted Chi Square Value (3.55, β)	0.432
95% Gamma Approximate KM-UCL (use when n>=50)	0.374	95% Gamma Adjusted KM-UCL (use when n<50)	0.48
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.735	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.361	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.325	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0563	Mean in Log Scale	-7.708
SD in Original Scale	0.199	SD in Log Scale	3.389
95% t UCL (assumes normality of ROS data)	0.147	95% Percentile Bootstrap UCL	0.159
95% BCA Bootstrap UCL	0.211	95% Bootstrap t UCL	4.16
95% H-UCL (Log ROS)	108.7		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-5.008	KM Geo Mean	0.00669
KM SD (logged)	1.427	95% Critical H Value (KM-Log)	3.478
KM Standard Error of Mean (logged)	0.404	95% H-UCL (KM -Log)	0.0697
KM SD (logged)	1.427	95% Critical H Value (KM-Log)	3.478
KM Standard Error of Mean (logged)	0.404		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0574	Mean in Log Scale	-5.382
SD in Original Scale	0.199	SD in Log Scale	1.679
95% t UCL (Assumes normality)	0.148	95% H-Stat UCL	0.111
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
99% KM (Chebyshev) UCL	0.598		
CLO4			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	15
		Number of Missing Observations	1

Number of Detects	11	Number of Non-Detects	4
Number of Distinct Detects	11	Number of Distinct Non-Detects	4
Minimum Detect	5.72E-04	Minimum Non-Detect	4.99E-04
Maximum Detect	0.0296	Maximum Non-Detect	5.05E-04
Variance Detects	9.24E-05	Percent Non-Detects	26.67%
Mean Detects	0.00741	SD Detects	0.00961
Median Detects	0.00321	CV Detects	1.298
Skewness Detects	1.612	Kurtosis Detects	1.817
Mean of Logged Detects	-5.724	SD of Logged Detects	1.379
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.752	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.27	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.251	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.00556	KM Standard Error of Mean	0.00228
KM SD	0.00842	95% KM (BCA) UCL	0.00975
95% KM (t) UCL	0.00958	95% KM (Percentile Bootstrap) UCL	0.00919
95% KM (z) UCL	0.00932	95% KM Bootstrap t UCL	0.0137
90% KM Chebyshev UCL	0.0124	95% KM Chebyshev UCL	0.0155
97.5% KM Chebyshev UCL	0.0198	99% KM Chebyshev UCL	0.0283
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.543	Anderson-Darling GOF Test	
5% A-D Critical Value	0.764	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.223	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.265	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.734	k star (bias corrected MLE)	0.594
Theta hat (MLE)	0.0101	Theta star (bias corrected MLE)	0.0125
nu hat (MLE)	16.14	nu star (bias corrected)	13.07
Mean (detects)	0.00741		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	5.72E-04	Mean	0.0081
Maximum	0.0296	Median	0.00637
SD	0.00821	CV	1.014
k hat (MLE)	0.953	k star (bias corrected MLE)	0.807
Theta hat (MLE)	0.0085	Theta star (bias corrected MLE)	0.01
nu hat (MLE)	28.59	nu star (bias corrected)	24.2
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (24.20, α)	14	Adjusted Chi Square Value (24.20, β)	13.05
95% Gamma Approximate UCL (use when n>=50)	0.014	95% Gamma Adjusted UCL (use when n<50)	0.015
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00556	SD (KM)	0.00842
Variance (KM)	7.10E-05	SE of Mean (KM)	0.00228
k hat (KM)	0.436	k star (KM)	0.393
nu hat (KM)	13.09	nu star (KM)	11.8
theta hat (KM)	0.0128	theta star (KM)	0.0141
80% gamma percentile (KM)	0.00896	90% gamma percentile (KM)	0.0158
95% gamma percentile (KM)	0.0232	99% gamma percentile (KM)	0.0421
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (11.80, α)	5.099	Adjusted Chi Square Value (11.80, β)	4.567

95% Gamma Approximate KM-UCL (use when n>=50)	0.0129	95% Gamma Adjusted KM-UCL (use when n<50)	0.0144
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.924	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.201	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00546	Mean in Log Scale	-6.608
SD in Original Scale	0.00878	SD in Log Scale	1.914
95% t UCL (assumes normality of ROS data)	0.00946	95% Percentile Bootstrap UCL	0.00938
95% BCA Bootstrap UCL	0.0105	95% Bootstrap t UCL	0.014
95% H-UCL (Log ROS)	0.0798		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.225	KM Geo Mean	0.00198
KM SD (logged)	1.399	95% Critical H Value (KM-Log)	3.427
KM Standard Error of Mean (logged)	0.379	95% H-UCL (KM -Log)	0.019
KM SD (logged)	1.399	95% Critical H Value (KM-Log)	3.427
KM Standard Error of Mean (logged)	0.379		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0055	Mean in Log Scale	-6.408
SD in Original Scale	0.00876	SD in Log Scale	1.654
95% t UCL (Assumes normality)	0.00948	95% H-Stat UCL	0.0363
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	**0.0144**		
Ag			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	15
		Number of Missing Observations	1
Minimum	0.125	Mean	0.437
Maximum	2.19	Median	0.27
SD	0.536	Std. Error of Mean	0.138
Coefficient of Variation	1.225	Skewness	2.922
Normal GOF Test			
Shapiro Wilk Test Statistic	0.584	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.325	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.22	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.681	95% Adjusted-CLT UCL (Chen-1995)	0.776
		95% Modified-t UCL (Johnson-1978)	0.698
Gamma GOF Test			
A-D Test Statistic	1.171	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.754	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.249	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.226	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	1.47	k star (bias corrected MLE)	1.221
Theta hat (MLE)	0.298	Theta star (bias corrected MLE)	0.358
nu hat (MLE)	44.11	nu star (bias corrected)	36.62
MLE Mean (bias corrected)	0.437	MLE Sd (bias corrected)	0.396
		Approximate Chi Square Value (0.05)	23.77
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	22.5
Assuming Gamma Distribution			

95% Approximate Gamma UCL (use when n>=50))	0.674	95% Adjusted Gamma UCL (use when n<50)	0.712

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.885	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.184	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.22	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.079	Mean of logged Data	-1.204
Maximum of Logged Data	0.784	SD of logged Data	0.788

Assuming Lognormal Distribution

95% H-UCL	0.682	90% Chebyshev (MVUE) UCL	0.658
95% Chebyshev (MVUE) UCL	0.775	97.5% Chebyshev (MVUE) UCL	0.938
99% Chebyshev (MVUE) UCL	1.258		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.665	**95% Jackknife UCL**	**0.681**
95% Standard Bootstrap UCL	0.661	95% Bootstrap-t UCL	1.352
95% Hall's Bootstrap UCL	1.72	95% Percentile Bootstrap UCL	0.681
95% BCA Bootstrap UCL	0.82		
90% Chebyshev(Mean, Sd) UCL	0.852	95% Chebyshev(Mean, Sd) UCL	1.04
97.5% Chebyshev(Mean, Sd) UCL	1.301	99% Chebyshev(Mean, Sd) UCL	1.814

Suggested UCL to Use

95% H-UCL	**0.682**

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

BenzAc

General Statistics

Total Number of Observations	15	Number of Distinct Observations	6
		Number of Missing Observations	1
Number of Detects	2	Number of Non-Detects	13
Number of Distinct Detects	2	Number of Distinct Non-Detects	4
Minimum Detect	0.458	Minimum Non-Detect	0.167
Maximum Detect	0.497	Maximum Non-Detect	0.17
Variance Detects	7.61E-04	Percent Non-Detects	86.67%
Mean Detects	0.478	SD Detects	0.0276
Median Detects	0.478	CV Detects	0.0578
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-0.74	SD of Logged Detects	0.0578

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.208	KM Standard Error of Mean	0.0386
KM SD	0.106	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.276	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.272	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.324	95% KM Chebyshev UCL	0.377

97.5% KM Chebyshev UCL	0.45	99% KM Chebyshev UCL	0.593
Gamma GOF Tests on Detected Observations Only			
Not Enough Data to Perform GOF Test			
Gamma Statistics on Detected Data Only			
k hat (MLE)	599.3	k star (bias corrected MLE)	N/A
Theta hat (MLE)	7.97E-04	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	2397	nu star (bias corrected)	N/A
Mean (detects)	0.478		
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.208	SD (KM)	0.106
Variance (KM)	0.0112	SE of Mean (KM)	0.0386
k hat (KM)	3.881	k star (KM)	3.149
nu hat (KM)	116.4	nu star (KM)	94.47
theta hat (KM)	0.0537	theta star (KM)	0.0662
80% gamma percentile (KM)	0.296	90% gamma percentile (KM)	0.366
95% gamma percentile (KM)	0.431	99% gamma percentile (KM)	0.573
Gamma Kaplan-Meier (KM) Statistics			
		Adjusted Level of Significance (β)	0.0324
Approximate Chi Square Value (94.47, α)	73.05	Adjusted Chi Square Value (94.47, β)	70.74
95% Gamma Approximate KM-UCL (use when n>=50)	0.269	95% Gamma Adjusted KM-UCL (use when n<50)	0.278
Lognormal GOF Test on Detected Observations Only			
Not Enough Data to Perform GOF Test			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.344	Mean in Log Scale	-1.085
SD in Original Scale	0.0679	SD in Log Scale	0.189
95% t UCL (assumes normality of ROS data)	0.374	95% Percentile Bootstrap UCL	0.372
95% BCA Bootstrap UCL	0.377	95% Bootstrap t UCL	0.382
95% H-UCL (Log ROS)	0.377		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.65	KM Geo Mean	0.192
KM SD (logged)	0.357	95% Critical H Value (KM-Log)	1.93
KM Standard Error of Mean (logged)	0.13	95% H-UCL (KM -Log)	0.246
KM SD (logged)	0.357	95% Critical H Value (KM-Log)	1.93
KM Standard Error of Mean (logged)	0.13		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.137	Mean in Log Scale	-2.244
SD in Original Scale	0.139	SD in Log Scale	0.611
95% t UCL (Assumes normality)	0.2	95% H-Stat UCL	0.183
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.276	KM H-UCL	0.246
95% KM (BCA) UCL	N/A		
Warning: One or more Recommended UCL(s) not available!			
B2EHP			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	9
		Number of Missing Observations	1
Number of Detects	6	Number of Non-Detects	9
Number of Distinct Detects	6	Number of Distinct Non-Detects	3
Minimum Detect	0.0255	Minimum Non-Detect	0.01
Maximum Detect	1.32	Maximum Non-Detect	0.0102
Variance Detects	0.315	Percent Non-Detects	60%
Mean Detects	0.655	SD Detects	0.561
Median Detects	0.616	CV Detects	0.858
Skewness Detects	0.0747	Kurtosis Detects	-2.718
Mean of Logged Detects	-1.05	SD of Logged Detects	1.523
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.866	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.263	Lilliefors GOF Test	

5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.268	KM Standard Error of Mean	0.128
KM SD	0.453	95% KM (BCA) UCL	0.483
95% KM (t) UCL	0.493	95% KM (Percentile Bootstrap) UCL	0.49
95% KM (z) UCL	0.478	95% KM Bootstrap t UCL	0.534
90% KM Chebyshev UCL	0.652	95% KM Chebyshev UCL	0.826
97.5% KM Chebyshev UCL	1.067	99% KM Chebyshev UCL	1.541
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.417	Anderson-Darling GOF Test	
5% A-D Critical Value	0.717	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.275	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.342	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.93	k star (bias corrected MLE)	0.576
Theta hat (MLE)	0.704	Theta star (bias corrected MLE)	1.136
nu hat (MLE)	11.16	nu star (bias corrected)	6.915
Mean (detects)	0.655		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	0.268
Maximum	1.32	Median	0.01
SD	0.468	CV	1.749
k hat (MLE)	0.359	k star (bias corrected MLE)	0.332
Theta hat (MLE)	0.746	Theta star (bias corrected MLE)	0.808
nu hat (MLE)	10.77	nu star (bias corrected)	9.948
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (9.95, α)	3.91	Adjusted Chi Square Value (9.95, β)	3.456
95% Gamma Approximate UCL (use when n>=50)	0.682	95% Gamma Adjusted UCL (use when n<50)	0.771
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.268	SD (KM)	0.453
Variance (KM)	0.205	SE of Mean (KM)	0.128
k hat (KM)	0.35	k star (KM)	0.325
nu hat (KM)	10.51	nu star (KM)	9.74
theta hat (KM)	0.765	theta star (KM)	0.825
80% gamma percentile (KM)	0.418	90% gamma percentile (KM)	0.782
95% gamma percentile (KM)	1.194	99% gamma percentile (KM)	2.255
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (9.74, α)	3.78	Adjusted Chi Square Value (9.74, β)	3.335
95% Gamma Approximate KM-UCL (use when n>=50)	0.69	95% Gamma Adjusted KM-UCL (use when n<50)	0.782
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.863	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.25	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.266	Mean in Log Scale	-3.773
SD in Original Scale	0.469	SD in Log Scale	2.692
95% t UCL (assumes normality of ROS data)	0.48	95% Percentile Bootstrap UCL	0.472
95% BCA Bootstrap UCL	0.495	95% Bootstrap t UCL	0.576
95% H-UCL (Log ROS)	61.91		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.183	KM Geo Mean	0.0415
KM SD (logged)	1.951	95% Critical H Value (KM-Log)	4.468
KM Standard Error of Mean (logged)	0.552	95% H-UCL (KM -Log)	2.859

KM SD (logged)	1.951	95% Critical H Value (KM-Log)	4.468
KM Standard Error of Mean (logged)	0.552		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.265	Mean in Log Scale	-3.593
SD in Original Scale	0.47	SD in Log Scale	2.334
95% t UCL (Assumes normality)	0.479	95% H-Stat UCL	10.91
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	**0.493**		
DNBP			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	7
		Number of Missing Observations	1
Number of Detects	4	Number of Non-Detects	11
Number of Distinct Detects	4	Number of Distinct Non-Detects	3
Minimum Detect	0.0131	Minimum Non-Detect	0.01
Maximum Detect	0.744	Maximum Non-Detect	0.0102
Variance Detects	0.118	Percent Non-Detects	73.33%
Mean Detects	0.239	SD Detects	0.343
Median Detects	0.1	CV Detects	1.435
Skewness Detects	1.776	Kurtosis Detects	3.132
Mean of Logged Detects	-2.459	SD of Logged Detects	1.785
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.779	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.333	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.0711	KM Standard Error of Mean	0.0549
KM SD	0.184	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.168	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.161	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.236	95% KM Chebyshev UCL	0.31
97.5% KM Chebyshev UCL	0.414	99% KM Chebyshev UCL	0.617
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.292	Anderson-Darling GOF Test	
5% A-D Critical Value	0.677	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.257	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.408	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.601	k star (bias corrected MLE)	0.317
Theta hat (MLE)	0.398	Theta star (bias corrected MLE)	0.755
nu hat (MLE)	4.805	nu star (bias corrected)	2.535
Mean (detects)	0.239		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	0.0711
Maximum	0.744	Median	0.01
SD	0.19	CV	2.678
k hat (MLE)	0.463	k star (bias corrected MLE)	0.415
Theta hat (MLE)	0.154	Theta star (bias corrected MLE)	0.172
nu hat (MLE)	13.88	nu star (bias corrected)	12.44
Adjusted Level of Significance (β)	0.0324		

Approximate Chi Square Value (12.44, α)	5.517	Adjusted Chi Square Value (12.44, β)	4.96
95% Gamma Approximate UCL (use when n>=50)	0.16	95% Gamma Adjusted UCL (use when n<50)	N/A
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0711	SD (KM)	0.184
Variance (KM)	0.0339	SE of Mean (KM)	0.0549
k hat (KM)	0.149	k star (KM)	0.164
nu hat (KM)	4.483	nu star (KM)	4.92
theta hat (KM)	0.476	theta star (KM)	0.434
80% gamma percentile (KM)	0.0829	90% gamma percentile (KM)	0.213
95% gamma percentile (KM)	0.384	99% gamma percentile (KM)	0.873
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (4.92, α)	1.115	Adjusted Chi Square Value (4.92, β)	0.912
95% Gamma Approximate KM-UCL (use when n>=50)	0.314	95% Gamma Adjusted KM-UCL (use when n<50)	0.384
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.972	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.204	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.064	Mean in Log Scale	-8.202
SD in Original Scale	0.193	SD in Log Scale	4.354
95% t UCL (assumes normality of ROS data)	0.152	95% Percentile Bootstrap UCL	0.161
95% BCA Bootstrap UCL	0.21	95% Bootstrap t UCL	1.472
95% H-UCL (Log ROS)	193999		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.033	KM Geo Mean	0.0177
KM SD (logged)	1.24	95% Critical H Value (KM-Log)	3.146
KM Standard Error of Mean (logged)	0.37	95% H-UCL (KM -Log)	0.109
KM SD (logged)	1.24	95% Critical H Value (KM-Log)	3.146
KM Standard Error of Mean (logged)	0.37		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0675	Mean in Log Scale	-4.534
SD in Original Scale	0.192	SD in Log Scale	1.536
95% t UCL (Assumes normality)	0.155	95% H-Stat UCL	0.158
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.168		
HMX			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	13
		Number of Missing Observations	1
Number of Detects	11	Number of Non-Detects	4
Number of Distinct Detects	11	Number of Distinct Non-Detects	2
Minimum Detect	0.158	Minimum Non-Detect	0.148
Maximum Detect	3.87	Maximum Non-Detect	0.149
Variance Detects	1.064	Percent Non-Detects	26.67%
Mean Detects	1.209	SD Detects	1.032
Median Detects	0.978	CV Detects	0.853
Skewness Detects	1.932	Kurtosis Detects	4.369
Mean of Logged Detects	-0.113	SD of Logged Detects	0.852
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.813	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.85	**Detected Data Not Normal at 5% Significance Level**	
Lilliefors Test Statistic	0.226	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.251	**Detected Data appear Normal at 5% Significance Level**	
Detected Data appear Approximate Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.926	KM Standard Error of Mean	0.261
KM SD	0.964	95% KM (BCA) UCL	1.41

95% KM (t) UCL	**1.386**	95% KM (Percentile Bootstrap) UCL	1.38
95% KM (z) UCL	1.356	95% KM Bootstrap t UCL	1.698
90% KM Chebyshev UCL	1.709	95% KM Chebyshev UCL	2.064
97.5% KM Chebyshev UCL	2.557	99% KM Chebyshev UCL	3.524
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.204	Anderson-Darling GOF Test	
5% A-D Critical Value	0.74	**Detected data appear Gamma Distributed at 5% Significance Level**	
K-S Test Statistic	0.128	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.259	**Detected data appear Gamma Distributed at 5% Significance Level**	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.799	k star (bias corrected MLE)	1.369
Theta hat (MLE)	0.672	Theta star (bias corrected MLE)	0.883
nu hat (MLE)	39.58	nu star (bias corrected)	30.12
Mean (detects)	1.209		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	0.889
Maximum	3.87	Median	0.652
SD	1.03	CV	1.158
k hat (MLE)	0.528	k star (bias corrected MLE)	0.467
Theta hat (MLE)	1.685	Theta star (bias corrected MLE)	1.906
nu hat (MLE)	15.83	nu star (bias corrected)	14
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (14.00, α)	6.57	Adjusted Chi Square Value (14.00, β)	5.954
95% Gamma Approximate UCL (use when n>=50)	1.895	95% Gamma Adjusted UCL (use when n<50)	2.091
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.926	SD (KM)	0.964
Variance (KM)	0.93	SE of Mean (KM)	0.261
k hat (KM)	0.923	k star (KM)	0.783
nu hat (KM)	27.68	nu star (KM)	23.48
theta hat (KM)	1.004	theta star (KM)	1.183
80% gamma percentile (KM)	1.515	90% gamma percentile (KM)	2.264
95% gamma percentile (KM)	3.028	99% gamma percentile (KM)	4.836
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (23.48, α)	13.45	Adjusted Chi Square Value (23.48, β)	12.52
95% Gamma Approximate KM-UCL (use when n>=50)	1.616	**95% Gamma Adjusted KM-UCL (use when n<50)**	**1.736**
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.98	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.132	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.92	Mean in Log Scale	-0.651
SD in Original Scale	1.004	SD in Log Scale	1.181
95% t UCL (assumes normality of ROS data)	1.376	95% Percentile Bootstrap UCL	1.353
95% BCA Bootstrap UCL	1.498	95% Bootstrap t UCL	1.691
95% H-UCL (Log ROS)	2.733		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.592	KM Geo Mean	0.553
KM SD (logged)	1.056	95% Critical H Value (KM-Log)	2.835
KM Standard Error of Mean (logged)	0.286	95% H-UCL (KM -Log)	2.151
KM SD (logged)	1.056	95% Critical H Value (KM-Log)	2.835
KM Standard Error of Mean (logged)	0.286		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.906	Mean in Log Scale	-0.776
SD in Original Scale	1.015	SD in Log Scale	1.347

95% t UCL (Assumes normality)	1.368	95% H-Stat UCL	3.788

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	**1.386**

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Isophorone

General Statistics

Total Number of Observations	15	Number of Distinct Observations	4
		Number of Missing Observations	1
Number of Detects	1	Number of Non-Detects	14
Number of Distinct Detects	1	Number of Distinct Non-Detects	3

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Isophorone was not processed!

RDX

General Statistics

Total Number of Observations	15	Number of Distinct Observations	10
		Number of Missing Observations	1
Number of Detects	7	Number of Non-Detects	8
Number of Distinct Detects	7	Number of Distinct Non-Detects	3
Minimum Detect	0.196	Minimum Non-Detect	0.148
Maximum Detect	4.76	Maximum Non-Detect	0.15
Variance Detects	2.991	Percent Non-Detects	53.33%
Mean Detects	1.611	SD Detects	1.729
Median Detects	0.608	CV Detects	1.074
Skewness Detects	1.112	Kurtosis Detects	0.366
Mean of Logged Detects	-0.151	SD of Logged Detects	1.281

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.824	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.29	Lilliefors GOF Test
5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.831	KM Standard Error of Mean	0.367
KM SD	1.315	95% KM (BCA) UCL	1.478
95% KM (t) UCL	1.476	95% KM (Percentile Bootstrap) UCL	1.437
95% KM (z) UCL	1.434	95% KM Bootstrap t UCL	1.842
90% KM Chebyshev UCL	1.931	95% KM Chebyshev UCL	2.429
97.5% KM Chebyshev UCL	3.12	99% KM Chebyshev UCL	4.479

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.462	Anderson-Darling GOF Test
5% A-D Critical Value	0.73	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.241	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.32	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.929	k star (bias corrected MLE)	0.626
Theta hat (MLE)	1.734	Theta star (bias corrected MLE)	2.573
nu hat (MLE)	13	nu star (bias corrected)	8.762
Mean (detects)	1.611		

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.757
Maximum	4.76	Median	0.01
SD	1.402	CV	1.852
k hat (MLE)	0.306	k star (bias corrected MLE)	0.289
Theta hat (MLE)	2.475	Theta star (bias corrected MLE)	2.618
nu hat (MLE)	9.174	nu star (bias corrected)	8.673
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (8.67, α)	3.13	Adjusted Chi Square Value (8.67, β)	2.734
95% Gamma Approximate UCL (use when n>=50)	2.097	95% Gamma Adjusted UCL (use when n<50)	2.401
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.831	SD (KM)	1.315
Variance (KM)	1.729	SE of Mean (KM)	0.367
k hat (KM)	0.399	k star (KM)	0.364
nu hat (KM)	11.97	nu star (KM)	10.91
theta hat (KM)	2.081	theta star (KM)	2.284
80% gamma percentile (KM)	1.323	90% gamma percentile (KM)	2.384
95% gamma percentile (KM)	3.565	99% gamma percentile (KM)	6.566
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (10.91, α)	4.518	Adjusted Chi Square Value (10.91, β)	4.023
95% Gamma Approximate KM-UCL (use when n>=50)	2.005	95% Gamma Adjusted KM-UCL (use when n<50)	2.252
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.898	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.225	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.766	Mean in Log Scale	-2.198
SD in Original Scale	1.397	SD in Log Scale	2.263
95% t UCL (assumes normality of ROS data)	1.401	95% Percentile Bootstrap UCL	1.378
95% BCA Bootstrap UCL	1.647	95% Bootstrap t UCL	1.894
95% H-UCL (Log ROS)	31.1		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.089	KM Geo Mean	0.336
KM SD (logged)	1.195	95% Critical H Value (KM-Log)	3.066
KM Standard Error of Mean (logged)	0.333	95% H-UCL (KM -Log)	1.828
KM SD (logged)	1.195	95% Critical H Value (KM-Log)	3.066
KM Standard Error of Mean (logged)	0.333		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.791	Mean in Log Scale	-1.457
SD in Original Scale	1.382	SD in Log Scale	1.517
95% t UCL (Assumes normality)	1.42	95% H-Stat UCL	3.229
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	**1.476**		
TATB			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	15
		Number of Missing Observations	1
Minimum	3.33	Mean	12.29
Maximum	22.2	Median	12.7
SD	4.898	Std. Error of Mean	1.265
Coefficient of Variation	0.399	Skewness	-0.203
Normal GOF Test			
Shapiro Wilk Test Statistic	0.955	Shapiro Wilk GOF Test	

5% Shapiro Wilk Critical Value	0.881	**Data appear Normal at 5% Significance Level**	
Lilliefors Test Statistic	0.138	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.22	**Data appear Normal at 5% Significance Level**	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	14.52	95% Adjusted-CLT UCL (Chen-1995)	14.3
		95% Modified-t UCL (Johnson-1978)	14.5
Gamma GOF Test			
A-D Test Statistic	0.768	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.739	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.205	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.222	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	4.988	k star (bias corrected MLE)	4.034
Theta hat (MLE)	2.464	Theta star (bias corrected MLE)	3.046
nu hat (MLE)	149.6	nu star (bias corrected)	121
MLE Mean (bias corrected)	12.29	MLE Sd (bias corrected)	6.118
		Approximate Chi Square Value (0.05)	96.63
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	93.95
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	15.39	95% Adjusted Gamma UCL (use when n<50)	15.83
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.843	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.235	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.22	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	1.203	Mean of logged Data	2.405
Maximum of Logged Data	3.1	SD of logged Data	0.523
Assuming Lognormal Distribution			
95% H-UCL	17.01	90% Chebyshev (MVUE) UCL	17.83
95% Chebyshev (MVUE) UCL	20.21	97.5% Chebyshev (MVUE) UCL	23.51
99% Chebyshev (MVUE) UCL	30.01		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	14.37	95% Jackknife UCL	14.52
95% Standard Bootstrap UCL	14.25	95% Bootstrap-t UCL	14.39
95% Hall's Bootstrap UCL	14.5	95% Percentile Bootstrap UCL	14.26
95% BCA Bootstrap UCL	14.31		
90% Chebyshev(Mean, Sd) UCL	16.08	95% Chebyshev(Mean, Sd) UCL	17.8
97.5% Chebyshev(Mean, Sd) UCL	20.19	99% Chebyshev(Mean, Sd) UCL	24.87
Suggested UCL to Use			
95% Student's-t UCL	**14.52**		

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

UCL Statistics for Uncensored Full Data Sets

User Selected Options		
Date/Time of Computation	**ProUCL 5.1 3/7/2022 7:32:40 PM**	
From File	**WorkSheet.xls**	
Full Precision	**OFF**	
Confidence Coefficient		**95%**
Number of Bootstrap Operations		**2000**

TEQ HH and Mammal

General Statistics			
Total Number of Observations	15	Number of Distinct Observations	11
		Number of Missing Observations	1.00E+00
Minimum	3.44E-06	Mean	3.70E-06

Maximum	5.03E-06	Median	3.49E-06
SD	4.38E-07	Std. Error of Mean	1.13E-07
Coefficient of Variation	N/A	Skewness	2.375
Normal GOF Test			
Shapiro Wilk Test Statistic	0.654	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.287	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.22	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	3.90E-06	95% Adjusted-CLT UCL (Chen-1995)	3.96E-06
		95% Modified-t UCL (Johnson-1978)	3.91E-06
Gamma GOF Test			
A-D Test Statistic	1.939	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.734	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.279	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.221	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	8.78E+01	k star (bias corrected MLE)	7.03E+01
Theta hat (MLE)	4.21E-08	Theta star (bias corrected MLE)	5.26E-08
nu hat (MLE)	2.63E+03	nu star (bias corrected)	2.11E+03
MLE Mean (bias corrected)	3.70E-06	MLE Sd (bias corrected)	4.41E-07
		Approximate Chi Square Value (0.05)	2003
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	1990
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	3.89E-06	95% Adjusted Gamma UCL (use when n<50)	3.92E-06
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.685	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.272	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.22	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-12.58	Mean of logged Data	-12.51
Maximum of Logged Data	-12.2	SD of logged Data	0.107
Assuming Lognormal Distribution			
95% H-UCL	3.89E-06	90% Chebyshev (MVUE) UCL	4.00E-06
95% Chebyshev (MVUE) UCL	4.14E-06	97.5% Chebyshev (MVUE) UCL	4.34E-06
99% Chebyshev (MVUE) UCL	4.71E-06		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution (0.05)			
Nonparametric Distribution Free UCLs			
95% CLT UCL	3.88E-06	95% Jackknife UCL	3.90E-06
95% Standard Bootstrap UCL	3.88E-06	95% Bootstrap-t UCL	4.11E-06
95% Hall's Bootstrap UCL	4.43E-06	95% Percentile Bootstrap UCL	3.90E-06
95% BCA Bootstrap UCL	3.95E-06		
90% Chebyshev(Mean, Sd) UCL	4.04E-06	95% Chebyshev(Mean, Sd) UCL	4.19E-06
97.5% Chebyshev(Mean, Sd) UCL	4.40E-06	99% Chebyshev(Mean, Sd) UCL	4.82E-06

Suggested UCL to Use

95% Student's-t UCL	3.90E-06	or 95% Modified-t UCL	3.91E-06
UCL Statistics for Uncensored Full Data Sets			
Avian TEQ			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	13
		Number of Missing Observations	1
Minimum	4.74E-06	Mean	4.85E-06
Maximum	5.06E-06	Median	4.81E-06
SD	9.88E-08	Std. Error of Mean	2.55E-08
Coefficient of Variation	N/A	Skewness	1.113
Normal GOF Test			
Shapiro Wilk Test Statistic	0.866	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.881	**Data Not Normal at 5% Significance Level**	
Lilliefors Test Statistic	0.188	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.22	Data appear Normal at 5% Significance Level	
Data appear Approximate Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	4.89E-06	95% Adjusted-CLT UCL (Chen-1995)	4.90E-06
		95% Modified-t UCL (Johnson-1978)	4.89E-06
Gamma GOF Test			
A-D Test Statistic	0.904	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.734	**Data Not Gamma Distributed at 5% Significance Level**	
K-S Test Statistic	0.209	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	2612	k star (bias corrected MLE)	2089
Theta hat (MLE)	1.86E-09	Theta star (bias corrected MLE)	2.32E-09
nu hat (MLE)	78347	nu star (bias corrected)	62679
MLE Mean (bias corrected)	4.85E-06	MLE Sd (bias corrected)	1.06E-07
		Approximate Chi Square Value (0.05)	62098
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	62027
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	4.89E-06	95% Adjusted Gamma UCL (use when n<50)	4.90E-06
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.87	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.881	**Data Not Lognormal at 5% Significance Level**	
Lilliefors Test Statistic	0.185	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.22	Data appear Lognormal at 5% Significance Level	
Data appear Approximate Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-12.26	Mean of logged Data	-12.24
Maximum of Logged Data	-12.19	SD of logged Data	0.0202
Assuming Lognormal Distribution			
95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	4.92E-06
95% Chebyshev (MVUE) UCL	4.96E-06	97.5% Chebyshev (MVUE) UCL	5.00E-06
99% Chebyshev (MVUE) UCL	5.10E-06		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			

95% CLT UCL	4.89E-06	95% Jackknife UCL	4.89E-06
95% Standard Bootstrap UCL	4.89E-06	95% Bootstrap-t UCL	4.91E-06
95% Hall's Bootstrap UCL	4.89E-06	95% Percentile Bootstrap UCL	4.89E-06
95% BCA Bootstrap UCL	4.89E-06		
90% Chebyshev(Mean, Sd) UCL	4.92E-06	95% Chebyshev(Mean, Sd) UCL	4.96E-06
97.5% Chebyshev(Mean, Sd) UCL	5.00E-06	99% Chebyshev(Mean, Sd) UCL	5.10E-06

Suggested UCL to Use

95% Student's-t UCL	**4.89E-06**

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

Date/Time of Computation	ProUCL 5.1 3/1/2022 6:10:36 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: CD(site)
Sample 2 Data: CD(bkg)
Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	15	39
Number of Missing Observations	1	0
Number of Non-Detects	12	36
Number of Detect Data	3	3
Minimum Non-Detect	0.0918	0.4
Maximum Non-Detect	0.101	2
Percent Non-detects	80.00%	92.31%
Minimum Detect	0.252	0.6
Maximum Detect	0.467	2.6
Mean of Detects	0.333	1.533
Median of Detects	0.28	1.4
SD of Detects	0.117	1.007
KM Mean	0.14	0.49
KM SD	0.105	0.381

Sample 1 vs Sample 2 Gehan Test
H0: Mean/Median of Sample 1 <= Mean/Median of background

Gehan z Test Value	-0.262
Critical z (0.05)	1.645
P-Value	**0.603**

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)
Use of Gehan or T-W test is suggested when multiple detection limits are present

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

Date/Time of Computation	ProUCL 5.13/1/2022 7:26:34 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Cr(site)
Sample 2 Data: Cr(bkg)
Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	15	173
Number of Missing Observations	1	1
Number of Non-Detects	0	0
Number of Detect Data	15	173
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non-detects	0.00%	0.00%
Minimum Detect	3.82	1.9
Maximum Detect	49.2	36.5
Mean of Detects	9.231	9.04
Median of Detects	6.67	8.6
SD of Detects	11.18	4.363

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	966
Standardized WMW U-Stat	-2.237
Mean (U)	1298
SD(U) - Adj ties	202.1
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.987

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

Date/Time of Computation	ProUCL 5.13/1/2022 7:32:50 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Cu(site)
Sample 2 Data: Cu(bkg)

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	15	174
Number of Missing Observations	1	0
Number of Non-Detects	0	2
Number of Detect Data	15	172
Minimum Non-Detect	N/A	0.5
Maximum Non-Detect	N/A	0.5
Percent Non-detects	0.00%	1.15%
Minimum Detect	8.21	0.6
Maximum Detect	597	16
Mean of Detects	74.49	6.125
Median of Detects	27.7	5.8
SD of Detects	147.3	2.523

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	2699
Standardized WMW U-Stat	6.266
Mean (U)	1305
SD(U) - Adj ties	203.3
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	1.86E-10

Conclusion with Alpha = 0.05

Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

Date/Time of Computation	ProUCL 5.13/1/2022 7:20:51 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Hg(site)
Sample 2 Data: Hg(bkg)

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	15	39
Number of Missing Observations	1	0
Number of Non-Detects	9	37
Number of Detect Data	6	2
Minimum Non-Detect	0.00343	0.1
Maximum Non-Detect	0.00396	0.1
Percent Non-detects	60.00%	94.87%
Minimum Detect	0.00476	0.1
Maximum Detect	0.775	0.1
Mean of Detects	0.141	0.1
Median of Detects	0.0062	0.1
SD of Detects	0.311	0

WMW test is meant for a Single Detection Limit Case
Use of Gehan or T-W test is suggested when multiple detection limits are present
All observations <= 0.1 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2
All observations are identical in at least one group
No analysis will be performed

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

Date/Time of Computation	ProUCL 5.13/1/2022 7:36:25 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Pb(site)
Sample 2 Data: Pb(bkg)

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	15	173
Number of Missing Observations	1	1
Number of Non-Detects	0	9
Number of Detect Data	15	164
Minimum Non-Detect	N/A	4
Maximum Non-Detect	N/A	4
Percent Non-detects	0.00%	5.20%
Minimum Detect	4.13	4
Maximum Detect	35.2	28
Mean of Detects	9.42	13.24
Median of Detects	6.52	13
SD of Detects	7.702	4.738

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	775
Standardized WMW U-Stat	-3.186
Mean (U)	1298
SD(U) - Adj ties	201.8
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.999

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

Date/Time of Computation	ProUCL 5.13/1/2022 7:39:29 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Ag(site)
Sample 2 Data: Ag(bkg)

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	15	113
Number of Missing Observations	1	0
Number of Non-Detects	0	112

Number of Detect Data	15	1
Minimum Non-Detect	N/A	0.4
Maximum Non-Detect	N/A	2
Percent Non-detects	0.00%	99.12%
Minimum Detect	0.125	1.9
Maximum Detect	2.19	1.9
Mean of Detects	0.437	1.9
Median of Detects	0.27	1.9
SD of Detects	0.536	N/A

WMW test is meant for a Single Detection Limit Case
Use of Gehan or T-W test is suggested when multiple detection limits are present
All observations <= 2 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2
All observations are identical in at least one group
No analysis will be performed

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

Date/Time of Computation	ProUCL 5.13/1/2022 7:44:26 PM
From File	ProUCL BKG STATS.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Tl(site)
Sample 2 Data: Tl(bkg)

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	15	173
Number of Missing Observations	1	1
Number of Non-Detects	12	68
Number of Detect Data	3	105
Minimum Non-Detect	0.129	0.125
Maximum Non-Detect	0.141	1
Percent Non-detects	80.00%	39.31%
Minimum Detect	0.158	0.2
Maximum Detect	2.22	1
Mean of Detects	0.887	0.332
Median of Detects	0.282	0.2
SD of Detects	1.156	0.176
KM Mean	0.281	0.262
KM SD	0.52	0.172

Sample 1 vs Sample 2 Gehan Test

H0: Mean/Median of Sample 1 <= Mean/Median of background

Gehan z Test Value	-3.244
Critical z (0.05)	1.645
P-Value	0.999

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

Date/Time of Computation	ProUCL 5.13/1/2022 7:49:22 PM
From File	ProUCL BKG STATS.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Zn(site)
Sample 2 Data: Zn(bkg)

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	15	172
Number of Missing Observations	1	0
Number of Non-Detects	0	0
Number of Detect Data	15	172
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non-detects	0.00%	0.00%
Minimum Detect	18.5	14

Maximum Detect	53.2	75.5
Mean of Detects	29.54	31.52
Median of Detects	25.3	30.75
SD of Detects	11.23	9.002

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	1139
Standardized WMW U-Stat	-1.351
Mean (U)	1290
SD(U) - Adj ties	200.9
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.912

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Sample 1 <= Sample 2

P-Value >= alpha (0.05)

ATTACHMENT B. LANL ECORISK DATABASE FOR SOIL (MG/KG)

Group	Name	CAS	Receptor	NE ESL	LE ESL	ESL ID
Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	Deer mouse (Mammalian omnivore)	0.00000058	0.0000038	SOIL_DM(ip)_1746-01-6
Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	Earthworm (Soil-dwelling invertebrate)	5	10	SOIL_EW_1746-01-6
Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	Gray fox (Mammalian top carnivore)	0.0001	0.00068	SOIL_RF(f)_1746-01-6
Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	Montane shrew (Mammalian insectivore)	0.00000029	0.0000019	SOIL_MS(i)_1746-01-6
Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	Mountain cottontail (Mammalian herbivore)	0.00004	0.00027	SOIL_DC(p)_1746-01-6
Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	American kestrel (Avian top carnivore)	4.10E-06		
Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	American kestrel (insectivore / carnivore)	4.10E-06		
Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	American robin (Avian herbivore)	4.10E-06		
Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	American robin (Avian insectivore)	4.10E-06		
Dioxin/ Furan	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	American robin (Avian omnivore)	4.10E-06		
High Explosive	3,5-Dinitroaniline Use amino-2,6-dinitrotoluene[4-	618-87-1	Deer mouse (Mammalian omnivore)	23	230	SOIL_DM(ip)_19406-51-0
High Explosive	3,5-Dinitroaniline Use amino-2,6-dinitrotoluene[4-	618-87-1	Earthworm (Soil-dwelling invertebrate)	18	180	SOIL_EW_19406-51-0
High Explosive	3,5-Dinitroaniline Use amino-2,6-dinitrotoluene[4-	618-87-1	Generic plant (Terrestrial autotroph - producer)	33	330	SOIL_GP_19406-51-0
High Explosive	3,5-Dinitroaniline Use amino-2,6-dinitrotoluene[4-	618-87-1	Gray fox (Mammalian top carnivore)	6700	67000	SOIL_RF(f)_19406-51-0
High Explosive	3,5-Dinitroaniline Use amino-2,6-dinitrotoluene[4-	618-87-1	Montane shrew (Mammalian insectivore)	12	120	SOIL_MS(i)_19406-51-0
High Explosive	3,5-Dinitroaniline Use amino-2,6-dinitrotoluene[4-	618-87-1	Mountain cottontail (Mammalian herbivore)	320	3200	SOIL_DC(p)_19406-51-0
High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	Deer mouse (Mammalian omnivore)	23	230	SOIL_DM(ip)_19406-51-0
High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	Earthworm (Soil-dwelling invertebrate)	18	180	SOIL_EW_19406-51-0
High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	Generic plant (Terrestrial autotroph - producer)	33	330	SOIL_GP_19406-51-0
High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	Gray fox (Mammalian top carnivore)	6700	67000	SOIL_RF(f)_19406-51-0
High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	Montane shrew (Mammalian insectivore)	12	120	SOIL_MS(i)_19406-51-0
High Explosive	Amino-2,6-dinitrotoluene[4-]	19406-51-0	Mountain cottontail (Mammalian herbivore)	320	3200	SOIL_DC(p)_19406-51-0
High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	Deer mouse (Mammalian omnivore)	23	230	SOIL_DM(ip)_35572-78-2
High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	Earthworm (Soil-dwelling invertebrate)	43	430	SOIL_EW_35572-78-2
High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	Generic plant (Terrestrial autotroph - producer)	14	140	SOIL_GP_35572-78-2
High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	Gray fox (Mammalian top carnivore)	9700	97000	SOIL_RF(f)_35572-78-2
High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	Montane shrew (Mammalian insectivore)	16	160	SOIL_MS(i)_35572-78-2
High Explosive	Amino-4,6-dinitrotoluene[2-]	35572-78-2	Mountain cottontail (Mammalian herbivore)	110	1100	SOIL_DC(p)_35572-78-2
High Explosive	Dinitrobenzene[1,3-]	99-65-0	American kestrel (Avian top carnivore)	120	1200	SOIL_AK(f)_99-65-0
High Explosive	Dinitrobenzene[1,3-]	99-65-0	American kestrel (insectivore / carnivore)	9.3	93	SOIL_AK(fi)_99-65-0
High Explosive	Dinitrobenzene[1,3-]	99-65-0	American robin (Avian herbivore)	0.079	0.79	SOIL_AR(p)_99-65-0
High Explosive	Dinitrobenzene[1,3-]	99-65-0	American robin (Avian insectivore)	1.6	16	SOIL_AR(i)_99-65-0
High Explosive	Dinitrobenzene[1,3-]	99-65-0	American robin (Avian omnivore)	0.15	1.5	SOIL_AR(ip)_99-65-0
High Explosive	Dinitrobenzene[1,3-]	99-65-0	Deer mouse (Mammalian omnivore)	0.072	0.16	SOIL_DM(ip)_99-65-0
High Explosive	Dinitrobenzene[1,3-]	99-65-0	Gray fox (Mammalian top carnivore)	82	190	SOIL_RF(f)_99-65-0
High Explosive	Dinitrobenzene[1,3-]	99-65-0	Montane shrew (Mammalian insectivore)	0.95	2.2	SOIL_MS(i)_99-65-0
High Explosive	Dinitrobenzene[1,3-]	99-65-0	Mountain cottontail (Mammalian herbivore)	0.091	0.21	SOIL_DC(p)_99-65-0
High Explosive	Dinitrotoluene[2,4-]	121-14-2	Deer mouse (Mammalian omnivore)	20	200	SOIL_DM(ip)_121-14-2
High Explosive	Dinitrotoluene[2,4-]	121-14-2	Earthworm (Soil-dwelling invertebrate)	18	180	SOIL_EW_121-14-2
High Explosive	Dinitrotoluene[2,4-]	121-14-2	Generic plant (Terrestrial autotroph - producer)	6	60	SOIL_GP_121-14-2
High Explosive	Dinitrotoluene[2,4-]	121-14-2	Gray fox (Mammalian top carnivore)	2000	20000	SOIL_RF(f)_121-14-2
High Explosive	Dinitrotoluene[2,4-]	121-14-2	Montane shrew (Mammalian insectivore)	14	140	SOIL_MS(i)_121-14-2
High Explosive	Dinitrotoluene[2,4-]	121-14-2	Mountain cottontail (Mammalian herbivore)	74	740	SOIL_DC(p)_121-14-2
High Explosive	Dinitrotoluene[2,6-]	606-20-2	American kestrel (Avian top carnivore)	18000	180000	SOIL_AK(f)_606-20-2
High Explosive	Dinitrotoluene[2,6-]	606-20-2	American kestrel (insectivore / carnivore)	680	6800	SOIL_AK(fi)_606-20-2
High Explosive	Dinitrotoluene[2,6-]	606-20-2	American robin (Avian herbivore)	52	520	SOIL_AR(p)_606-20-2
High Explosive	Dinitrotoluene[2,6-]	606-20-2	American robin (Avian insectivore)	130	1300	SOIL_AR(i)_606-20-2
High Explosive	Dinitrotoluene[2,6-]	606-20-2	American robin (Avian omnivore)	74	740	SOIL_AR(ip)_606-20-2

Group	Name	CAS	Receptor	NE ESL	LE ESL	ESL ID
High Explosive	Dinitrotoluene[2,6-]	606-20-2	Deer mouse (Mammalian omnivore)	4	40	SOIL_DM(ip)_606-20-2
High Explosive	Dinitrotoluene[2,6-]	606-20-2	Earthworm (Soil-dwelling invertebrate)	30	44	SOIL_EW_606-20-2
High Explosive	Dinitrotoluene[2,6-]	606-20-2	Gray fox (Mammalian top carnivore)	1300	13000	SOIL_RF(f)_606-20-2
High Explosive	Dinitrotoluene[2,6-]	606-20-2	Montane shrew (Mammalian insectivore)	7.6	76	SOIL_MS(i)_606-20-2
High Explosive	Dinitrotoluene[2,6-]	606-20-2	Mountain cottontail (Mammalian herbivore)	6.7	67	SOIL_DC(p)_606-20-2
High Explosive	HMX	2691-41-0	Deer mouse (Mammalian omnivore)	290	790	SOIL_DM(ip)_2691-41-0
High Explosive	HMX	2691-41-0	Earthworm (Soil-dwelling invertebrate)	16	160	SOIL_EW_2691-41-0
High Explosive	HMX	2691-41-0	Generic plant (Terrestrial autotroph - producer)	2700	3500	SOIL_GP_2691-41-0
High Explosive	HMX	2691-41-0	Gray fox (Mammalian top carnivore)	59000	150000	SOIL_RF(f)_2691-41-0
High Explosive	HMX	2691-41-0	Montane shrew (Mammalian insectivore)	1100	2900	SOIL_MS(i)_2691-41-0
High Explosive	HMX	2691-41-0	Mountain cottontail (Mammalian herbivore)	410	1100	SOIL_DC(p)_2691-41-0
High Explosive	Nitroglycerine	55-63-0	Deer mouse (Mammalian omnivore)	70	740	SOIL_DM(ip)_55-63-0
High Explosive	Nitroglycerine	55-63-0	Earthworm (Soil-dwelling invertebrate)	13	130	SOIL_EW_55-63-0
High Explosive	Nitroglycerine	55-63-0	Generic plant (Terrestrial autotroph - producer)	21	210	SOIL_GP_55-63-0
High Explosive	Nitroglycerine	55-63-0	Gray fox (Mammalian top carnivore)	69000	730000	SOIL_RF(f)_55-63-0
High Explosive	Nitroglycerine	55-63-0	Montane shrew (Mammalian insectivore)	1200	13000	SOIL_MS(i)_55-63-0
High Explosive	Nitroglycerine	55-63-0	Mountain cottontail (Mammalian herbivore)	88	930	SOIL_DC(p)_55-63-0
High Explosive	Nitrotoluene[2-]	88-72-2	Deer mouse (Mammalian omnivore)	9.8	98	SOIL_DM(ip)_88-72-2
High Explosive	Nitrotoluene[2-]	88-72-2	Gray fox (Mammalian top carnivore)	6000	60000	SOIL_RF(f)_88-72-2
High Explosive	Nitrotoluene[2-]	88-72-2	Montane shrew (Mammalian insectivore)	22	220	SOIL_MS(i)_88-72-2
High Explosive	Nitrotoluene[2-]	88-72-2	Mountain cottontail (Mammalian herbivore)	15	150	SOIL_DC(p)_88-72-2
High Explosive	Nitrotoluene[3-]	99-08-1	Deer mouse (Mammalian omnivore)	12	120	SOIL_DM(ip)_99-08-1
High Explosive	Nitrotoluene[3-]	99-08-1	Gray fox (Mammalian top carnivore)	7000	70000	SOIL_RF(f)_99-08-1
High Explosive	Nitrotoluene[3-]	99-08-1	Montane shrew (Mammalian insectivore)	19	190	SOIL_MS(i)_99-08-1
High Explosive	Nitrotoluene[3-]	99-08-1	Mountain cottontail (Mammalian herbivore)	21	210	SOIL_DC(p)_99-08-1
High Explosive	Nitrotoluene[4-]	99-99-0	Deer mouse (Mammalian omnivore)	21	210	SOIL_DM(ip)_99-99-0
High Explosive	Nitrotoluene[4-]	99-99-0	Gray fox (Mammalian top carnivore)	13000	130000	SOIL_RF(f)_99-99-0
High Explosive	Nitrotoluene[4-]	99-99-0	Montane shrew (Mammalian insectivore)	41	410	SOIL_MS(i)_99-99-0
High Explosive	Nitrotoluene[4-]	99-99-0	Mountain cottontail (Mammalian herbivore)	36	360	SOIL_DC(p)_99-99-0
High Explosive	PETN	78-11-5	Deer mouse (Mammalian omnivore)	100	1000	SOIL_DM(ip)_78-11-5
High Explosive	PETN	78-11-5	Gray fox (Mammalian top carnivore)	47000	470000	SOIL_RF(f)_78-11-5
High Explosive	PETN	78-11-5	Montane shrew (Mammalian insectivore)	1000	10000	SOIL_MS(i)_78-11-5
High Explosive	PETN	78-11-5	Mountain cottontail (Mammalian herbivore)	120	1200	SOIL_DC(p)_78-11-5
High Explosive	RDX	121-82-4	American kestrel (Avian top carnivore)	780	1400	SOIL_AK(f)_121-82-4
High Explosive	RDX	121-82-4	American kestrel (insectivore / carnivore)	11	22	SOIL_AK(fi)_121-82-4
High Explosive	RDX	121-82-4	American robin (Avian herbivore)	2.3	4.3	SOIL_AR(p)_121-82-4
High Explosive	RDX	121-82-4	American robin (Avian insectivore)	2.4	4.5	SOIL_AR(i)_121-82-4
High Explosive	RDX	121-82-4	American robin (Avian omnivore)	2.3	4.4	SOIL_AR(ip)_121-82-4
High Explosive	RDX	121-82-4	Deer mouse (Mammalian omnivore)	16	51	SOIL_DM(ip)_121-82-4
High Explosive	RDX	121-82-4	Earthworm (Soil-dwelling invertebrate)	8.4	15	SOIL_EW_121-82-4
High Explosive	RDX	121-82-4	Gray fox (Mammalian top carnivore)	7000	22000	SOIL_RF(f)_121-82-4
High Explosive	RDX	121-82-4	Montane shrew (Mammalian insectivore)	16	53	SOIL_MS(i)_121-82-4
High Explosive	RDX	121-82-4	Mountain cottontail (Mammalian herbivore)	38	120	SOIL_DC(p)_121-82-4
High Explosive	Tetryl	479-45-8	Deer mouse (Mammalian omnivore)	1.5	7.2	SOIL_DM(ip)_479-45-8
High Explosive	Tetryl	479-45-8	Gray fox (Mammalian top carnivore)	960	4600	SOIL_RF(f)_479-45-8
High Explosive	Tetryl	479-45-8	Montane shrew (Mammalian insectivore)	60	280	SOIL_MS(i)_479-45-8
High Explosive	Tetryl	479-45-8	Mountain cottontail (Mammalian herbivore)	1.8	8.9	SOIL_DC(p)_479-45-8
High Explosive	TATB Use 1,3,5-TNB	3058-38-6	Deer mouse (Mammalian omnivore)	110	1100	SOIL_DM(ip)_99-35-4
High Explosive	TATB Use 1,3,5-TNB	3058-38-6	Earthworm (Soil-dwelling invertebrate)	10	28	SOIL_EW_99-35-4
High Explosive	TATB Use 1,3,5-TNB	3058-38-6	Gray fox (Mammalian top carnivore)	10000	100000	SOIL_RF(f)_99-35-4
High Explosive	TATB Use 1,3,5-TNB	3058-38-6	Montane shrew (Mammalian insectivore)	720	7200	SOIL_MS(i)_99-35-4
High Explosive	TATB Use 1,3,5-TNB	3058-38-6	Mountain cottontail (Mammalian herbivore)	150	1500	SOIL_DC(p)_99-35-4

Group	Name	CAS	Receptor	NE ESL	LE ESL	ESL ID
High Explosive	Trinitrobenzene[1,3,5-]	99-35-4	Deer mouse (Mammalian omnivore)	110	1100	SOIL_DM(ip)_99-35-4
High Explosive	Trinitrobenzene[1,3,5-]	99-35-4	Earthworm (Soil-dwelling invertebrate)	10	28	SOIL_EW_99-35-4
High Explosive	Trinitrobenzene[1,3,5-]	99-35-4	Gray fox (Mammalian top carnivore)	10000	100000	SOIL_RF(f)_99-35-4
High Explosive	Trinitrobenzene[1,3,5-]	99-35-4	Montane shrew (Mammalian insectivore)	720	7200	SOIL_MS(i)_99-35-4
High Explosive	Trinitrobenzene[1,3,5-]	99-35-4	Mountain cottontail (Mammalian herbivore)	150	1500	SOIL_DC(p)_99-35-4
High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	American kestrel (Avian top carnivore)	3100	5700	SOIL_AK(f)_118-96-7
High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	American kestrel (insectivore / carnivore)	1300	2400	SOIL_AK(fi)_118-96-7
High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	American robin (Avian herbivore)	7.5	13	SOIL_AR(p)_118-96-7
High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	American robin (Avian insectivore)	120	220	SOIL_AR(i)_118-96-7
High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	American robin (Avian omnivore)	14	26	SOIL_AR(ip)_118-96-7
High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	Deer mouse (Mammalian omnivore)	95	440	SOIL_DM(ip)_118-96-7
High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	Earthworm (Soil-dwelling invertebrate)	32	58	SOIL_EW_118-96-7
High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	Generic plant (Terrestrial autotroph - producer)	62	120	SOIL_GP_118-96-7
High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	Gray fox (Mammalian top carnivore)	26000	120000	SOIL_RF(f)_118-96-7
High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	Montane shrew (Mammalian insectivore)	1900	9100	SOIL_MS(i)_118-96-7
High Explosive	Trinitrotoluene[2,4,6-]	118-96-7	Mountain cottontail (Mammalian herbivore)	110	540	SOIL_DC(p)_118-96-7
Inorganic	Aluminum	7429-90-5	American kestrel (Avian top carnivore)	pH dependent. Aluminum is identified as a COPC only at sites where the soil pH is less than 5.5.		SOIL_AK(f)_AL
Inorganic	Aluminum	7429-90-5	American kestrel (insectivore / carnivore)	pH dependent. Aluminum is identified as a COPC only at sites where the soil pH is less than 5.5.		SOIL_AK(fi)_AL
Inorganic	Aluminum	7429-90-5	American robin (Avian herbivore)	pH dependent. Aluminum is identified as a COPC only at sites where the soil pH is less than 5.5.		SOIL_AR(p)_AL
Inorganic	Aluminum	7429-90-5	American robin (Avian insectivore)	pH dependent. Aluminum is identified as a COPC only at sites where the soil pH is less than 5.5.		SOIL_AR(i)_AL
Inorganic	Aluminum	7429-90-5	American robin (Avian omnivore)	pH dependent. Aluminum is identified as a COPC only at sites where the soil pH is less than 5.5.		SOIL_AR(ip)_AL
Inorganic	Aluminum	7429-90-5	Deer mouse (Mammalian omnivore)	pH dependent. Aluminum is identified as a COPC only at sites where the soil pH is less than 5.5.		SOIL_DM(ip)_AL
Inorganic	Aluminum	7429-90-5	Earthworm (Soil-dwelling invertebrate)	pH dependent. Aluminum is identified as a COPC only at sites where the soil pH is less than 5.5.		SOIL_EW_AL
Inorganic	Aluminum	7429-90-5	Generic plant (Terrestrial autotroph - producer)	pH dependent. Aluminum is identified as a COPC only at sites where the soil pH is less than 5.5.		SOIL_GP_AL
Inorganic	Aluminum	7429-90-5	Gray fox (Mammalian top carnivore)	pH dependent. Aluminum is identified as a COPC only at sites where the soil pH is less than 5.5.		SOIL_RF(f)_AL
Inorganic	Aluminum	7429-90-5	Montane shrew (Mammalian insectivore)	pH dependent. Aluminum is identified as a COPC only at sites where the soil pH is less than 5.5.		SOIL_MS(i)_AL
Inorganic	Aluminum	7429-90-5	Mountain cottontail (Mammalian herbivore)	pH dependent. Aluminum is identified as a COPC only at		SOIL_DC(p)_AL

Group	Name	CAS	Receptor	NE ESL	LE ESL	ESL ID
				sites where the soil pH is less than 5.5.		
Inorganic	Antimony	7440-36-0	Deer mouse (Mammalian omnivore)	2.3	23	SOIL_DM(ip)_SB
Inorganic	Antimony	7440-36-0	Earthworm (Soil-dwelling invertebrate)	78	780	SOIL_EW_SB
Inorganic	Antimony	7440-36-0	Generic plant (Terrestrial autotroph - producer)	11	58	SOIL_GP_SB
Inorganic	Antimony	7440-36-0	Gray fox (Mammalian top carnivore)	46	460	SOIL_RF(f)_SB
Inorganic	Antimony	7440-36-0	Montane shrew (Mammalian insectivore)	7.9	79	SOIL_MS(i)_SB
Inorganic	Antimony	7440-36-0	Mountain cottontail (Mammalian herbivore)	2.7	27	SOIL_DC(p)_SB
Inorganic	Arsenic	7440-38-2	American kestrel (Avian top carnivore)	740	7400	SOIL_AK(f)_AS
Inorganic	Arsenic	7440-38-2	American kestrel (insectivore / carnivore)	100	1000	SOIL_AK(fi)_AS
Inorganic	Arsenic	7440-38-2	American robin (Avian herbivore)	34	340	SOIL_AR(p)_AS
Inorganic	Arsenic	7440-38-2	American robin (Avian insectivore)	15	150	SOIL_AR(i)_AS
Inorganic	Arsenic	7440-38-2	American robin (Avian omnivore)	21	210	SOIL_AR(ip)_AS
Inorganic	Arsenic	7440-38-2	Deer mouse (Mammalian omnivore)	32	51	SOIL_DM(ip)_AS
Inorganic	Arsenic	7440-38-2	Earthworm (Soil-dwelling invertebrate)	6.8	68	SOIL_EW_AS
Inorganic	Arsenic	7440-38-2	Generic plant (Terrestrial autotroph - producer)	18	91	SOIL_GP_AS
Inorganic	Arsenic	7440-38-2	Gray fox (Mammalian top carnivore)	820	1300	SOIL_RF(f)_AS
Inorganic	Arsenic	7440-38-2	Montane shrew (Mammalian insectivore)	19	31	SOIL_MS(i)_AS
Inorganic	Arsenic	7440-38-2	Mountain cottontail (Mammalian herbivore)	110	180	SOIL_DC(p)_AS
Inorganic	Barium	7440-39-3	American kestrel (Avian top carnivore)	24000	44000	SOIL_AK(f)_BA
Inorganic	Barium	7440-39-3	American kestrel (insectivore / carnivore)	7500	13000	SOIL_AK(fi)_BA
Inorganic	Barium	7440-39-3	American robin (Avian herbivore)	720	1200	SOIL_AR(p)_BA
Inorganic	Barium	7440-39-3	American robin (Avian insectivore)	820	1400	SOIL_AR(i)_BA
Inorganic	Barium	7440-39-3	American robin (Avian omnivore)	770	1300	SOIL_AR(ip)_BA
Inorganic	Barium	7440-39-3	Deer mouse (Mammalian omnivore)	1800	8700	SOIL_DM(ip)_BA
Inorganic	Barium	7440-39-3	Earthworm (Soil-dwelling invertebrate)	330	3200	SOIL_EW_BA
Inorganic	Barium	7440-39-3	Generic plant (Terrestrial autotroph - producer)	110	260	SOIL_GP_BA
Inorganic	Barium	7440-39-3	Gray fox (Mammalian top carnivore)	41000	190000	SOIL_RF(f)_BA
Inorganic	Barium	7440-39-3	Montane shrew (Mammalian insectivore)	2100	10000	SOIL_MS(i)_BA
Inorganic	Barium	7440-39-3	Mountain cottontail (Mammalian herbivore)	2900	14000	SOIL_DC(p)_BA
Inorganic	Beryllium	7440-41-7	Deer mouse (Mammalian omnivore)	56	560	SOIL_DM(ip)_BE
Inorganic	Beryllium	7440-41-7	Earthworm (Soil-dwelling invertebrate)	40	400	SOIL_EW_BE
Inorganic	Beryllium	7440-41-7	Generic plant (Terrestrial autotroph - producer)	2.5	25	SOIL_GP_BE
Inorganic	Beryllium	7440-41-7	Gray fox (Mammalian top carnivore)	420	4200	SOIL_RF(f)_BE
Inorganic	Beryllium	7440-41-7	Montane shrew (Mammalian insectivore)	35	350	SOIL_MS(i)_BE
Inorganic	Beryllium	7440-41-7	Mountain cottontail (Mammalian herbivore)	89	890	SOIL_DC(p)_BE
Inorganic	Boron	#N/A	American kestrel (Avian top carnivore)	960	4700	SOIL_AK(f)_B
Inorganic	Boron	#N/A	American kestrel (insectivore / carnivore)	37	180	SOIL_AK(fi)_B
Inorganic	Boron	#N/A	American robin (Avian herbivore)	2	10	SOIL_AR(p)_B
Inorganic	Boron	#N/A	American robin (Avian insectivore)	7.1	35	SOIL_AR(i)_B
Inorganic	Boron	#N/A	American robin (Avian omnivore)	3.1	15	SOIL_AR(ip)_B
Inorganic	Boron	#N/A	Deer mouse (Mammalian omnivore)	55	550	SOIL_DM(ip)_B
Inorganic	Boron	#N/A	Generic plant (Terrestrial autotroph - producer)	36	86	SOIL_GP_B
Inorganic	Boron	#N/A	Gray fox (Mammalian top carnivore)	21000	210000	SOIL_RF(f)_B
Inorganic	Boron	#N/A	Montane shrew (Mammalian insectivore)	130	1300	SOIL_MS(i)_B
Inorganic	Boron	#N/A	Mountain cottontail (Mammalian herbivore)	84	840	SOIL_DC(p)_B
Inorganic	Cadmium	7440-43-9	American kestrel (Avian top carnivore)	430	2300	SOIL_AK(f)_CD
Inorganic	Cadmium	7440-43-9	American kestrel (insectivore / carnivore)	1.3	7.7	SOIL_AK(fi)_CD
Inorganic	Cadmium	7440-43-9	American robin (Avian herbivore)	4.3	23	SOIL_AR(p)_CD
Inorganic	Cadmium	7440-43-9	American robin (Avian insectivore)	0.29	1.6	SOIL_AR(i)_CD
Inorganic	Cadmium	7440-43-9	American robin (Avian omnivore)	0.54	3	SOIL_AR(ip)_CD
Inorganic	Cadmium	7440-43-9	Deer mouse (Mammalian omnivore)	0.5	6.8	SOIL_DM(ip)_CD
Inorganic	Cadmium	7440-43-9	Earthworm (Soil-dwelling invertebrate)	140	760	SOIL_EW_CD
Inorganic	Cadmium	7440-43-9	Generic plant (Terrestrial autotroph - producer)	32	160	SOIL_GP_CD
Inorganic	Cadmium	7440-43-9	Gray fox (Mammalian top carnivore)	550	7400	SOIL_RF(f)_CD
Inorganic	Cadmium	7440-43-9	Montane shrew (Mammalian insectivore)	0.27	3.6	SOIL_MS(i)_CD
Inorganic	Cadmium	7440-43-9	Mountain cottontail (Mammalian herbivore)	10	140	SOIL_DC(p)_CD

Group	Name	CAS	Receptor	NE ESL	LE ESL	ESL ID
Inorganic	Chromium (total)	16065-83-1	American kestrel (Avian top carnivore)	860	2700	SOIL_AK(f)_CR
Inorganic	Chromium (total)	16065-83-1	American kestrel (insectivore / carnivore)	170	560	SOIL_AK(fi)_CR
Inorganic	Chromium (total)	16065-83-1	American robin (Avian herbivore)	51	160	SOIL_AR(p)_CR
Inorganic	Chromium (total)	16065-83-1	American robin (Avian insectivore)	23	73	SOIL_AR(i)_CR
Inorganic	Chromium (total)	16065-83-1	American robin (Avian omnivore)	32	100	SOIL_AR(ip)_CR
Inorganic	Chromium (total)	16065-83-1	Deer mouse (Mammalian omnivore)	110	11000	SOIL_DM(ip)_CR
Inorganic	Chromium (total)	16065-83-1	Gray fox (Mammalian top carnivore)	1800	180000	SOIL_RF(f)_CR
Inorganic	Chromium (total)	16065-83-1	Montane shrew (Mammalian insectivore)	63	6300	SOIL_MS(i)_CR
Inorganic	Chromium (total)	16065-83-1	Mountain cottontail (Mammalian herbivore)	410	41000	SOIL_DC(p)_CR
Inorganic	Chromium(+6)	#N/A	American kestrel (Avian top carnivore)	3600	36000	SOIL_AK(f)_CR(+6)
Inorganic	Chromium(+6)	#N/A	American kestrel (insectivore / carnivore)	1400	14000	SOIL_AK(fi)_CR(+6)
Inorganic	Chromium(+6)	#N/A	American robin (Avian herbivore)	210	2100	SOIL_AR(p)_CR(+6)
Inorganic	Chromium(+6)	#N/A	American robin (Avian insectivore)	140	1400	SOIL_AR(i)_CR(+6)
Inorganic	Chromium(+6)	#N/A	American robin (Avian omnivore)	160	1600	SOIL_AR(ip)_CR(+6)
Inorganic	Chromium(+6)	#N/A	Deer mouse (Mammalian omnivore)	850	5500	SOIL_DM(ip)_CR(+6)
Inorganic	Chromium(+6)	#N/A	Earthworm (Soil-dwelling invertebrate)	0.34	3.4	SOIL_EW_CR(+6)
Inorganic	Chromium(+6)	#N/A	Generic plant (Terrestrial autotroph - producer)	0.35	4	SOIL_GP_CR(+6)
Inorganic	Chromium(+6)	#N/A	Gray fox (Mammalian top carnivore)	7200	46000	SOIL_RF(f)_CR(+6)
Inorganic	Chromium(+6)	#N/A	Montane shrew (Mammalian insectivore)	510	3300	SOIL_MS(i)_CR(+6)
Inorganic	Chromium(+6)	#N/A	Mountain cottontail (Mammalian herbivore)	1600	10000	SOIL_DC(p)_CR(+6)
Inorganic	Cobalt	7440-48-4	American kestrel (Avian top carnivore)	2300	5200	SOIL_AK(f)_CO
Inorganic	Cobalt	7440-48-4	American kestrel (insectivore / carnivore)	620	1400	SOIL_AK(fi)_CO
Inorganic	Cobalt	7440-48-4	American robin (Avian herbivore)	130	300	SOIL_AR(p)_CO
Inorganic	Cobalt	7440-48-4	American robin (Avian insectivore)	76	170	SOIL_AR(i)_CO
Inorganic	Cobalt	7440-48-4	American robin (Avian omnivore)	97	210	SOIL_AR(ip)_CO
Inorganic	Cobalt	7440-48-4	Deer mouse (Mammalian omnivore)	400	1000	SOIL_DM(ip)_CO
Inorganic	Cobalt	7440-48-4	Generic plant (Terrestrial autotroph - producer)	13	130	SOIL_GP_CO
Inorganic	Cobalt	7440-48-4	Gray fox (Mammalian top carnivore)	5400	14000	SOIL_RF(f)_CO
Inorganic	Cobalt	7440-48-4	Montane shrew (Mammalian insectivore)	240	640	SOIL_MS(i)_CO
Inorganic	Cobalt	7440-48-4	Mountain cottontail (Mammalian herbivore)	1000	2800	SOIL_DC(p)_CO
Inorganic	Copper	7440-50-8	American kestrel (Avian top carnivore)	1100	3500	SOIL_AK(f)_CU
Inorganic	Copper	7440-50-8	American kestrel (insectivore / carnivore)	80	240	SOIL_AK(fi)_CU
Inorganic	Copper	7440-50-8	American robin (Avian herbivore)	34	100	SOIL_AR(p)_CU
Inorganic	Copper	7440-50-8	American robin (Avian insectivore)	14	43	SOIL_AR(i)_CU
Inorganic	Copper	7440-50-8	American robin (Avian omnivore)	20	60	SOIL_AR(ip)_CU
Inorganic	Copper	7440-50-8	Deer mouse (Mammalian omnivore)	63	100	SOIL_DM(ip)_CU
Inorganic	Copper	7440-50-8	Earthworm (Soil-dwelling invertebrate)	80	530	SOIL_EW_CU
Inorganic	Copper	7440-50-8	Generic plant (Terrestrial autotroph - producer)	70	490	SOIL_GP_CU
Inorganic	Copper	7440-50-8	Gray fox (Mammalian top carnivore)	4000	6700	SOIL_RF(f)_CU
Inorganic	Copper	7440-50-8	Montane shrew (Mammalian insectivore)	42	70	SOIL_MS(i)_CU
Inorganic	Copper	7440-50-8	Mountain cottontail (Mammalian herbivore)	260	430	SOIL_DC(p)_CU
Inorganic	Cyanide (total)	#N/A	American kestrel (Avian top carnivore)	0.59	5.9	SOIL_AK(f)_CN(-1)
Inorganic	Cyanide (total)	#N/A	American kestrel (insectivore / carnivore)	0.36	3.6	SOIL_AK(fi)_CN(-1)
Inorganic	Cyanide (total)	#N/A	American robin (Avian herbivore)	0.1	1	SOIL_AR(p)_CN(-1)
Inorganic	Cyanide (total)	#N/A	American robin (Avian insectivore)	0.098	0.98	SOIL_AR(i)_CN(-1)
Inorganic	Cyanide (total)	#N/A	American robin (Avian omnivore)	0.099	0.99	SOIL_AR(ip)_CN(-1)
Inorganic	Cyanide (total)	#N/A	Deer mouse (Mammalian omnivore)	330	3300	SOIL_DM(ip)_CN(-1)
Inorganic	Cyanide (total)	#N/A	Gray fox (Mammalian top carnivore)	3300	33000	SOIL_RF(f)_CN(-1)
Inorganic	Cyanide (total)	#N/A	Montane shrew (Mammalian insectivore)	330	3300	SOIL_MS(i)_CN(-1)
Inorganic	Cyanide (total)	#N/A	Mountain cottontail (Mammalian herbivore)	790	7900	SOIL_DC(p)_CN(-1)
Inorganic	Fluoride	#N/A	American kestrel (Avian top carnivore)	2200	22000	SOIL_AK(f)_F(-1)
Inorganic	Fluoride	#N/A	American kestrel (insectivore / carnivore)	910	9100	SOIL_AK(fi)_F(-1)
Inorganic	Fluoride	#N/A	American robin (Avian herbivore)	170	1700	SOIL_AR(p)_F(-1)
Inorganic	Fluoride	#N/A	American robin (Avian insectivore)	120	1200	SOIL_AR(i)_F(-1)
Inorganic	Fluoride	#N/A	American robin (Avian omnivore)	140	1400	SOIL_AR(ip)_F(-1)
Inorganic	Fluoride	#N/A	Deer mouse (Mammalian omnivore)	1100	2100	SOIL_DM(ip)_F(-1)
Inorganic	Fluoride	#N/A	Gray fox (Mammalian top carnivore)	13000	24000	SOIL_RF(f)_F(-1)

Group	Name	CAS	Receptor	NE ESL	LE ESL	ESL ID
Inorganic	Fluoride	#N/A	Montane shrew (Mammalian insectivore)	870	1600	SOIL_MS(i)_F(-1)
Inorganic	Fluoride	#N/A	Mountain cottontail (Mammalian herbivore)	2600	4800	SOIL_DC(p)_F(-1)
Inorganic	Lead	7439-92-1	American kestrel (Avian top carnivore)	540	1000	SOIL_AK(f)_PB
Inorganic	Lead	7439-92-1	American kestrel (insectivore / carnivore)	83	160	SOIL_AK(fi)_PB
Inorganic	Lead	7439-92-1	American robin (Avian herbivore)	18	36	SOIL_AR(p)_PB
Inorganic	Lead	7439-92-1	American robin (Avian insectivore)	11	23	SOIL_AR(i)_PB
Inorganic	Lead	7439-92-1	American robin (Avian omnivore)	14	28	SOIL_AR(ip)_PB
Inorganic	Lead	7439-92-1	Deer mouse (Mammalian omnivore)	120	230	SOIL_DM(ip)_PB
Inorganic	Lead	7439-92-1	Earthworm (Soil-dwelling invertebrate)	1700	8400	SOIL_EW_PB
Inorganic	Lead	7439-92-1	Generic plant (Terrestrial autotroph - producer)	120	570	SOIL_GP_PB
Inorganic	Lead	7439-92-1	Gray fox (Mammalian top carnivore)	3700	7000	SOIL_RF(f)_PB
Inorganic	Lead	7439-92-1	Montane shrew (Mammalian insectivore)	93	170	SOIL_MS(i)_PB
Inorganic	Lead	7439-92-1	Mountain cottontail (Mammalian herbivore)	310	600	SOIL_DC(p)_PB
Inorganic	Lithium	#N/A	Deer mouse (Mammalian omnivore)	100	480	SOIL_DM(ip)_LI
Inorganic	Lithium	#N/A	Gray fox (Mammalian top carnivore)	870	4100	SOIL_RF(f)_LI
Inorganic	Lithium	#N/A	Montane shrew (Mammalian insectivore)	75	350	SOIL_MS(i)_LI
Inorganic	Lithium	#N/A	Mountain cottontail (Mammalian herbivore)	150	750	SOIL_DC(p)_LI
Inorganic	Manganese	7439-96-5	American kestrel (Avian top carnivore)	60000	120000	SOIL_AK(f)_MN
Inorganic	Manganese	7439-96-5	American kestrel (insectivore / carnivore)	24000	50000	SOIL_AK(fi)_MN
Inorganic	Manganese	7439-96-5	American robin (Avian herbivore)	1300	2700	SOIL_AR(p)_MN
Inorganic	Manganese	7439-96-5	American robin (Avian insectivore)	2200	4700	SOIL_AR(i)_MN
Inorganic	Manganese	7439-96-5	American robin (Avian omnivore)	1600	3500	SOIL_AR(ip)_MN
Inorganic	Manganese	7439-96-5	Deer mouse (Mammalian omnivore)	1400	5400	SOIL_DM(ip)_MN
Inorganic	Manganese	7439-96-5	Earthworm (Soil-dwelling invertebrate)	450	4500	SOIL_EW_MN
Inorganic	Manganese	7439-96-5	Generic plant (Terrestrial autotroph - producer)	220	1100	SOIL_GP_MN
Inorganic	Manganese	7439-96-5	Gray fox (Mammalian top carnivore)	40000	150000	SOIL_RF(f)_MN
Inorganic	Manganese	7439-96-5	Montane shrew (Mammalian insectivore)	2800	10000	SOIL_MS(i)_MN
Inorganic	Manganese	7439-96-5	Mountain cottontail (Mammalian herbivore)	2000	7500	SOIL_DC(p)_MN
Inorganic	Mercury (inorganic)	7487-94-7	American kestrel (Avian top carnivore)	0.32	3.2	SOIL_AK(f)_HGI
Inorganic	Mercury (inorganic)	7487-94-7	American kestrel (insectivore / carnivore)	0.058	0.58	SOIL_AK(fi)_HGI
Inorganic	Mercury (inorganic)	7487-94-7	American robin (Avian herbivore)	0.067	0.67	SOIL_AR(p)_HGI
Inorganic	Mercury (inorganic)	7487-94-7	American robin (Avian insectivore)	0.013	0.13	SOIL_AR(i)_HGI
Inorganic	Mercury (inorganic)	7487-94-7	American robin (Avian omnivore)	0.022	0.22	SOIL_AR(ip)_HGI
Inorganic	Mercury (inorganic)	7487-94-7	Deer mouse (Mammalian omnivore)	3	30	SOIL_DM(ip)_HGI
Inorganic	Mercury (inorganic)	7487-94-7	Earthworm (Soil-dwelling invertebrate)	0.05	0.5	SOIL_EW_HGI
Inorganic	Mercury (inorganic)	7487-94-7	Generic plant (Terrestrial autotroph - producer)	34	64	SOIL_GP_HGI
Inorganic	Mercury (inorganic)	7487-94-7	Gray fox (Mammalian top carnivore)	76	760	SOIL_RF(f)_HGI
Inorganic	Mercury (inorganic)	7487-94-7	Montane shrew (Mammalian insectivore)	1.7	17	SOIL_MS(i)_HGI
Inorganic	Mercury (inorganic)	7487-94-7	Mountain cottontail (Mammalian herbivore)	23	230	SOIL_DC(p)_HGI
Inorganic	Mercury (methyl)	#N/A	American kestrel (Avian top carnivore)	0.009	0.09	SOIL_AK(f)_HGM
Inorganic	Mercury (methyl)	#N/A	American kestrel (insectivore / carnivore)	0.0015	0.015	SOIL_AK(fi)_HGM
Inorganic	Mercury (methyl)	#N/A	American robin (Avian herbivore)	0.066	0.66	SOIL_AR(p)_HGM
Inorganic	Mercury (methyl)	#N/A	American robin (Avian insectivore)	0.00035	0.0035	SOIL_AR(i)_HGM
Inorganic	Mercury (methyl)	#N/A	American robin (Avian omnivore)	0.00071	0.0071	SOIL_AR(ip)_HGM
Inorganic	Mercury (methyl)	#N/A	Deer mouse (Mammalian omnivore)	0.0062	0.031	SOIL_DM(ip)_HGM
Inorganic	Mercury (methyl)	#N/A	Earthworm (Soil-dwelling invertebrate)	2.5	12	SOIL_EW_HGM
Inorganic	Mercury (methyl)	#N/A	Gray fox (Mammalian top carnivore)	0.14	0.74	SOIL_RF(f)_HGM
Inorganic	Mercury (methyl)	#N/A	Montane shrew (Mammalian insectivore)	0.0031	0.015	SOIL_MS(i)_HGM
Inorganic	Mercury (methyl)	#N/A	Mountain cottontail (Mammalian herbivore)	1.9	9.8	SOIL_DC(p)_HGM
Inorganic	Molybdenum	#N/A	American kestrel (Avian top carnivore)	1100	11000	SOIL_AK(f)_MO
Inorganic	Molybdenum	#N/A	American kestrel (insectivore / carnivore)	90	900	SOIL_AK(fi)_MO
Inorganic	Molybdenum	#N/A	American robin (Avian herbivore)	18	180	SOIL_AR(p)_MO
Inorganic	Molybdenum	#N/A	American robin (Avian insectivore)	15	150	SOIL_AR(i)_MO
Inorganic	Molybdenum	#N/A	American robin (Avian omnivore)	16	160	SOIL_AR(ip)_MO
Inorganic	Nickel	7440-02-0	American kestrel (Avian top carnivore)	2000	8100	SOIL_AK(f)_NI
Inorganic	Nickel	7440-02-0	American kestrel (insectivore / carnivore)	110	440	SOIL_AK(fi)_NI
Inorganic	Nickel	7440-02-0	American robin (Avian herbivore)	120	500	SOIL_AR(p)_NI

Group	Name	CAS	Receptor	NE ESL	LE ESL	ESL ID
Inorganic	Nickel	7440-02-0	American robin (Avian insectivore)	20	81	SOIL_AR(i)_NI
Inorganic	Nickel	7440-02-0	American robin (Avian omnivore)	35	130	SOIL_AR(ip)_NI
Inorganic	Nickel	7440-02-0	Deer mouse (Mammalian omnivore)	20	40	SOIL_DM(ip)_NI
Inorganic	Nickel	7440-02-0	Earthworm (Soil-dwelling invertebrate)	280	1300	SOIL_EW_NI
Inorganic	Nickel	7440-02-0	Generic plant (Terrestrial autotroph - producer)	38	270	SOIL_GP_NI
Inorganic	Nickel	7440-02-0	Gray fox (Mammalian top carnivore)	1200	2500	SOIL_RF(f)_NI
Inorganic	Nickel	7440-02-0	Montane shrew (Mammalian insectivore)	10	21	SOIL_MS(i)_NI
Inorganic	Nickel	7440-02-0	Mountain cottontail (Mammalian herbivore)	270	540	SOIL_DC(p)_NI
Inorganic	Perchlorate	14797-73-0	American kestrel (Avian top carnivore)	2	4	SOIL_AK(f)_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	American kestrel (insectivore / carnivore)	3.9	8	SOIL_AK(fi)_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	American robin (Avian herbivore)	0.12	0.24	SOIL_AR(p)_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	American robin (Avian insectivore)	31	64	SOIL_AR(i)_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	American robin (Avian omnivore)	0.24	0.49	SOIL_AR(ip)_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	Deer mouse (Mammalian omnivore)	0.21	1	SOIL_DM(ip)_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	Earthworm (Soil-dwelling invertebrate)	3.5	35	SOIL_EW_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	Generic plant (Terrestrial autotroph - producer)	40	80	SOIL_GP_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	Gray fox (Mammalian top carnivore)	3.3	16	SOIL_RF(f)_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	Montane shrew (Mammalian insectivore)	31	150	SOIL_MS(i)_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	Mountain cottontail (Mammalian herbivore)	0.26	1.3	SOIL_DC(p)_ClO4(-1)
Inorganic	Selenium	7782-49-2	American kestrel (Avian top carnivore)	74	140	SOIL_AK(f)_SE
Inorganic	Selenium	7782-49-2	American kestrel (insectivore / carnivore)	3.7	7.5	SOIL_AK(fi)_SE
Inorganic	Selenium	7782-49-2	American robin (Avian herbivore)	0.98	1.9	SOIL_AR(p)_SE
Inorganic	Selenium	7782-49-2	American robin (Avian insectivore)	0.71	1.4	SOIL_AR(i)_SE
Inorganic	Selenium	7782-49-2	American robin (Avian omnivore)	0.83	1.6	SOIL_AR(ip)_SE
Inorganic	Selenium	7782-49-2	Deer mouse (Mammalian omnivore)	0.82	1.2	SOIL_DM(ip)_SE
Inorganic	Selenium	7782-49-2	Earthworm (Soil-dwelling invertebrate)	4.1	41	SOIL_EW_SE
Inorganic	Selenium	7782-49-2	Generic plant (Terrestrial autotroph - producer)	0.52	3	SOIL_GP_SE
Inorganic	Selenium	7782-49-2	Gray fox (Mammalian top carnivore)	92	130	SOIL_RF(f)_SE
Inorganic	Selenium	7782-49-2	Montane shrew (Mammalian insectivore)	0.7	1	SOIL_MS(i)_SE
Inorganic	Selenium	7782-49-2	Mountain cottontail (Mammalian herbivore)	2.2	3.4	SOIL_DC(p)_SE
Inorganic	Silver	7440-22-4	American kestrel (Avian top carnivore)	600	6000	SOIL_AK(f)_AG
Inorganic	Silver	7440-22-4	American kestrel (insectivore / carnivore)	13	130	SOIL_AK(fi)_AG
Inorganic	Silver	7440-22-4	American robin (Avian herbivore)	10	100	SOIL_AR(p)_AG
Inorganic	Silver	7440-22-4	American robin (Avian insectivore)	2.6	26	SOIL_AR(i)_AG
Inorganic	Silver	7440-22-4	American robin (Avian omnivore)	4.1	41	SOIL_AR(ip)_AG
Inorganic	Silver	7440-22-4	Deer mouse (Mammalian omnivore)	24	240	SOIL_DM(ip)_AG
Inorganic	Silver	7440-22-4	Generic plant (Terrestrial autotroph - producer)	560	2800	SOIL_GP_AG
Inorganic	Silver	7440-22-4	Gray fox (Mammalian top carnivore)	4400	44000	SOIL_RF(f)_AG
Inorganic	Silver	7440-22-4	Montane shrew (Mammalian insectivore)	14	140	SOIL_MS(i)_AG
Inorganic	Silver	7440-22-4	Mountain cottontail (Mammalian herbivore)	150	1500	SOIL_DC(p)_AG
Inorganic	Strontium (stable)	#N/A	Deer mouse (Mammalian omnivore)	95	950	SOIL_DM(ip)_SR
Inorganic	Strontium (stable)	#N/A	Gray fox (Mammalian top carnivore)	19000	190000	SOIL_RF(f)_SR
Inorganic	Strontium (stable)	#N/A	Montane shrew (Mammalian insectivore)	1000	10000	SOIL_MS(i)_SR
Inorganic	Strontium (stable)	#N/A	Mountain cottontail (Mammalian herbivore)	110	1100	SOIL_DC(p)_SR
Inorganic	Thallium	7440-28-0	American kestrel (Avian top carnivore)	100	1000	SOIL_AK(f)_TL
Inorganic	Thallium	7440-28-0	American kestrel (insectivore / carnivore)	48	480	SOIL_AK(fi)_TL
Inorganic	Thallium	7440-28-0	American robin (Avian herbivore)	6.9	69	SOIL_AR(p)_TL
Inorganic	Thallium	7440-28-0	American robin (Avian insectivore)	4.5	45	SOIL_AR(i)_TL
Inorganic	Thallium	7440-28-0	American robin (Avian omnivore)	5.5	55	SOIL_AR(ip)_TL
Inorganic	Thallium	7440-28-0	Deer mouse (Mammalian omnivore)	0.72	7.2	SOIL_DM(ip)_TL
Inorganic	Thallium	7440-28-0	Generic plant (Terrestrial autotroph - producer)	0.05	0.5	SOIL_GP_TL
Inorganic	Thallium	7440-28-0	Gray fox (Mammalian top carnivore)	5	50	SOIL_RF(f)_TL
Inorganic	Thallium	7440-28-0	Montane shrew (Mammalian insectivore)	0.42	4.2	SOIL_MS(i)_TL
Inorganic	Thallium	7440-28-0	Mountain cottontail (Mammalian herbivore)	1.2	12	SOIL_DC(p)_TL
Inorganic	Titanium	#N/A	Deer mouse (Mammalian omnivore)	150	1500	SOIL_DM(ip)_TI
Inorganic	Titanium	#N/A	Gray fox (Mammalian top carnivore)	8600	86000	SOIL_RF(f)_TI
Inorganic	Titanium	#N/A	Montane shrew (Mammalian insectivore)	77	770	SOIL_MS(i)_TI

Group	Name	CAS	Receptor	NE ESL	LE ESL	ESL ID
Inorganic	Titanium	#N/A	Mountain cottontail (Mammalian herbivore)	2800	28000	SOIL_DC(p)_TI
Inorganic	Uranium	#N/A	American kestrel (Avian top carnivore)	26000	260000	SOIL_AK(f)_U
Inorganic	Uranium	#N/A	American kestrel (insectivore / carnivore)	14000	140000	SOIL_AK(fi)_U
Inorganic	Uranium	#N/A	American robin (Avian herbivore)	1500	15000	SOIL_AR(p)_U
Inorganic	Uranium	#N/A	American robin (Avian insectivore)	1100	11000	SOIL_AR(i)_U
Inorganic	Uranium	#N/A	American robin (Avian omnivore)	1200	12000	SOIL_AR(ip)_U
Inorganic	Uranium	#N/A	Deer mouse (Mammalian omnivore)	740	1800	SOIL_DM(ip)_U
Inorganic	Uranium	#N/A	Generic plant (Terrestrial autotroph - producer)	25	250	SOIL_GP_U
Inorganic	Uranium	#N/A	Gray fox (Mammalian top carnivore)	4800	12000	SOIL_RF(f)_U
Inorganic	Uranium	#N/A	Montane shrew (Mammalian insectivore)	480	1200	SOIL_MS(i)_U
Inorganic	Uranium	#N/A	Mountain cottontail (Mammalian herbivore)	1000	2600	SOIL_DC(p)_U
Inorganic	Vanadium	7440-62-2	American kestrel (Avian top carnivore)	110	230	SOIL_AK(f)_V
Inorganic	Vanadium	7440-62-2	American kestrel (insectivore / carnivore)	56	110	SOIL_AK(fi)_V
Inorganic	Vanadium	7440-62-2	American robin (Avian herbivore)	6.8	13	SOIL_AR(p)_V
Inorganic	Vanadium	7440-62-2	American robin (Avian insectivore)	4.7	9.5	SOIL_AR(i)_V
Inorganic	Vanadium	7440-62-2	American robin (Avian omnivore)	5.5	11	SOIL_AR(ip)_V
Inorganic	Vanadium	7440-62-2	Deer mouse (Mammalian omnivore)	470	1000	SOIL_DM(ip)_V
Inorganic	Vanadium	7440-62-2	Generic plant (Terrestrial autotroph - producer)	60	80	SOIL_GP_V
Inorganic	Vanadium	7440-62-2	Gray fox (Mammalian top carnivore)	3200	6900	SOIL_RF(f)_V
Inorganic	Vanadium	7440-62-2	Montane shrew (Mammalian insectivore)	290	610	SOIL_MS(i)_V
Inorganic	Vanadium	7440-62-2	Mountain cottontail (Mammalian herbivore)	740	1500	SOIL_DC(p)_V
Inorganic	Zinc	7440-66-6	American kestrel (Avian top carnivore)	2600	7000	SOIL_AK(f)_ZN
Inorganic	Zinc	7440-66-6	American kestrel (insectivore / carnivore)	220	590	SOIL_AK(fi)_ZN
Inorganic	Zinc	7440-66-6	American robin (Avian herbivore)	330	120	SOIL_AR(p)_ZN
Inorganic	Zinc	7440-66-6	American robin (Avian insectivore)	47	120	SOIL_AR(i)_ZN
Inorganic	Zinc	7440-66-6	American robin (Avian omnivore)	83	220	SOIL_AR(ip)_ZN
Inorganic	Zinc	7440-66-6	Deer mouse (Mammalian omnivore)	170	1700	SOIL_DM(ip)_ZN
Inorganic	Zinc	7440-66-6	Earthworm (Soil-dwelling invertebrate)	120	930	SOIL_EW_ZN
Inorganic	Zinc	7440-66-6	Generic plant (Terrestrial autotroph - producer)	160	810	SOIL_GP_ZN
Inorganic	Zinc	7440-66-6	Gray fox (Mammalian top carnivore)	9600	94000	SOIL_RF(f)_ZN
Inorganic	Zinc	7440-66-6	Montane shrew (Mammalian insectivore)	99	980	SOIL_MS(i)_ZN
Inorganic	Zinc	7440-66-6	Mountain cottontail (Mammalian herbivore)	1800	18000	SOIL_DC(p)_ZN
Organic	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	Earthworm (Soil-dwelling invertebrate)	1.8	81.5	SOIL_EW_1763-23-1
Organic	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	Generic plant (Terrestrial autotroph - producer)	62.2	80.8	SOIL_GP_1763-23-1
Organic	Perfluorooctanoic acid (PFOA)	335-67-1	Earthworm (Soil-dwelling invertebrate)	12.2	101.1	SOIL_EW_335-67-1
Organic	Perfluorooctanoic acid (PFOA)	335-67-1	Generic plant (Terrestrial autotroph - producer)	41.1	62.1	SOIL_GP_335-67-1
Organic	Total Petroleum Hydrocarbon (Fraction 2, Fraction 3)	TPH F2F3	Earthworm (Soil-dwelling invertebrate)	198	1977	SOIL_EW_TPH F2F3
Organic	Total Petroleum Hydrocarbon (Fraction 2, Fraction 3)	TPH F2F3	Generic plant (Terrestrial autotroph - producer)	81.2	419	SOIL_GP_TPH F2F3
Organic	Total Petroleum Hydrocarbon DRO	TPH-DRO	Earthworm (Soil-dwelling invertebrate)	198	1977	SOIL_EW_TPH F2F3
Organic	Total Petroleum Hydrocarbon DRO	TPH-DRO	Generic plant (Terrestrial autotroph - producer)	81.2	419	SOIL_GP_TPH F2F3
PAH	Acenaphthene	83-32-9	Deer mouse (Mammalian omnivore)	160	1600	SOIL_DM(ip)_83-32-9
PAH	Acenaphthene	83-32-9	Generic plant (Terrestrial autotroph - producer)	0.25	2	SOIL_GP_83-32-9
PAH	Acenaphthene	83-32-9	Gray fox (Mammalian top carnivore)	29000	290000	SOIL_RF(f)_83-32-9
PAH	Acenaphthene	83-32-9	Montane shrew (Mammalian insectivore)	130	1300	SOIL_MS(i)_83-32-9
PAH	Acenaphthene	83-32-9	Mountain cottontail (Mammalian herbivore)	530	5300	SOIL_DC(p)_83-32-9
PAH	Acenaphthylene	208-96-8	Deer mouse (Mammalian omnivore)	160	1600	SOIL_DM(ip)_208-96-8
PAH	Acenaphthylene	208-96-8	Gray fox (Mammalian top carnivore)	28000	280000	SOIL_RF(f)_208-96-8
PAH	Acenaphthylene	208-96-8	Montane shrew (Mammalian insectivore)	120	1200	SOIL_MS(i)_208-96-8
PAH	Acenaphthylene	208-96-8	Mountain cottontail (Mammalian herbivore)	540	5400	SOIL_DC(p)_208-96-8
PAH	Anthracene	120-12-7	Deer mouse (Mammalian omnivore)	300	3000	SOIL_DM(ip)_120-12-7
PAH	Anthracene	120-12-7	Generic plant (Terrestrial autotroph - producer)	6.8	9	SOIL_GP_120-12-7
PAH	Anthracene	120-12-7	Gray fox (Mammalian top carnivore)	38000	380000	SOIL_RF(f)_120-12-7

Group	Name	CAS	Receptor	NE ESL	LE ESL	ESL ID
PAH	Anthracene	120-12-7	Montane shrew (Mammalian insectivore)	210	2100	SOIL_MS(i)_120-12-7
PAH	Anthracene	120-12-7	Mountain cottontail (Mammalian herbivore)	1200	12000	SOIL_DC(p)_120-12-7
PAH	Benzo(a)anthracene	56-55-3	American kestrel (Avian top carnivore)	28	280	SOIL_AK(f)_56-55-3
PAH	Benzo(a)anthracene	56-55-3	American kestrel (insectivore / carnivore)	6.4	64	SOIL_AK(fi)_56-55-3
PAH	Benzo(a)anthracene	56-55-3	American robin (Avian herbivore)	0.73	7.3	SOIL_AR(p)_56-55-3
PAH	Benzo(a)anthracene	56-55-3	American robin (Avian insectivore)	0.88	8.8	SOIL_AR(i)_56-55-3
PAH	Benzo(a)anthracene	56-55-3	American robin (Avian omnivore)	0.8	8	SOIL_AR(ip)_56-55-3
PAH	Benzo(a)anthracene	56-55-3	Deer mouse (Mammalian omnivore)	3.4	34	SOIL_DM(ip)_56-55-3
PAH	Benzo(a)anthracene	56-55-3	Generic plant (Terrestrial autotroph - producer)	18	180	SOIL_GP_56-55-3
PAH	Benzo(a)anthracene	56-55-3	Gray fox (Mammalian top carnivore)	110	1100	SOIL_RF(f)_56-55-3
PAH	Benzo(a)anthracene	56-55-3	Montane shrew (Mammalian insectivore)	4	40	SOIL_MS(i)_56-55-3
PAH	Benzo(a)anthracene	56-55-3	Mountain cottontail (Mammalian herbivore)	6.1	61	SOIL_DC(p)_56-55-3
PAH	Benzo(a)pyrene	50-32-8	Deer mouse (Mammalian omnivore)	84	260	SOIL_DM(ip)_50-32-8
PAH	Benzo(a)pyrene	50-32-8	Gray fox (Mammalian top carnivore)	3400	11000	SOIL_RF(f)_50-32-8
PAH	Benzo(a)pyrene	50-32-8	Montane shrew (Mammalian insectivore)	62	190	SOIL_MS(i)_50-32-8
PAH	Benzo(a)pyrene	50-32-8	Mountain cottontail (Mammalian herbivore)	260	830	SOIL_DC(p)_50-32-8
PAH	Benzo(b)fluoranthene	205-99-2	Deer mouse (Mammalian omnivore)	51	510	SOIL_DM(ip)_205-99-2
PAH	Benzo(b)fluoranthene	205-99-2	Generic plant (Terrestrial autotroph - producer)	18	180	SOIL_GP_205-99-2
PAH	Benzo(b)fluoranthene	205-99-2	Gray fox (Mammalian top carnivore)	2400	24000	SOIL_RF(f)_205-99-2
PAH	Benzo(b)fluoranthene	205-99-2	Montane shrew (Mammalian insectivore)	44	440	SOIL_MS(i)_205-99-2
PAH	Benzo(b)fluoranthene	205-99-2	Mountain cottontail (Mammalian herbivore)	130	1300	SOIL_DC(p)_205-99-2
PAH	Benzo(g,h,i)perylene	191-24-2	Deer mouse (Mammalian omnivore)	46	460	SOIL_DM(ip)_191-24-2
PAH	Benzo(g,h,i)perylene	191-24-2	Gray fox (Mammalian top carnivore)	3600	36000	SOIL_RF(f)_191-24-2
PAH	Benzo(g,h,i)perylene	191-24-2	Montane shrew (Mammalian insectivore)	25	250	SOIL_MS(i)_191-24-2
PAH	Benzo(g,h,i)perylene	191-24-2	Mountain cottontail (Mammalian herbivore)	470	4700	SOIL_DC(p)_191-24-2
PAH	Benzo(k)fluoranthene	207-08-9	Deer mouse (Mammalian omnivore)	99	990	SOIL_DM(ip)_207-08-9
PAH	Benzo(k)fluoranthene	207-08-9	Gray fox (Mammalian top carnivore)	4300	43000	SOIL_RF(f)_207-08-9
PAH	Benzo(k)fluoranthene	207-08-9	Montane shrew (Mammalian insectivore)	71	710	SOIL_MS(i)_207-08-9
PAH	Benzo(k)fluoranthene	207-08-9	Mountain cottontail (Mammalian herbivore)	330	3300	SOIL_DC(p)_207-08-9
PAH	Chrysene	218-01-9	Deer mouse (Mammalian omnivore)	3.1	31	SOIL_DM(ip)_218-01-9
PAH	Chrysene	218-01-9	Gray fox (Mammalian top carnivore)	110	1100	SOIL_RF(f)_218-01-9
PAH	Chrysene	218-01-9	Montane shrew (Mammalian insectivore)	3.1	31	SOIL_MS(i)_218-01-9
PAH	Chrysene	218-01-9	Mountain cottontail (Mammalian herbivore)	6.3	63	SOIL_DC(p)_218-01-9
PAH	Dibenzo(a,h)anthracene	53-70-3	Deer mouse (Mammalian omnivore)	22	220	SOIL_DM(ip)_53-70-3
PAH	Dibenzo(a,h)anthracene	53-70-3	Gray fox (Mammalian top carnivore)	850	8500	SOIL_RF(f)_53-70-3
PAH	Dibenzo(a,h)anthracene	53-70-3	Montane shrew (Mammalian insectivore)	14	140	SOIL_MS(i)_53-70-3
PAH	Dibenzo(a,h)anthracene	53-70-3	Mountain cottontail (Mammalian herbivore)	84	840	SOIL_DC(p)_53-70-3
PAH	Fluoranthene	206-44-0	Deer mouse (Mammalian omnivore)	38	380	SOIL_DM(ip)_206-44-0
PAH	Fluoranthene	206-44-0	Earthworm (Soil-dwelling invertebrate)	10	23	SOIL_EW_206-44-0
PAH	Fluoranthene	206-44-0	Gray fox (Mammalian top carnivore)	3900	39000	SOIL_RF(f)_206-44-0
PAH	Fluoranthene	206-44-0	Montane shrew (Mammalian insectivore)	22	220	SOIL_MS(i)_206-44-0
PAH	Fluoranthene	206-44-0	Mountain cottontail (Mammalian herbivore)	270	2700	SOIL_DC(p)_206-44-0
PAH	Fluorene	86-73-7	Deer mouse (Mammalian omnivore)	340	680	SOIL_DM(ip)_86-73-7
PAH	Fluorene	86-73-7	Earthworm (Soil-dwelling invertebrate)	3.7	19	SOIL_EW_86-73-7
PAH	Fluorene	86-73-7	Gray fox (Mammalian top carnivore)	50000	100000	SOIL_RF(f)_86-73-7
PAH	Fluorene	86-73-7	Montane shrew (Mammalian insectivore)	250	510	SOIL_MS(i)_86-73-7
PAH	Fluorene	86-73-7	Mountain cottontail (Mammalian herbivore)	1100	2300	SOIL_DC(p)_86-73-7
PAH	Indeno(1,2,3-cd)pyrene	193-39-5	Deer mouse (Mammalian omnivore)	110	1100	SOIL_DM(ip)_193-39-5
PAH	Indeno(1,2,3-cd)pyrene	193-39-5	Gray fox (Mammalian top carnivore)	4600	46000	SOIL_RF(f)_193-39-5
PAH	Indeno(1,2,3-cd)pyrene	193-39-5	Montane shrew (Mammalian insectivore)	71	710	SOIL_MS(i)_193-39-5
PAH	Indeno(1,2,3-cd)pyrene	193-39-5	Mountain cottontail (Mammalian herbivore)	510	5100	SOIL_DC(p)_193-39-5
PAH	Methylnaphthalene[2-]	91-57-6	Deer mouse (Mammalian omnivore)	24	240	SOIL_DM(ip)_91-57-6
PAH	Methylnaphthalene[2-]	91-57-6	Gray fox (Mammalian top carnivore)	4900	49000	SOIL_RF(f)_91-57-6
PAH	Methylnaphthalene[2-]	91-57-6	Montane shrew (Mammalian insectivore)	16	160	SOIL_MS(i)_91-57-6
PAH	Methylnaphthalene[2-]	91-57-6	Mountain cottontail (Mammalian herbivore)	110	1100	SOIL_DC(p)_91-57-6
PAH	Naphthalene	91-20-3	American kestrel (Avian top carnivore)	2100	21000	SOIL_AK(f)_91-20-3
PAH	Naphthalene	91-20-3	American kestrel (insectivore / carnivore)	78	780	SOIL_AK(fi)_91-20-3

Group	Name	CAS	Receptor	NE ESL	LE ESL	ESL ID
PAH	Naphthalene	91-20-3	American robin (Avian herbivore)	3.4	34	SOIL_AR(p)_91-20-3
PAH	Naphthalene	91-20-3	American robin (Avian insectivore)	15	150	SOIL_AR(i)_91-20-3
PAH	Naphthalene	91-20-3	American robin (Avian omnivore)	5.7	57	SOIL_AR(ip)_91-20-3
PAH	Naphthalene	91-20-3	Deer mouse (Mammalian omnivore)	9.6	27	SOIL_DM(ip)_91-20-3
PAH	Naphthalene	91-20-3	Generic plant (Terrestrial autotroph - producer)	1	10	SOIL_GP_91-20-3
PAH	Naphthalene	91-20-3	Gray fox (Mammalian top carnivore)	5800	16000	SOIL_RF(f)_91-20-3
PAH	Naphthalene	91-20-3	Montane shrew (Mammalian insectivore)	28	79	SOIL_MS(i)_91-20-3
PAH	Naphthalene	91-20-3	Mountain cottontail (Mammalian herbivore)	14	40	SOIL_DC(p)_91-20-3
PAH	Phenanthrene	85-01-8	Deer mouse (Mammalian omnivore)	15	150	SOIL_DM(ip)_85-01-8
PAH	Phenanthrene	85-01-8	Earthworm (Soil-dwelling invertebrate)	5.5	12	SOIL_EW_85-01-8
PAH	Phenanthrene	85-01-8	Gray fox (Mammalian top carnivore)	1900	19000	SOIL_RF(f)_85-01-8
PAH	Phenanthrene	85-01-8	Montane shrew (Mammalian insectivore)	11	110	SOIL_MS(i)_85-01-8
PAH	Phenanthrene	85-01-8	Mountain cottontail (Mammalian herbivore)	62	620	SOIL_DC(p)_85-01-8
PAH	Pyrene	129-00-0	American kestrel (Avian top carnivore)	3000	30000	SOIL_AK(f)_129-00-0
PAH	Pyrene	129-00-0	American kestrel (insectivore / carnivore)	160	1600	SOIL_AK(fi)_129-00-0
PAH	Pyrene	129-00-0	American robin (Avian herbivore)	68	680	SOIL_AR(p)_129-00-0
PAH	Pyrene	129-00-0	American robin (Avian insectivore)	33	330	SOIL_AR(i)_129-00-0
PAH	Pyrene	129-00-0	American robin (Avian omnivore)	44	440	SOIL_AR(ip)_129-00-0
PAH	Pyrene	129-00-0	Deer mouse (Mammalian omnivore)	31	310	SOIL_DM(ip)_129-00-0
PAH	Pyrene	129-00-0	Earthworm (Soil-dwelling invertebrate)	10	20	SOIL_EW_129-00-0
PAH	Pyrene	129-00-0	Gray fox (Mammalian top carnivore)	3100	31000	SOIL_RF(f)_129-00-0
PAH	Pyrene	129-00-0	Montane shrew (Mammalian insectivore)	23	230	SOIL_MS(i)_129-00-0
PAH	Pyrene	129-00-0	Mountain cottontail (Mammalian herbivore)	110	1100	SOIL_DC(p)_129-00-0
SVOC	Benzoic Acid	65-85-0	Deer mouse (Mammalian omnivore)	1.3	13	SOIL_DM(ip)_65-85-0
SVOC	Benzoic Acid	65-85-0	Gray fox (Mammalian top carnivore)	2000	20000	SOIL_RF(f)_65-85-0
SVOC	Benzoic Acid	65-85-0	Montane shrew (Mammalian insectivore)	1	10	SOIL_MS(i)_65-85-0
SVOC	Benzoic Acid	65-85-0	Mountain cottontail (Mammalian herbivore)	4.6	46	SOIL_DC(p)_65-85-0
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	American kestrel (Avian top carnivore)	9.3	93	SOIL_AK(f)_117-81-7
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	American kestrel (insectivore / carnivore)	0.096	0.96	SOIL_AK(fi)_117-81-7
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	American robin (Avian herbivore)	16	160	SOIL_AR(p)_117-81-7
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	American robin (Avian insectivore)	0.02	0.2	SOIL_AR(i)_117-81-7
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	American robin (Avian omnivore)	0.04	0.4	SOIL_AR(ip)_117-81-7
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	Deer mouse (Mammalian omnivore)	1.1	11	SOIL_DM(ip)_117-81-7
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	Gray fox (Mammalian top carnivore)	500	5000	SOIL_RF(f)_117-81-7
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	Montane shrew (Mammalian insectivore)	0.6	6	SOIL_MS(i)_117-81-7
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	Mountain cottontail (Mammalian herbivore)	1900	19000	SOIL_DC(p)_117-81-7
SVOC	Butyl Benzyl Phthalate	85-68-7	Deer mouse (Mammalian omnivore)	160	1600	SOIL_DM(ip)_85-68-7
SVOC	Butyl Benzyl Phthalate	85-68-7	Gray fox (Mammalian top carnivore)	23000	230000	SOIL_RF(f)_85-68-7
SVOC	Butyl Benzyl Phthalate	85-68-7	Montane shrew (Mammalian insectivore)	90	900	SOIL_MS(i)_85-68-7
SVOC	Butyl Benzyl Phthalate	85-68-7	Mountain cottontail (Mammalian herbivore)	2400	24000	SOIL_DC(p)_85-68-7
SVOC	Carbazole	86-74-8	Deer mouse (Mammalian omnivore)	79	790	SOIL_DM(ip)_86-74-8
SVOC	Carbazole	86-74-8	Gray fox (Mammalian top carnivore)	13000	130000	SOIL_RF(f)_86-74-8
SVOC	Carbazole	86-74-8	Montane shrew (Mammalian insectivore)	110	1100	SOIL_MS(i)_86-74-8
SVOC	Carbazole	86-74-8	Mountain cottontail (Mammalian herbivore)	140	1400	SOIL_DC(p)_86-74-8
SVOC	Chlorobenzene	108-90-7	Deer mouse (Mammalian omnivore)	53	530	SOIL_DM(ip)_108-90-7
SVOC	Chlorobenzene	108-90-7	Earthworm (Soil-dwelling invertebrate)	2.4	24	SOIL_EW_108-90-7
SVOC	Chlorobenzene	108-90-7	Gray fox (Mammalian top carnivore)	25000	250000	SOIL_RF(f)_108-90-7
SVOC	Chlorobenzene	108-90-7	Montane shrew (Mammalian insectivore)	43	430	SOIL_MS(i)_108-90-7
SVOC	Chlorobenzene	108-90-7	Mountain cottontail (Mammalian herbivore)	170	1700	SOIL_DC(p)_108-90-7
SVOC	Chlorophenol[2-]	95-57-8	American kestrel (Avian top carnivore)	310	3100	SOIL_AK(f)_95-57-8
SVOC	Chlorophenol[2-]	95-57-8	American kestrel (insectivore / carnivore)	14	140	SOIL_AK(fi)_95-57-8
SVOC	Chlorophenol[2-]	95-57-8	American robin (Avian herbivore)	0.39	3.9	SOIL_AR(p)_95-57-8
SVOC	Chlorophenol[2-]	95-57-8	American robin (Avian insectivore)	2.6	26	SOIL_AR(i)_95-57-8
SVOC	Chlorophenol[2-]	95-57-8	American robin (Avian omnivore)	0.68	6.8	SOIL_AR(ip)_95-57-8
SVOC	Chlorophenol[2-]	95-57-8	Deer mouse (Mammalian omnivore)	0.54	5.4	SOIL_DM(ip)_95-57-8
SVOC	Chlorophenol[2-]	95-57-8	Gray fox (Mammalian top carnivore)	340	3400	SOIL_RF(f)_95-57-8
SVOC	Chlorophenol[2-]	95-57-8	Montane shrew (Mammalian insectivore)	2.3	23	SOIL_MS(i)_95-57-8

Group	Name	CAS	Receptor	NE ESL	LE ESL	ESL ID
SVOC	Chlorophenol[2-]	95-57-8	Mountain cottontail (Mammalian herbivore)	0.74	7.4	SOIL_DC(p)_95-57-8
SVOC	Dibenzofuran	132-64-9	Generic plant (Terrestrial autotroph - producer)	6.1	61	SOIL_GP_132-64-9
SVOC	Diethyl Phthalate	84-66-2	Deer mouse (Mammalian omnivore)	3600	36000	SOIL_DM(ip)_84-66-2
SVOC	Diethyl Phthalate	84-66-2	Generic plant (Terrestrial autotroph - producer)	100	1000	SOIL_GP_84-66-2
SVOC	Diethyl Phthalate	84-66-2	Gray fox (Mammalian top carnivore)	2500000	25000000	SOIL_RF(f)_84-66-2
SVOC	Diethyl Phthalate	84-66-2	Montane shrew (Mammalian insectivore)	3600	36000	SOIL_MS(i)_84-66-2
SVOC	Diethyl Phthalate	84-66-2	Mountain cottontail (Mammalian herbivore)	8800	88000	SOIL_DC(p)_84-66-2
SVOC	Dimethyl Phthalate	131-11-3	Deer mouse (Mammalian omnivore)	38	460	SOIL_DM(ip)_131-11-3
SVOC	Dimethyl Phthalate	131-11-3	Earthworm (Soil-dwelling invertebrate)	10	100	SOIL_EW_131-11-3
SVOC	Dimethyl Phthalate	131-11-3	Gray fox (Mammalian top carnivore)	48000	590000	SOIL_RF(f)_131-11-3
SVOC	Dimethyl Phthalate	131-11-3	Montane shrew (Mammalian insectivore)	80	980	SOIL_MS(i)_131-11-3
SVOC	Dimethyl Phthalate	131-11-3	Mountain cottontail (Mammalian herbivore)	60	740	SOIL_DC(p)_131-11-3
SVOC	Di-n-Butyl Phthalate	84-74-2	American kestrel (Avian top carnivore)	2	20	SOIL_AK(f)_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	American kestrel (insectivore / carnivore)	0.052	0.52	SOIL_AK(fi)_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	American robin (Avian herbivore)	0.38	3.8	SOIL_AR(p)_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	American robin (Avian insectivore)	0.011	0.11	SOIL_AR(i)_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	American robin (Avian omnivore)	0.021	0.21	SOIL_AR(ip)_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	Deer mouse (Mammalian omnivore)	360	860	SOIL_DM(ip)_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	Generic plant (Terrestrial autotroph - producer)	160	600	SOIL_GP_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	Gray fox (Mammalian top carnivore)	62000	140000	SOIL_RF(f)_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	Montane shrew (Mammalian insectivore)	180	450	SOIL_MS(i)_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	Mountain cottontail (Mammalian herbivore)	17000	40000	SOIL_DC(p)_84-74-2
SVOC	Di-n-octylphthalate	117-84-0	Deer mouse (Mammalian omnivore)	1.8	18	SOIL_DM(ip)_117-84-0
SVOC	Di-n-octylphthalate	117-84-0	Gray fox (Mammalian top carnivore)	1300	13000	SOIL_RF(f)_117-84-0
SVOC	Di-n-octylphthalate	117-84-0	Montane shrew (Mammalian insectivore)	0.91	9.1	SOIL_MS(i)_117-84-0
SVOC	Di-n-octylphthalate	117-84-0	Mountain cottontail (Mammalian herbivore)	8400	84000	SOIL_DC(p)_117-84-0
SVOC	Methylphenol[2-]	95-48-7	Deer mouse (Mammalian omnivore)	580	5800	SOIL_DM(ip)_95-48-7
SVOC	Methylphenol[2-]	95-48-7	Generic plant (Terrestrial autotroph - producer)	0.67	7	SOIL_GP_95-48-7
SVOC	Methylphenol[2-]	95-48-7	Gray fox (Mammalian top carnivore)	160000	1600000	SOIL_RF(f)_95-48-7
SVOC	Methylphenol[2-]	95-48-7	Montane shrew (Mammalian insectivore)	1500	15000	SOIL_MS(i)_95-48-7
SVOC	Methylphenol[2-]	95-48-7	Mountain cottontail (Mammalian herbivore)	880	8800	SOIL_DC(p)_95-48-7
SVOC	Methylphenol[3-]	108-39-4	Generic plant (Terrestrial autotroph - producer)	0.69	7	SOIL_GP_108-39-4
SVOC	Nitroaniline[2-]	88-74-4	Deer mouse (Mammalian omnivore)	5.3	10	SOIL_DM(ip)_88-74-4
SVOC	Nitroaniline[2-]	88-74-4	Gray fox (Mammalian top carnivore)	2200	4400	SOIL_RF(f)_88-74-4
SVOC	Nitroaniline[2-]	88-74-4	Montane shrew (Mammalian insectivore)	6.5	13	SOIL_MS(i)_88-74-4
SVOC	Nitroaniline[2-]	88-74-4	Mountain cottontail (Mammalian herbivore)	11	22	SOIL_DC(p)_88-74-4
SVOC	Nitrobenzene	98-95-3	Deer mouse (Mammalian omnivore)	4.8	48	SOIL_DM(ip)_98-95-3
SVOC	Nitrobenzene	98-95-3	Earthworm (Soil-dwelling invertebrate)	2.2	22	SOIL_EW_98-95-3
SVOC	Nitrobenzene	98-95-3	Gray fox (Mammalian top carnivore)	4100	41000	SOIL_RF(f)_98-95-3
SVOC	Nitrobenzene	98-95-3	Montane shrew (Mammalian insectivore)	21	210	SOIL_MS(i)_98-95-3
SVOC	Nitrobenzene	98-95-3	Mountain cottontail (Mammalian herbivore)	6.7	67	SOIL_DC(p)_98-95-3
SVOC	Pentachloronitrobenzene	82-68-8	American kestrel (Avian top carnivore)	110	1100	SOIL_AK(f)_82-68-8
SVOC	Pentachloronitrobenzene	82-68-8	American kestrel (insectivore / carnivore)	3.3	33	SOIL_AK(fi)_82-68-8
SVOC	Pentachloronitrobenzene	82-68-8	American robin (Avian herbivore)	21	210	SOIL_AR(p)_82-68-8
SVOC	Pentachloronitrobenzene	82-68-8	American robin (Avian insectivore)	0.7	7	SOIL_AR(i)_82-68-8
SVOC	Pentachloronitrobenzene	82-68-8	American robin (Avian omnivore)	1.3	13	SOIL_AR(ip)_82-68-8
SVOC	Pentachloronitrobenzene	82-68-8	Deer mouse (Mammalian omnivore)	22	220	SOIL_DM(ip)_82-68-8
SVOC	Pentachloronitrobenzene	82-68-8	Gray fox (Mammalian top carnivore)	3500	35000	SOIL_RF(f)_82-68-8
SVOC	Pentachloronitrobenzene	82-68-8	Montane shrew (Mammalian insectivore)	11	110	SOIL_MS(i)_82-68-8
SVOC	Pentachloronitrobenzene	82-68-8	Mountain cottontail (Mammalian herbivore)	930	9300	SOIL_DC(p)_82-68-8
SVOC	Pentachlorophenol	87-86-5	American kestrel (Avian top carnivore)	57	570	SOIL_AK(f)_87-86-5
SVOC	Pentachlorophenol	87-86-5	American kestrel (insectivore / carnivore)	1.7	17	SOIL_AK(fi)_87-86-5
SVOC	Pentachlorophenol	87-86-5	American robin (Avian herbivore)	29	290	SOIL_AR(p)_87-86-5
SVOC	Pentachlorophenol	87-86-5	American robin (Avian insectivore)	0.36	3.6	SOIL_AR(i)_87-86-5
SVOC	Pentachlorophenol	87-86-5	American robin (Avian omnivore)	0.72	7.2	SOIL_AR(ip)_87-86-5
SVOC	Pentachlorophenol	87-86-5	Deer mouse (Mammalian omnivore)	1.5	15	SOIL_DM(ip)_87-86-5
SVOC	Pentachlorophenol	87-86-5	Earthworm (Soil-dwelling invertebrate)	31	150	SOIL_EW_87-86-5

Group	Name	CAS	Receptor	NE ESL	LE ESL	ESL ID
SVOC	Pentachlorophenol	87-86-5	Generic plant (Terrestrial autotroph - producer)	5	50	SOIL_GP_87-86-5
SVOC	Pentachlorophenol	87-86-5	Gray fox (Mammalian top carnivore)	230	2300	SOIL_RF(f)_87-86-5
SVOC	Pentachlorophenol	87-86-5	Montane shrew (Mammalian insectivore)	0.81	8.1	SOIL_MS(i)_87-86-5
SVOC	Pentachlorophenol	87-86-5	Mountain cottontail (Mammalian herbivore)	180	1800	SOIL_DC(p)_87-86-5
SVOC	Phenol	108-95-2	Deer mouse (Mammalian omnivore)	37	370	SOIL_DM(ip)_108-95-2
SVOC	Phenol	108-95-2	Earthworm (Soil-dwelling invertebrate)	1.8	18	SOIL_EW_108-95-2
SVOC	Phenol	108-95-2	Generic plant (Terrestrial autotroph - producer)	0.79	8	SOIL_GP_108-95-2
SVOC	Phenol	108-95-2	Gray fox (Mammalian top carnivore)	43000	430000	SOIL_RF(f)_108-95-2
SVOC	Phenol	108-95-2	Montane shrew (Mammalian insectivore)	640	6400	SOIL_MS(i)_108-95-2
SVOC	Phenol	108-95-2	Mountain cottontail (Mammalian herbivore)	47	470	SOIL_DC(p)_108-95-2
VOC	Acetone	67-64-1	American kestrel (Avian top carnivore)	66000	660000	SOIL_AK(f)_67-64-1
VOC	Acetone	67-64-1	American kestrel (insectivore / carnivore)	840	8400	SOIL_AK(fi)_67-64-1
VOC	Acetone	67-64-1	American robin (Avian herbivore)	7.5	75	SOIL_AR(p)_67-64-1
VOC	Acetone	67-64-1	American robin (Avian insectivore)	170	1700	SOIL_AR(i)_67-64-1
VOC	Acetone	67-64-1	American robin (Avian omnivore)	14	140	SOIL_AR(ip)_67-64-1
VOC	Acetone	67-64-1	Deer mouse (Mammalian omnivore)	1.2	6.3	SOIL_DM(ip)_67-64-1
VOC	Acetone	67-64-1	Gray fox (Mammalian top carnivore)	7800	39000	SOIL_RF(f)_67-64-1
VOC	Acetone	67-64-1	Montane shrew (Mammalian insectivore)	15	79	SOIL_MS(i)_67-64-1
VOC	Acetone	67-64-1	Mountain cottontail (Mammalian herbivore)	1.6	8	SOIL_DC(p)_67-64-1
VOC	Benzene	71-43-2	Deer mouse (Mammalian omnivore)	24	240	SOIL_DM(ip)_71-43-2
VOC	Benzene	71-43-2	Gray fox (Mammalian top carnivore)	18000	180000	SOIL_RF(f)_71-43-2
VOC	Benzene	71-43-2	Montane shrew (Mammalian insectivore)	49	490	SOIL_MS(i)_71-43-2
VOC	Benzene	71-43-2	Mountain cottontail (Mammalian herbivore)	38	380	SOIL_DC(p)_71-43-2
VOC	Benzyl Alcohol	100-51-6	Deer mouse (Mammalian omnivore)	120	1200	SOIL_DM(ip)_100-51-6
VOC	Benzyl Alcohol	100-51-6	Gray fox (Mammalian top carnivore)	110000	1100000	SOIL_RF(f)_100-51-6
VOC	Benzyl Alcohol	100-51-6	Montane shrew (Mammalian insectivore)	270	2700	SOIL_MS(i)_100-51-6
VOC	Benzyl Alcohol	100-51-6	Mountain cottontail (Mammalian herbivore)	190	1900	SOIL_DC(p)_100-51-6
VOC	Butanone[2-]	78-93-3	Deer mouse (Mammalian omnivore)	350	920	SOIL_DM(ip)_78-93-3
VOC	Butanone[2-]	78-93-3	Gray fox (Mammalian top carnivore)	1300000	3500000	SOIL_RF(f)_78-93-3
VOC	Butanone[2-]	78-93-3	Montane shrew (Mammalian insectivore)	2700	6900	SOIL_MS(i)_78-93-3
VOC	Butanone[2-]	78-93-3	Mountain cottontail (Mammalian herbivore)	470	1200	SOIL_DC(p)_78-93-3
VOC	Carbon Disulfide	75-15-0	Deer mouse (Mammalian omnivore)	0.81	8.1	SOIL_DM(ip)_75-15-0
VOC	Carbon Disulfide	75-15-0	Gray fox (Mammalian top carnivore)	190	1900	SOIL_RF(f)_75-15-0
VOC	Carbon Disulfide	75-15-0	Montane shrew (Mammalian insectivore)	1.2	12	SOIL_MS(i)_75-15-0
VOC	Carbon Disulfide	75-15-0	Mountain cottontail (Mammalian herbivore)	1.4	14	SOIL_DC(p)_75-15-0
VOC	Chloroaniline[4-]	106-47-8	Earthworm (Soil-dwelling invertebrate)	1.8	18	SOIL_EW_106-47-8
VOC	Chloroaniline[4-]	106-47-8	Generic plant (Terrestrial autotroph - producer)	1	10	SOIL_GP_106-47-8
VOC	Chloroform	67-66-3	Deer mouse (Mammalian omnivore)	8	21	SOIL_DM(ip)_67-66-3
VOC	Chloroform	67-66-3	Gray fox (Mammalian top carnivore)	8900	24000	SOIL_RF(f)_67-66-3
VOC	Chloroform	67-66-3	Montane shrew (Mammalian insectivore)	8.2	22	SOIL_MS(i)_67-66-3
VOC	Chloroform	67-66-3	Mountain cottontail (Mammalian herbivore)	19	52	SOIL_DC(p)_67-66-3
VOC	Dichlorobenzene[1,2-]	95-50-1	Deer mouse (Mammalian omnivore)	1.5	15	SOIL_DM(ip)_95-50-1
VOC	Dichlorobenzene[1,2-]	95-50-1	Gray fox (Mammalian top carnivore)	480	4800	SOIL_RF(f)_95-50-1
VOC	Dichlorobenzene[1,2-]	95-50-1	Montane shrew (Mammalian insectivore)	0.92	9.2	SOIL_MS(i)_95-50-1
VOC	Dichlorobenzene[1,2-]	95-50-1	Mountain cottontail (Mammalian herbivore)	12	120	SOIL_DC(p)_95-50-1
VOC	Dichlorobenzene[1,3-]	541-73-1	Deer mouse (Mammalian omnivore)	1.2	12	SOIL_DM(ip)_541-73-1
VOC	Dichlorobenzene[1,3-]	541-73-1	Gray fox (Mammalian top carnivore)	380	3800	SOIL_RF(f)_541-73-1
VOC	Dichlorobenzene[1,3-]	541-73-1	Montane shrew (Mammalian insectivore)	0.74	7.4	SOIL_MS(i)_541-73-1
VOC	Dichlorobenzene[1,3-]	541-73-1	Mountain cottontail (Mammalian herbivore)	13	130	SOIL_DC(p)_541-73-1
VOC	Dichlorobenzene[1,4-]	106-46-7	Deer mouse (Mammalian omnivore)	1.5	6	SOIL_DM(ip)_106-46-7
VOC	Dichlorobenzene[1,4-]	106-46-7	Earthworm (Soil-dwelling invertebrate)	1.2	12	SOIL_EW_106-46-7
VOC	Dichlorobenzene[1,4-]	106-46-7	Gray fox (Mammalian top carnivore)	470	1800	SOIL_RF(f)_106-46-7
VOC	Dichlorobenzene[1,4-]	106-46-7	Montane shrew (Mammalian insectivore)	0.89	3.5	SOIL_MS(i)_106-46-7
VOC	Dichlorobenzene[1,4-]	106-46-7	Mountain cottontail (Mammalian herbivore)	12	49	SOIL_DC(p)_106-46-7
VOC	Dichloroethane[1,1-]	75-34-3	Deer mouse (Mammalian omnivore)	210	2100	SOIL_DM(ip)_75-34-3
VOC	Dichloroethane[1,1-]	75-34-3	Gray fox (Mammalian top carnivore)	250000	2500000	SOIL_RF(f)_75-34-3
VOC	Dichloroethane[1,1-]	75-34-3	Montane shrew (Mammalian insectivore)	290	2900	SOIL_MS(i)_75-34-3

Group	Name	CAS	Receptor	NE ESL	LE ESL	ESL ID
VOC	Dichloroethane[1,1-]	75-34-3	Mountain cottontail (Mammalian herbivore)	410	4100	SOIL_DC(p)_75-34-3
VOC	Dichloroethane[1,2-]	107-06-2	American kestrel (Avian top carnivore)	1300	2700	SOIL_AK(f)_107-06-2
VOC	Dichloroethane[1,2-]	107-06-2	American kestrel (insectivore / carnivore)	22	44	SOIL_AK(fi)_107-06-2
VOC	Dichloroethane[1,2-]	107-06-2	American robin (Avian herbivore)	0.85	1.6	SOIL_AR(p)_107-06-2
VOC	Dichloroethane[1,2-]	107-06-2	American robin (Avian insectivore)	4.5	9	SOIL_AR(i)_107-06-2
VOC	Dichloroethane[1,2-]	107-06-2	American robin (Avian omnivore)	1.4	2.8	SOIL_AR(ip)_107-06-2
VOC	Dichloroethane[1,2-]	107-06-2	Deer mouse (Mammalian omnivore)	27	270	SOIL_DM(ip)_107-06-2
VOC	Dichloroethane[1,2-]	107-06-2	Gray fox (Mammalian top carnivore)	36000	360000	SOIL_RF(f)_107-06-2
VOC	Dichloroethane[1,2-]	107-06-2	Montane shrew (Mammalian insectivore)	91	910	SOIL_MS(i)_107-06-2
VOC	Dichloroethane[1,2-]	107-06-2	Mountain cottontail (Mammalian herbivore)	39	390	SOIL_DC(p)_107-06-2
VOC	Dichloroethene[1,1-]	75-35-4	Deer mouse (Mammalian omnivore)	14	140	SOIL_DM(ip)_75-35-4
VOC	Dichloroethene[1,1-]	75-35-4	Gray fox (Mammalian top carnivore)	14000	140000	SOIL_RF(f)_75-35-4
VOC	Dichloroethene[1,1-]	75-35-4	Montane shrew (Mammalian insectivore)	11	110	SOIL_MS(i)_75-35-4
VOC	Dichloroethene[1,1-]	75-35-4	Mountain cottontail (Mammalian herbivore)	44	440	SOIL_DC(p)_75-35-4
VOC	Dichloroethene[cis/trans-1,2-]	540-59-0	Deer mouse (Mammalian omnivore)	25	250	SOIL_DM(ip)_540-59-0
VOC	Dichloroethene[cis/trans-1,2-]	540-59-0	Gray fox (Mammalian top carnivore)	25000	250000	SOIL_RF(f)_540-59-0
VOC	Dichloroethene[cis/trans-1,2-]	540-59-0	Montane shrew (Mammalian insectivore)	24	240	SOIL_MS(i)_540-59-0
VOC	Dichloroethene[cis/trans-1,2-]	540-59-0	Mountain cottontail (Mammalian herbivore)	64	640	SOIL_DC(p)_540-59-0
VOC	Diphenylamine	122-39-4	American kestrel (Avian top carnivore)	3900	6500	SOIL_AK(f)_122-39-4
VOC	Diphenylamine	122-39-4	American kestrel (insectivore / carnivore)	49	81	SOIL_AK(fi)_122-39-4
VOC	Diphenylamine	122-39-4	American robin (Avian herbivore)	78	130	SOIL_AR(p)_122-39-4
VOC	Diphenylamine	122-39-4	American robin (Avian insectivore)	10	16	SOIL_AR(i)_122-39-4
VOC	Diphenylamine	122-39-4	American robin (Avian omnivore)	17	29	SOIL_AR(ip)_122-39-4
VOC	Hexachlorobenzene	118-74-1	American kestrel (Avian top carnivore)	12	120	SOIL_AK(f)_118-74-1
VOC	Hexachlorobenzene	118-74-1	American kestrel (insectivore / carnivore)	0.37	3.7	SOIL_AK(fi)_118-74-1
VOC	Hexachlorobenzene	118-74-1	American robin (Avian herbivore)	83	830	SOIL_AR(p)_118-74-1
VOC	Hexachlorobenzene	118-74-1	American robin (Avian insectivore)	0.079	0.79	SOIL_AR(i)_118-74-1
VOC	Hexachlorobenzene	118-74-1	American robin (Avian omnivore)	0.15	1.5	SOIL_AR(ip)_118-74-1
VOC	Hexachlorobenzene	118-74-1	Deer mouse (Mammalian omnivore)	0.39	3.9	SOIL_DM(ip)_118-74-1
VOC	Hexachlorobenzene	118-74-1	Earthworm (Soil-dwelling invertebrate)	10	100	SOIL_EW_118-74-1
VOC	Hexachlorobenzene	118-74-1	Generic plant (Terrestrial autotroph - producer)	10	100	SOIL_GP_118-74-1
VOC	Hexachlorobenzene	118-74-1	Gray fox (Mammalian top carnivore)	59	590	SOIL_RF(f)_118-74-1
VOC	Hexachlorobenzene	118-74-1	Montane shrew (Mammalian insectivore)	0.2	2	SOIL_MS(i)_118-74-1
VOC	Hexachlorobenzene	118-74-1	Mountain cottontail (Mammalian herbivore)	910	9100	SOIL_DC(p)_118-74-1
VOC	Hexanone[2-]	591-78-6	American kestrel (Avian top carnivore)	290	2900	SOIL_AK(f)_591-78-6
VOC	Hexanone[2-]	591-78-6	American kestrel (insectivore / carnivore)	1.7	17	SOIL_AK(fi)_591-78-6
VOC	Hexanone[2-]	591-78-6	American robin (Avian herbivore)	0.47	4.7	SOIL_AR(p)_591-78-6
VOC	Hexanone[2-]	591-78-6	American robin (Avian insectivore)	0.36	3.6	SOIL_AR(i)_591-78-6
VOC	Hexanone[2-]	591-78-6	American robin (Avian omnivore)	0.41	4.1	SOIL_AR(ip)_591-78-6
VOC	Hexanone[2-]	591-78-6	Deer mouse (Mammalian omnivore)	6.1	23	SOIL_DM(ip)_591-78-6
VOC	Hexanone[2-]	591-78-6	Gray fox (Mammalian top carnivore)	5900	22000	SOIL_RF(f)_591-78-6
VOC	Hexanone[2-]	591-78-6	Montane shrew (Mammalian insectivore)	5.4	20	SOIL_MS(i)_591-78-6
VOC	Hexanone[2-]	591-78-6	Mountain cottontail (Mammalian herbivore)	17	65	SOIL_DC(p)_591-78-6
VOC	Iodomethane	74-88-4	American kestrel (Avian top carnivore)	46	92	SOIL_AK(f)_74-88-4
VOC	Iodomethane	74-88-4	American kestrel (insectivore / carnivore)	0.29	0.59	SOIL_AK(fi)_74-88-4
VOC	Iodomethane	74-88-4	American robin (Avian herbivore)	0.038	0.076	SOIL_AR(p)_74-88-4
VOC	Iodomethane	74-88-4	American robin (Avian insectivore)	0.062	0.12	SOIL_AR(i)_74-88-4
VOC	Iodomethane	74-88-4	American robin (Avian omnivore)	0.047	0.095	SOIL_AR(ip)_74-88-4
VOC	Methyl-2-pentanone[4-]	108-10-1	Deer mouse (Mammalian omnivore)	9.7	97	SOIL_DM(ip)_108-10-1
VOC	Methyl-2-pentanone[4-]	108-10-1	Gray fox (Mammalian top carnivore)	18000	180000	SOIL_RF(f)_108-10-1
VOC	Methyl-2-pentanone[4-]	108-10-1	Montane shrew (Mammalian insectivore)	15	150	SOIL_MS(i)_108-10-1
VOC	Methyl-2-pentanone[4-]	108-10-1	Mountain cottontail (Mammalian herbivore)	17	170	SOIL_DC(p)_108-10-1
VOC	Methylene Chloride	75-09-2	Deer mouse (Mammalian omnivore)	2.6	22	SOIL_DM(ip)_75-09-2
VOC	Methylene Chloride	75-09-2	Generic plant (Terrestrial autotroph - producer)	1600	16000	SOIL_GP_75-09-2
VOC	Methylene Chloride	75-09-2	Gray fox (Mammalian top carnivore)	4300	36000	SOIL_RF(f)_75-09-2
VOC	Methylene Chloride	75-09-2	Montane shrew (Mammalian insectivore)	9.2	79	SOIL_MS(i)_75-09-2
VOC	Methylene Chloride	75-09-2	Mountain cottontail (Mammalian herbivore)	3.8	32	SOIL_DC(p)_75-09-2

Group	Name	CAS	Receptor	NE ESL	LE ESL	ESL ID
VOC	Styrene	100-42-5	Earthworm (Soil-dwelling invertebrate)	1.2	12	SOIL_EW_100-42-5
VOC	Styrene	100-42-5	Generic plant (Terrestrial autotroph - producer)	3.2	32	SOIL_GP_100-42-5
VOC	Tetrachloroethene	127-18-4	Deer mouse (Mammalian omnivore)	0.35	1.7	SOIL_DM(ip)_127-18-4
VOC	Tetrachloroethene	127-18-4	Generic plant (Terrestrial autotroph - producer)	10	100	SOIL_GP_127-18-4
VOC	Tetrachloroethene	127-18-4	Gray fox (Mammalian top carnivore)	120	630	SOIL_RF(f)_127-18-4
VOC	Tetrachloroethene	127-18-4	Montane shrew (Mammalian insectivore)	0.18	0.94	SOIL_MS(i)_127-18-4
VOC	Tetrachloroethene	127-18-4	Mountain cottontail (Mammalian herbivore)	9.5	47	SOIL_DC(p)_127-18-4
VOC	**Isopropyltoluene[4-].** Use toluene	99-87-6	Deer mouse (Mammalian omnivore)	25	250	SOIL_DM(ip)_108-88-3
VOC	**Isopropyltoluene[4-].** Use toluene	99-87-6	Generic plant (Terrestrial autotroph - producer)	200	2000	SOIL_GP_108-88-3
VOC	**Isopropyltoluene[4-].** Use toluene	99-87-6	Gray fox (Mammalian top carnivore)	12000	120000	SOIL_RF(f)_108-88-3
VOC	**Isopropyltoluene[4-].** Use toluene	99-87-6	Montane shrew (Mammalian insectivore)	23	230	SOIL_MS(i)_108-88-3
VOC	**Isopropyltoluene[4-].** Use toluene	99-87-6	Mountain cottontail (Mammalian herbivore)	66	660	SOIL_DC(p)_108-88-3
VOC	Toluene	108-88-3	Deer mouse (Mammalian omnivore)	25	250	SOIL_DM(ip)_108-88-3
VOC	Toluene	108-88-3	Generic plant (Terrestrial autotroph - producer)	200	2000	SOIL_GP_108-88-3
VOC	Toluene	108-88-3	Gray fox (Mammalian top carnivore)	12000	120000	SOIL_RF(f)_108-88-3
VOC	Toluene	108-88-3	Montane shrew (Mammalian insectivore)	23	230	SOIL_MS(i)_108-88-3
VOC	Toluene	108-88-3	Mountain cottontail (Mammalian herbivore)	66	660	SOIL_DC(p)_108-88-3
VOC	Trichlorobenzene[1,2,4-]	120-82-1	Deer mouse (Mammalian omnivore)	0.51	5.1	SOIL_DM(ip)_120-82-1
VOC	Trichlorobenzene[1,2,4-]	120-82-1	Earthworm (Soil-dwelling invertebrate)	1.2	12	SOIL_EW_120-82-1
VOC	Trichlorobenzene[1,2,4-]	120-82-1	Gray fox (Mammalian top carnivore)	110	1100	SOIL_RF(f)_120-82-1
VOC	Trichlorobenzene[1,2,4-]	120-82-1	Montane shrew (Mammalian insectivore)	0.27	2.7	SOIL_MS(i)_120-82-1
VOC	Trichlorobenzene[1,2,4-]	120-82-1	Mountain cottontail (Mammalian herbivore)	12	120	SOIL_DC(p)_120-82-1
VOC	Trichloroethane[1,1,1-]	71-55-6	Deer mouse (Mammalian omnivore)	400	4000	SOIL_DM(ip)_71-55-6
VOC	Trichloroethane[1,1,1-]	71-55-6	Gray fox (Mammalian top carnivore)	310000	3100000	SOIL_RF(f)_71-55-6
VOC	Trichloroethane[1,1,1-]	71-55-6	Montane shrew (Mammalian insectivore)	260	2600	SOIL_MS(i)_71-55-6
VOC	Trichloroethane[1,1,1-]	71-55-6	Mountain cottontail (Mammalian herbivore)	2000	20000	SOIL_DC(p)_71-55-6
VOC	Trichloroethene	79-01-6	Deer mouse (Mammalian omnivore)	54	540	SOIL_DM(ip)_79-01-6
VOC	Trichloroethene	79-01-6	Gray fox (Mammalian top carnivore)	42000	420000	SOIL_RF(f)_79-01-6
VOC	Trichloroethene	79-01-6	Montane shrew (Mammalian insectivore)	42	420	SOIL_MS(i)_79-01-6
VOC	Trichloroethene	79-01-6	Mountain cottontail (Mammalian herbivore)	190	1900	SOIL_DC(p)_79-01-6
VOC	Trichlorofluoromethane	75-69-4	Deer mouse (Mammalian omnivore)	97	650	SOIL_DM(ip)_75-69-4
VOC	Trichlorofluoromethane	75-69-4	Gray fox (Mammalian top carnivore)	62000	420000	SOIL_RF(f)_75-69-4
VOC	Trichlorofluoromethane	75-69-4	Montane shrew (Mammalian insectivore)	52	350	SOIL_MS(i)_75-69-4
VOC	Trichlorofluoromethane	75-69-4	Mountain cottontail (Mammalian herbivore)	1800	12000	SOIL_DC(p)_75-69-4
VOC	Vinyl Chloride	75-01-4	Deer mouse (Mammalian omnivore)	0.13	1.3	SOIL_DM(ip)_75-01-4
VOC	Vinyl Chloride	75-01-4	Gray fox (Mammalian top carnivore)	110	1100	SOIL_RF(f)_75-01-4
VOC	Vinyl Chloride	75-01-4	Montane shrew (Mammalian insectivore)	0.12	1.2	SOIL_MS(i)_75-01-4
VOC	Vinyl Chloride	75-01-4	Mountain cottontail (Mammalian herbivore)	0.34	3.4	SOIL_DC(p)_75-01-4
VOC	Xylene (Total)	1330-20-7	American kestrel (Avian top carnivore)	13000	130000	SOIL_AK(f)_1330-20-7
VOC	Xylene (Total)	1330-20-7	American kestrel (insectivore / carnivore)	190	1900	SOIL_AK(fi)_1330-20-7
VOC	Xylene (Total)	1330-20-7	American robin (Avian herbivore)	89	890	SOIL_AR(p)_1330-20-7
VOC	Xylene (Total)	1330-20-7	American robin (Avian insectivore)	41	410	SOIL_AR(i)_1330-20-7
VOC	Xylene (Total)	1330-20-7	American robin (Avian omnivore)	56	560	SOIL_AR(ip)_1330-20-7
VOC	Xylene (Total)	1330-20-7	Deer mouse (Mammalian omnivore)	1.9	2.4	SOIL_DM(ip)_1330-20-7
VOC	Xylene (Total)	1330-20-7	Generic plant (Terrestrial autotroph - producer)	100	1000	SOIL_GP_1330-20-7
VOC	Xylene (Total)	1330-20-7	Gray fox (Mammalian top carnivore)	750	930	SOIL_RF(f)_1330-20-7
VOC	Xylene (Total)	1330-20-7	Montane shrew (Mammalian insectivore)	1.4	1.8	SOIL_MS(i)_1330-20-7
VOC	Xylene (Total)	1330-20-7	Mountain cottontail (Mammalian herbivore)	7.6	9.5	SOIL_DC(p)_1330-20-7

Attachment 14

Revised Supplement 4-8,
Open Detonation Unit at Technical Area 39
Human Health and Ecological Risk Screening Assessments

OPEN DETONATION UNIT AT TECHNICAL AREA 39
HUMAN HEALTH AND ECOLOGICAL
RISK-SCREENING ASSESSMENTS

May 16, 2022

EXECUTIVE SUMMARY

The area around the open detonation (OD) area near Building 6 at Technical Area (TA) 39 (the TA-39-6 OD Unit) within the Los Alamos National Laboratory (LANL) was sampled as part of the application process for a Resource Conservation and Recovery Act (RCRA) permit to perform hazardous waste treatment operations. The TA-39-6 OD Unit is referred to as "the Unit" in the remainder of this risk assessment. Surface soil and tuff samples were collected in September 2018 and analyzed for inorganic and organic compounds. Data from these samples were used to conduct human health and ecological risk-screening assessments to determine whether hazardous contaminants from ongoing treatment operations are being released to soil at levels that pose an unacceptable risk to human health or the environment.

Screening criteria for these assessments require that residential, industrial, and construction worker exposure scenarios be evaluated, despite that the TA-39-6 OD Unit is not located at a residential location. For the human health risk assessment, a hypothetical future resident and industrial exposure scenarios were evaluated by comparing the maximum exposure point concentration for each analyte to the New Mexico Environment Department (NMED) soil screening levels (NMSSLs) (NMED 2021). The following conclusions are made:

- **Detected inorganics were compared to background values (BVs) and risk-based screening levels (NMSSLs).** Six detected inorganics exceeded background, although four of those were only 1.2 to 1.3 times higher than background. No inorganics exceeded risk-based screening levels (SLs).

- **Detected organics were compared to risk-based NMSSLs.** Maximum concentrations of detected analytes were compared to the NMSSLs. There are no individual constituents that exceed NMSSLs.

- **Cumulative Cancer Risks (CCR) and Hazard Indices (HI) were calculated.** The sum of the cancer risks (CR) is called a CCR, and the sum of the noncancer hazard quotients (HQs) is called an HI. The CCRs are less than the NMED target cancer risk of $1x10^{-5}$. The HIs do not exceed the target value of one.

- The screening evaluation indicates that hypothetical future residents, general workers, or construction workers are not at risk due to exposure to soils at the Unit.

Potential risk to ecological receptors was evaluated by analyzing different lines of evidence that were weighed to draw a conclusion regarding the potential for adverse ecological effects. This included:

- **Comparing maximum exposure point concentrations (EPC) to no effect (NE) ecological screening levels (ESLs).** There were 10 analytes that exceeded NE ESLs to produce HQs greater than 0.1. There were no ESLs for calcium, which was detected and slightly elevated above background.

- **Comparing upper 95th percentile confidence limits (UCL95) as the refined EPC to low effect (LE) ESLs.** There were six analytes that exceeded LE ESLs.

- **Calculating HIs.** The HIs for NE ESL and LE ESL comparisons exceeded 1.

- **Application of site-specific area use factors.** Only plants had HQs above 1 for the area use factor analysis. There were no analytes that exceeded LE ESLs once the areal extent of the Unit was taken into consideration in conjunction with typical home range for ecological receptors. The HIs for plants and earthworms were 2 and 3 respectively for NE ESLs, and less than 1 for LE ESLs. Plants and earthworms are not expected to occur in the Unit due to intended use and presence of bare ground.

- **Avian and mammalian population and tissue data.** There was no indication that bird or mammal populations are being affected. Tissue concentrations were not elevated relative to regional statistical reference levels (RSRLs).

- There is no apparent risk to ecological receptors at the Unit.

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ACRONYMS AND ABBREVIATIONS

AUF	Area Use Factor
BMP	Best Management Practice
BV	Background Value
COPC	Contaminant of Potential Concern
COPEC	Contaminant of Potential Ecological Concern
CCR	Cumulative Cancer Risk
CR	Cancer Risk
CSEM	Conceptual Site Exposure Model
DAF	Dilution Attenuation Factor
EPA	Environmental Protection Agency
EPC	Exposure Point Concentration
ERA	Ecological Risk Assessment
ESL	Ecological Screening Level
ha	Hectare
HHRA	Human Health Risk Assessment
HI	Hazard Index
HMX	Cyclotetramethylene-tetranitramine
HQ	Hazard Quotient
HR	Home Range
LANL	Los Alamos National Laboratory
LD50	Lethal Dose for Half of the Population
LE	Low Effect
LOAEL	Lowest Observed Adverse Effect Level
MDL	Method Detection Limit
MTGW	Migration to Groundwater
NE	No Effect
NMED	New Mexico Environment Department
NMSSL	New Mexico Soil Screening Levels
NOAEL	No Observed Adverse Effect Level
OD	Open Detonation
PAHs	Polynuclear Aromatic Hydrocarbons
PAUF	Population Area Use Factor
RCRA	Resource Conservation and Recovery Act
RfD	Reference Dose
RSL	Regional Screening Level
RSRL	Regional Statistical Reference Levels
SF	Cancer Slope Factor
SL	Screening Level
SVOC	Semi-volatile Organic Compounds
TA	Technical Area
TATB	2,4,6-Triamino-1,3,5-trinitrobenzene
TECi	Toxicity Equivalent Concentration for congener ***i***
TEF	Toxicity Equivalency Factor
TEQ	Toxicity Equivalent Quotient

TCDD	2,3,7,8-Tetrachlorodibenzo-p-dioxin
UCL95	95% Upper Confidence Limit of The Mean
VOC	Volatile Organic Compound
WHO	World Health Organization

1. INTRODUCTION

The area around the open detonation (OD) area near Building 6 at Technical Area (TA) 39 (the TA-39-6 OD Unit) within the Los Alamos National Laboratory (LANL) was sampled as part of the application process for a Resource Conservation and Recovery Act (RCRA) permit to perform hazardous waste treatment operations. The TA-39-6 OD Unit is referred to as “the Unit” in the remainder of this risk assessment.

The Unit is a hazardous waste management unit located in the southern portion of LANL (Figure 1-1). The Unit consists of a relatively flat, sand covered area that measures approximately 40 feet by 40 feet and is located directly to the west of Building 6 (the control building) (Figure 1-2). The Unit has historically been used for experimental, sanitization, and waste treatment OD activities.

Steep canyon walls that rise to heights of 100 feet or higher form a semicircle around the Unit and act to attenuate the force of the detonations. Although the Unit is used to treat both solid and liquid explosive hazardous waste, the primary use of the unit is for nontreatment-related experimental test detonations. The last hazardous waste treatment shot at the site occurred on December 9, 2014. Upgrades to the firing pad at the Unit in recent years include a concrete retaining wall and storm water best management practices (BMPs) that improve fragment capture and minimize runoff from the firing site to the surrounding areas, respectively.

One surface soil sampling event of the top 2 inches of soil and tuff at 12 discrete locations and one duplicate (Figure 1-2) was conducted in and around the Unit on September 27, 2018. Sample collection included soil both in and out of potential run-off areas; however, sample collection did not include rocks, debris, or vegetation. Data from these samples were used to conduct human health and ecological risk assessments to determine whether hazardous contaminants from ongoing treatment operations are being released to soil at levels that pose an unacceptable risk to human health or the environment.

The results of the risk assessments are presented in the following sections.

2. HUMAN HEALTH RISK ASSESSMENT

2.1. CONCEPTUAL SITE MODEL

The primary land use is industrial because only authorized Laboratory workers currently have access to the area around the Unit. Laboratory workers are the primary human receptors, and the industrial scenario is the defining scenario for the human health risk-screening assessment (i.e., the scenario on which decisions are based).

2.1.1. Receptors

Because the site is located within the boundaries of an operational facility (TA-39), the reasonably foreseeable future land use will continue to be industrial. An industrial worker and a construction worker exposure scenario are evaluated. A Hypothetical Future Residential exposure is also assessed and provided for comparison purposes.

2.1.2. Exposure Pathways

The release of contaminants from open detonation operations has potentially occurred for many years. Releases are transported primarily by wind, which rapidly disperses the material in ambient air. Most material is likely deposited close to the source(s), and concentrations are expected to decrease with distance from the source. Exposure to a site worker may occur through various surface soil contact pathways. Potential exposure pathways are:

- Incidental ingestion of surface soil
- Inhalation of fugitive dust or volatiles emanating from surface soil
- Dermal contact with surface soil

Surface water is not considered an exposure pathway. Storm water discharges from the Unit are regulated under the Clean Water Act by the National Pollutant Discharge Elimination System permit program under the LANL Storm Water Individual Permit. The LANL Storm Water Individual Permit contains nonnumeric technology-based effluent limitations, coupled with a comprehensive, coordinated monitoring program and implementation of corrective actions where necessary, to minimize pollutants in LANL's storm water discharges. Grading for runoff and erosion control has been performed in the area of the Unit. In addition, berms and infiltration systems have been installed. In addition, berms and infiltration systems have been installed. This, combined with the distance to the nearest surface water, makes it unlikely that impacts to surface water east of the Unit will occur.

Published precipitation data for TA-39 do not exist; however, TA-49, located west of TA39-6, has an annual precipitation of 22.27 inches per year, as summarized in LANL (2009). The evaporation rate of freestanding water exceeds the average annual precipitation. Hydrologic information for the area north of the Unit is presented in the Pajarito Canyon Investigation Report, Revision 1 (LANL, 2009). Generally, on the Pajarito Plateau, dry canyons have relatively small catchment areas (less than 13 square kilometers), experience infrequent surface flows, and have limited or no saturated alluvial systems. The hydrologic conditions yield little down canyon, near-surface contaminant migration and are characterized by very slow unsaturated water flow from the surface to the regional aquifer. Because surface-water flow is infrequent and shallow alluvial groundwater is not common, contaminants largely remain near their original sources, predominantly in soil and sediment. Net infiltration beneath dry canyons is low, with rates generally believed to be less than tens of mm/yr. and commonly on the order of 1 mm/yr. or less. Finally, transport times to the regional aquifer beneath dry canyons are expected to exceed hundreds of years.

Groundwater in the unit is not utilized for potable purposes. The closest water supply wells into the regional aquifer are over a mile northeast and upgradient with respect to groundwater flow direction. The depth to groundwater is approximately 1000 feet, suggesting percolation to groundwater is unlikely to occur. Furthermore, evapotranspiration exceeds precipitation, resulting in infiltration rates of less than 10 milliliters per year. Migration to groundwater is not indicated as a viable exposure pathway.

2.2. APPROACH FOR IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN

2.2.1. Sampling and Data Analysis

Twelve surface soil samples and one duplicate were collected September 27, 2018. Surface soil samples were collected as grab samples (independent, discrete samples) from a depth of 0 to 2 inches below ground surface. The duplicate pair was point 1 and 1 dup (field sample identification WST39-18-162832 and WST39-18-162973). Each sample set was analyzed for the following:

- Semi-Volatile Organic Compounds (SVOCs)
- Volatile Organic Compounds (VOCs)
- Total Metals
- Dioxins/Furans
- High Explosives

A staged approach was used for the risk assessment. Duplicates were evaluated consistent with the New Mexico Environment Department (NMED) guidance (NMED 2019) which states that in the initial screening assessment the maximum, and not the average, of the duplicate pair must be used. Figure 1-1 shows a map of the site location, and Figure 1-2 shows site features and the current sampling locations from which data were obtained for use in the risk assessment.

2.2.2. Comparison to Background

The background data used in this evaluation is presented in the report "Inorganic and Radionuclide Background Data for Soils, Sediments, and Bandelier Tuff at Los Alamos National Laboratory," (LANL, 1998). The background data are used in the RCRA corrective action process to distinguish between contaminated and uncontaminated media and have been accepted by NMED. As stated in the background report, the background dataset was collected as follows:

> "Twenty-one soil profiles distributed across the Pajarito Plateau were described in the field and were sampled for inorganic chemical analyses. These samples provide information about the varied soils and geomorphic settings that occur on the Pajarito Plateau, allowing for an evaluation of the variability in soil characteristics and chemistry within several of the soil series previously described by Nyhan et al. (1978, 05702). Most sampled soils were collected from mesa tops. Other geomorphic settings sampled include hillslopes and canyon bottoms." (LANL, 1998)

The locations sampled as part of the background study were not impacted by deposition from the historical operation of the OD units or other firing sites. Background values (BVs) were obtained from this document to use in comparison to site data.

An attribution analysis (NMED 2019) was conducted by comparing the inorganic site data BVs. Analytes less than BVs were eliminated from further evaluation. Analytes greater than BVs were evaluated with statistical hypothesis tests to determine whether or not the site data were significantly different from background. No further evaluation is necessary for analytes for which the maximum is less than the BV, and these data are not compared to NMED (2021) risk-based soil screening levels (NMSSLs). Organic analytes are not compared to background values as a matter of standard practice, although there are naturally occurring sources of organic constituents.

2.2.3. Comparison of Maximum Exposure Point Concentrations to NMSSLs

The maximum concentration was used as the maximum exposure point concentration (EPC), which is the environmental concentration to which the receptors are potentially exposed. The screening approach used the maximum of all detected data, including the duplicate pair, for the initial screening evaluation. The maximum concentration of each analyte was divided by its NMED (2021) NMSSL. For the HHRA, this meant using two screening levels (SLs) based on toxicity endpoints, i.e., a cancer and noncancer SL were used to obtain a cancer risk (CR) and noncancer hazard quotient (HQ), respectively.

All analytes that exceeded the NMSSLs were considered to have "failed" the initial screen. These are considered to be contaminants of potential concern (COPCs).

2.2.4. NMSSLs and Surrogates

Where an NMSSL (NMED 2021) was not available, the U.S. Environmental Protection Agency (EPA) Regional Screening Level (RSL) for residential soils was applied as an SL for residential use, and the RSL for industrial commercial soil was used as the SL for industrial and construction workers. Consistent with NMED guidance, EPA cancer-based RSLs were adjusted to a CR level of 1×10^{-5} by multiplying the RSL by 10; noncancer RSLs were based on a HQ of 1. If an RSL was also not available, a suitable surrogate is proposed if physicochemical data suggest identifying a suitable surrogate. Most of the surrogates are proposed for nondetected analytes in order to verify that method detection limits (MDLs) are suitable for performing risk assessment.

NMSSLs were available for all inorganics. The toxicity values for NMED mercuric salts were used for the SL as this is the form expected in arid soils. Per NMED (2019), lead is evaluated with the EPA toxicity values of 400 mg/kg in soil for residents and 800 mg/kg for workers.

The NMED protection from migration to groundwater (MTGW) SLs are used to assess potential migration to groundwater risks assuming human receptors then consume groundwater. Where MTGW SLs are unavailable, surrogates based on EPA RSLs are proposed. In these cases, the EPA RSL for protection of migration to groundwater was used. The EPA RSL for protection of migration to groundwater is based on a dilution attenuation factor (DAF) of 1, whereas the NMED SL-SSL is based on a DAF of 20. For consistency with NMED, the EPA RSL migration to groundwater values were multiplied by a factor of 20.

Surrogates were obtained for the following analytes because NMSSLs were not available; and although most are not detected, the SL is needed to verify that the MDL is adequate for use in the risk assessment:

- 2,4-Diamino-6-nitrotoluene – There is no NMSSL or RSL. Use o-nitrotoluene RSLs, which has both cancer and noncancer RSL values, and the lowest of the nitrotoluene isomer cancer RSLs.
- 2,6-Diamino-4-nitrotoluene – Use o-nitrotoluene RSLs, which has both cancer and noncancer RSL values, and the lowest of the nitrotoluene isomer cancer RSLs.
- 3,5-Dinitroaniline – There is no NMSSL. Use the amino-2,6-dinitrotoluene[4-] RSL as surrogate based on structural similarity.
- Acenaphthylene – There is no NMSSL or RSL. The NMSSLs for acenaphthene were used as a surrogate based on structural similarity.
- Aniline - There is no NMSSL. The RSLs were used as a surrogate.
- Azobenzene - There is no NMSSL. The RSLs were used as a surrogate.
- Benzo(g,h,i)perylene – There is no NMSSL or RSL. The NMSSLs for benzo(a)pyrene were used as a surrogate.
- Benzoic Acid - There is no NMSSL. RSLs were used as a surrogate.
- Benzyl Alcohol- There is no NMSSL. RSLs were used as a surrogate.
- Bis(2-chloroethoxy)methane- There is no NMSSL. RSLs were used as a surrogate.
- Bromobenzene - There is no NMSSL. RSLs were used as a surrogate.
- Bromochloromethane - There is no NMSSL. RSLs were used as a surrogate.
- Bromophenyl-phenylether[4-] – There is no NMSSL or RSL. The RSL for pentabromodiphenyl ether was used.
- Butylbenzene isomers – There are no NMSSLs. The RSLs are used as surrogates.
- Butylbenzylphthalate – There are no NMSSLs. The RSLs are used as surrogates.
- Chloro-3-methylphenol[4-]– There are no NMSSLs. The RSLs are used as surrogates.
- Chloroaniline[4-] – There are no NMSSLs. The RSLs are used as surrogates.
- Chlorophenyl-phenyl[4-] Ether– There is no NMSSL or RSL. No recommendation for a surrogate is made.
- Chlorotoluene[4-] – Use the NMSSLs for the o-chlorotoluene isomer because the RSLs for the two isomers are the same.
- Dibenzofuran – There are no NMSSLs. The RSLs are used as surrogates.

- Dichlorobenzene[1,3-] – There is no NMSSL or RSL. The NMSSLs for 1,4-dichlorobenzene were used as it may be the more toxic isomer considering it has cancer-based as well as noncancer-based endpoints.
- Dichloropropane[2,2-] – There is no NMSSL or RSL. The NMSSLs for 1,2-dichloropropane were used. The RSL is higher for 1,3 than 1,2 dichloropropane, and therefore this is considered conservative.
- Dichloropropane[1,3-] – There is no NMSSL. The NMSSLs for 1,2-dichloropropane were used.
- Dichloropropene[1,1-] – There is no NMSSL or RSL. The NMSSLs for 1,3-dichloropropene were used.
- Dichloropropene[cis-1,3-] – There is no NMSSL or RSL. The NMSSLs for 1,3-dichloropropene were used.
- Dichloropropene[trans-1,3-] – There is no NMSSL or RSL. The NMSSLs for 1,3-dichloropropene were used.
- Dimethyl phthalate– There is no NMSSL or RSL. The NMSSLs for diethyl phthalate were used.
- Dinitrobenzene[1,3-] – There are no NMSSLs. The RSLs are used as surrogates.
- Di-n-octylphthalate – There are no NMSSLs. The RSLs are used as surrogates.
- Diphenylamine – There are no NMSSLs. The RSLs are used as surrogates.
- Hexanone[2] – There are no NMSSLs. The RSLs are used as surrogates.
- Iodomethane – There is no NMSSL or RSL. No recommendation for a surrogate is made.
- 4-Isopropyltoluene – There is no NMSSL. The NMSSL values for toluene were used as a surrogate.
- Methylphenols – There are no NMSSLs for these compounds. The RSLs were applied for 2- and 4-methylphenol. The RSLs for 3-methylphenol were used for 3,4-methylphenol as most conservative option.
- Nitroanilines – There are no NMSSLs for these compounds. The RSLs were applied for 2- and 4-nitroaniline. The RSL for 4-nitroaniline was applied to 3-nitroaniline.
- Nitrophenols – There are no NMSSLs or RSLs for these compounds. The RSLs for phenol were applied for 2- and 4-nitrophenol.
- Nitroso-di-n-propylamine[N-] – There are no NMSSLs. The RSLs were applied.
- PETN - There is no NMSSL for PETN. RSLs were used as a surrogate.
- Propylbenzene[1-] – There are no NMSSLs. The RSLs are used as surrogates.
- Pyridine– There are no NMSSLs. The RSLs are used as surrogates.
- 1,3,5-Trinitrobenzene – There is no NMSSL. RSLs for 1,3,5-trinitrobenzene were used as a surrogate.
- TATB – There is no NMSSL or RSL for TATB. RSLs for 1,3,5-trinitrobenzene were used as a surrogate because of structural similarity.
- Trimethylbenzenes – There are no NMSSLs. The RSLs are used as surrogates.
- Tris (o-cresyl) phosphate – There is no NMSSL or RSL. The RSL for tris(2-ethylhexyl)phosphate was applied as a similar structure without halogen substitutions.

2.2.5. Evaluation of Refined EPCs

A refinement of the EPCs was performed if the HI or the CCR based on maxima exceeded target levels of 1 or $1x10^{-5}$, respectively. The maximum of each duplicate pair was retained prior to calculating an upper 95^{th} percent confidence limit on the mean (UCL95). The UCL95 concentrations were compared to SLs, and any analytes above the SLs are evaluated further.

2.3. SCREENING EVALUATION

The following sections present the human health risk-screening assessment for the Unit.

2.3.1. Data Analysis

The summary statistics and maximum values used as EPCs are presented in Table 2-1.

The EPC based on the maximum concentration for each detected analyte was compared with the industrial and residential soil SLs to obtain a HQ or CR, and the HI was calculated by summing the HQs and the CCR was calculated by summing the CRs (NMED 2019). The chemical SLs used in the evaluations were obtained from current NMED guidance (NMED 2020) or from the most recent RSLs (EPA 2021) if an NMED value was not available.

The NMSSLs for carcinogens are equivalent to a 1×10^{-5} cancer risk, and for noncarcinogens the NMSSLs correlate to a ratio or HQ of 1. The cancer-based EPA RSLs as surrogates were multiplied by 10 to adjust them to a cancer risk level of $1x10^{-5}$, consistent with the NMSSLs. Any detected organic analytes that exceeded the SLs were considered COPCs. Any inorganic analytes that exceeded both background and the SL were also considered COPCs.

The exposure interval for industrial workers is 0–1 ft bgs and for hypothetical future residents and construction workers the exposure interval is 0–10 ft bgs. Since all data fall within the 0–1 ft depth interval, the available data set was used for all receptors.

Antimony, cadmium, selenium, silver, and thallium were not detected in any of the 12 samples and one duplicate. Mercury was detected in 7 samples, and the remaining inorganics were detected in all samples (Table 2-1).

Many of the organics are not detected. Organics that were detected are the energetics or explosives HMX [cyclotetramethylene-tetranitramine] and TATB. SVOCs detected include the polynuclear aromatic hydrocarbons (PAHs) fluoranthene and pyrene, two phthalates (butylbenzyl- and di-n-butylphthalate) and benzoic acid, and the volatile benzyl alcohol was detected (Table 2-1). Five dioxin/furan congeners were detected.

2.3.2. Comparison to Background

The maximum detected result was used as the initial EPC (Table 2-2) and compared to background. Background values for the site are from the 1998 background report (LANL 1998). There were no BVs for perchlorate; however, perchlorate was not detected in any samples. The maximum concentration of the following inorganics exceeded BVs:

- Calcium
- Chromium
- Copper
- Mercury
- Vanadium
- Zinc

Wilcoxon-Mann-Whitney two sample hypothesis tests were performed on these inorganics, with the exception of mercury, for which Gehan’s test was considered more appropriate due to differing detection limits in the site data. The minimum of the duplicate pair was removed from the data prior to statistical analysis. Each inorganic, with the exception of mercury, was statistically significantly higher in the site samples than in the all horizon soils (All H) background dataset. Mercury was not statistically higher in site samples than in background soils; however, due to the low number of detections and because all values for background data were the same, the statistical tests are not robust. Therefore, mercury was also retained for further evaluation. The ProUCL (EPA 2015) output is presented in Attachment A. All six inorganics listed above carry forward for comparison to NMSSLs.

2.3.3. Comparison of Maximum EPCs to NMSSLs

None of the inorganics exceeded the residential, general worker, or construction worker NMSSLs (NMED 2021). There was therefore no elevated cancer risk or noncancer hazard indicated for the Unit for any inorganic. All reporting limits were adequate when compared to risk-based NMSSLs for nondetected inorganics or organics with the exception of nitrosodimethylamine[N-] (Table 2-3), as determined by cancer risks and HQs less than the targets of $1x10^{-5}$ and 1, respectively. There were no rejected (R-qualified) inorganic data in the dataset.

A few organics were detected in the surface soil samples (Table 2-1). These include energetics or explosives (e.g., HMX [cyclotetramethylene-tetranitramine] and TATB). The SVOCs fluoranthene and pyrene were detected in one sample. Phthalates (e.g., butylbenzyl- and di-n-butylphthalate) were also detected (Table 2-1), as were benzyl alcohol and benzoic acid.

No individual detected constituents exceeded NMSSLs (NMED 2020) (Table 2-4). The CCR for the evaluation of maximum detected soil concentrations for cancer-based health effects was $3x10^{-7}$ for hypothetical future residents, $6x10^{-8}$ for general workers, and $8x10^{-9}$ for construction workers (Table 2-4). The noncancer-based sum of the screening level HQs for maximum detected soil concentrations was 0.2 for residents, 0.01 for general workers, and 0.1 for construction workers (Table 2-4).

2.3.4. Lead

Maximum lead concentrations were less than BVs. Lead was not evaluated further.

2.3.5. Dioxin/Furans

The dioxin/furans are organics but are evaluated in the analysis differently than other organics. Dioxins/furans were detected in the surface soil samples (Table 2-5). The detection status is indicated by a zero for nondetect, and a 1 for a detected value.

The evaluation of the dioxin/furans is summarized in Table 2-6. The measured detected concentration or the MDL for nondetects for each congener in each sample is multiplied by the toxicity equivalency factor (TEF) (Table 2-5) to produce the toxicity equivalent concentration (TECi) (Table 2-6). Summing the TECi yields the toxicity equivalent quotient (TEQ). Dividing the maximum TEQ by the residential or industrial NMSSLs (Table 2-7) produces a CR or HQ which for all samples was less than target levels of $1x10^{-5}$ or 1, respectively. Therefore, the dioxins and furans do not exceed risk-based SLs. This maximum TEQ was also used to calculate the HI reported in Table 2-4.

2.3.6. Migration to Groundwater

The maximum concentrations were compared to the groundwater protection MTGW SLs (NMED 2020) (Table 2-8). None of the detected analytes and inorganics greater than background exceeded the groundwater protection SLs. There is no potential impact to groundwater due to analytes detected at the Unit. There are some reporting limits that exceed MTGW SL values.

Given that there is no human health risk due to direct contact exposure pathways, and that groundwater is very deep, groundwater impacts are not indicated.

2.3.7. Data Analysis Conclusions

The risk analysis for all inorganic and organic analytes was based on comparison of the maximum detected value as the EPC. There are no individual constituents that exceed NMED residential, commercial/industrial, or construction worker NMSSLs. The CCR does not exceed $1x10^{-5}$ for any receptor, and the HIs do not exceed a value of one. The screening evaluation indicates that hypothetical future residents, general workers, or construction workers are not at risk due to exposure to soils at the Unit.

2.4. UNCERTAINTY ANALYSIS

The human health risk assessment has inherent uncertainties associated with data and data evaluation, exposure assessment, and the toxicity values on which the SLs are based. Each or all of these uncertainties may affect the assessment results, biasing the risk assessment results high or low.

2.4.1. Data and Data Analysis

Uncertainties in the data or its analysis may include errors in sampling, laboratory analysis, and data analysis. Data evaluation uncertainties are expected to have little effect on the assessment results because the data have undergone validation to minimize errors, and any errors are not expected to bias the results high or low. The J-flagged (estimated) qualification of detected concentrations of some organic COPCs does not affect the assessment. The data represent deposition from more than 60 years of operation into 2019. Therefore, the data and subsequently the screening assessment results represent current baseline conditions.

The use of a judgmental sampling design biases the risk results high since samples were targeted to locations where contamination was most likely to occur or known to occur from past sampling events.

The use of the maximum as the EPC is also expected to bias risk estimates high, erring towards being conservative. Use of the maximum as the EPC overestimates exposure, as by definition all other concentrations are below this value.

2.4.2. Exposure Assessment

The exposure assessment assumptions bias the risk results high (i.e., overestimate risk). The assumptions for the industrial SLs are that the potentially exposed individual is a Laboratory worker who is outside at the Unit for 8 hours per day for 225 days per year (NMED 2019), and who spends the entire 8 hours on-site within the contaminated area. Assumptions for the residential SLs are that the potentially exposed individual is a hypothetical future resident who is present 24 hours per day for 350 days per year (NMED 2019) and spends the entire 24 hours on-site within the contaminated area. Because it is unlikely the worker or resident would be within the Unit for the entire time, the screening assessments overestimate the exposure. As a result, risks may be overestimated.

Assumptions underlying the exposure parameters, routes of exposure, and intake rates for routes of exposure are consistent with NMED parameters and default values (NMED 2019). In the absence of site-specific data, several upper-bound values for the assumptions may be combined to estimate exposure for any one pathway, and the resulting risk estimate can exceed the 99th percentile. Therefore, uncertainties in the assumptions underlying the exposure pathways may contribute to risk assessments that overestimate the reasonably expected risk levels.

2.4.3. Toxicity Values

The primary uncertainty associated with the screening values is related to the derivation of toxicity values used in their calculation. Toxicity values (slope factors [SFs] and reference doses [RfDs]) were used to derive the risk-based screening values used in the screening evaluation (NMED 2019). Uncertainties were identified in four areas with respect to the toxicity values: (1) extrapolation from animals to humans, (2) variability between individuals in the human population, (3) the derivation of RfDs and SFs, and (4) the chemical form of the COPC.

The SFs and RfDs are often determined by extrapolation from animal data to humans, which may result in uncertainties in toxicity values because differences exist between animals and humans in chemical absorption, metabolism, excretion, and toxic responses. Differences in body weight, surface area, and pharmacokinetic relationships between animals and humans are taken into account to address these uncertainties in the dose-response relationship. However, conservatism is usually incorporated in each of these steps, potentially biasing the estimate high and resulting in the overestimation of potential risk.

For noncarcinogenic effects, the degree of variability in human physical characteristics is important both in determining the risks that can be expected at low exposures and in defining the no observed adverse effect level (NOAEL). The NOAEL uncertainty factor approach incorporates a 10-fold factor to reflect individual variability within the human population that can contribute to uncertainty in the risk assessment. This factor of 10 is generally considered to result in a conservative estimate of risk for noncarcinogenic COPCs.

The RfDs and SFs for different chemicals are derived from experiments conducted by different laboratories that may have different accuracy and precision that could lead to an over- or underestimation of risk. The uncertainty associated with the toxicity factors for noncarcinogens is measured by the uncertainty factor, the modifying factor, and the confidence level. For carcinogens, the weight of evidence classification indicates the likelihood that a contaminant is a human carcinogen.

COPCs may be bound to the environmental matrix and not be available for absorption into the human body following ingestion. However, the exposure scenarios typically default to the assumption that the COPCs are bioavailable. This assumption can lead to an overestimation of the total exposure and overestimate risk.

2.4.4. Additive Approach

For noncarcinogens, the effects of exposure to multiple chemicals are generally unknown and possible interactions could be synergistic or antagonistic, resulting in either an underestimation or overestimation of the potential risk by assuming additivity. Additionally, RfDs used in the risk calculations typically are not based on the same endpoints with respect to severity, effects, or target organs. Therefore, the potential for noncarcinogenic effects may be overestimated by the HI considering individual COPCs act by different mechanisms and on different target organs but are addressed additively. Cancer risks are typically assumed to be additive.

2.5. CONCLUSIONS

Inorganics were compared to BVs and risk-based SLs. Six inorganics equaled or exceeded background. No inorganics exceeded risk-based SLs. The cancer risks were less than $1x10^{-5}$ and noncancer screening level HQs than 1 for inorganics for workers or hypothetical residents.

Organics were compared to risk-based SLs. There were a few organics detected, including some energetics, some SVOCs, and dioxin/furans. However, maximum concentrations of any of the detected analytes were below SLs for all constituents. The maximum TEQ for dioxin/furans did not exceed the TCDD SL. The Unit does not present an elevated cancer risk or noncancer hazard to human health due to exposure to soils. The following interpretation can be made from the analysis:

- For the hypothetical future residential scenario, inorganics above background, and maximum detected concentrations for each analyte, the noncancer HI (0.2) is less than the NMED target level of 1. The CCR of $3x10^{-7}$ is also below the NMED target level of $1x10^{-5}$.

- Based on an industrial scenario, inorganics above background, and maximum detected concentrations for each analyte, the noncancer HIs (0.01) and CCRs ($6x10^{-8}$) are less than the NMED target levels of 1 and $1x10^{-5}$, respectively.

- For the construction worker scenario, inorganics above background, and maximum detected concentrations for each analyte, the noncancer HI (0.1) is less than the NMED target level of 1. The CCR of $8x10^{-9}$ is also below the NMED target level of $1x10^{-5}$.

- The concentration of each dioxin/furan congener was summed to obtain a TEQ which was compared to the NMED NMSSL for TCDD. Cancer risk and HQs for each receptor were below target levels.

- Summing the maximum dioxin/furan ratio with the other cancer risks and HIs provides a CCR of $3x10^{-7}$ and a total HI of 0.2 for residential use, a CCR of $6x10^{-8}$ and a total HI of 0.01 for commercial/industrial use, and a CCR of $8x10^{-9}$ and a total HI of 0.1 for construction workers.

- The maximum lead concentration of 15.6 mg/kg is less than the background value of 22.3 mg/kg and is much less than the residential SL (400 mg/kg).

- There are no elevated human health risks for exposure to soils based on this evaluation.

- There are no potential impacts to groundwater based on comparison of maximum concentrations of detected analytes including those inorganics above background to NMED MTGW SLs.

3. ECOLOGICAL SCREENING ASSESSMENT

3.1. INTRODUCTION

The ecological risk assessment (ERA) for the Unit is presented in the following sections. The ecological risk-screening evaluation identifies chemicals of potential ecological concern (COPECs) and is based on the comparison of EPCs with Ecological Screening Levels (ESLs) in accordance with Laboratory guidance (LANL 2012a) and NMED (2017) guidance. Site information including ESLs, biological studies, and historical information were reviewed and a site visit was conducted. A preliminary conceptual site exposure model (CSEM) was prepared.

The ESLs obtained from the ECORISK Database, Version 4.2 (LANL 2017; LANL 2020) for detected chemicals and inorganics above background are presented in Table 3-1. The ESLs are based on toxicity data for laboratory species similar to those expected to occur at the site, and are derived from experimentally determined NOAELs, lowest observed adverse effect levels (LOAELs), or doses determined to be lethal to 50% of the test population (LD50s). Information relevant to the calculation of ESLs, including concentration equations, dose equations, bioconcentration factors, transfer factors, and toxicity reference values, are presented in the ECORISK Database, Versions 2.0, 3.1, 4.1, and 4.2 (LANL 2003; LANL 2012b; LANL 2017; LANL 2019; LANL 2020).

The screening evaluation is conducted by dividing the EPCs by the ESLs to obtain a HQ calculated for each COPEC and screening receptor. As a generalization, the higher the contaminant levels relative to the ESLs, the higher the potential risk to receptors; conversely, the higher the ESLs relative to the contaminant levels, the lower the potential risk to receptors. HQs greater than 0.1 are used to identify COPECs requiring additional evaluation.

Individual HQs for a receptor are summed to derive a HI. An HI greater than 1 indicates that further assessment may be needed to ensure exposure to multiple COPECs at a site will not lead to potential adverse impacts to a given receptor population. The HQ and HI analyses provide a conservative indication of potential adverse effects and are designed to minimize the potential of overlooking possible COPECs at the site.

3.2. PROBLEM FORMULATION AND CONCEPTUAL SITE EXPOSURE MODEL

The Unit is a terrestrial ecosystem. The area is disturbed with little to no vegetation present. Vegetation increases with distance from the OD area and consists of grasses and shrubs. There are likely terrestrial birds and small mammals including deer mice (*Peromyscus maniculatus*) or ground squirrels using the area, although intermittently due to the lack of food or cover. There is not enough vegetation within the Unit to support large herbivores.

Due to the site history, there is the potential for energetic compounds or their breakdown products to be present in surface soils. Terrestrial animals and plants may contact surface soils and be exposed. This possibility led to the collection of data and ecological risk assessment.

3.2.1. Data Summary

Soil samples used in this analysis were collected in September 2018. Surface soil samples were collected as grab samples (independent, discrete samples) from a depth of 0 - 2 inches below ground surface. Each sample set was analyzed for the following:

- VOCs –12 samples and one duplicate
- SVOCs –12 samples and one duplicate
- Total Metals –12 samples and one duplicate
- Dioxins/Furans –12 samples and one duplicate
- High Explosives –12 samples and one duplicate

Some organics were analyzed by more than one method, resulting in an apparently higher sample count (i.e., 2,4 and 2,6 dinitrotoluene, nitrobenzene, dichlorobenzenes). Figure 1-2 shows a map of the site including the current sampling locations from which data were obtained for use in the risk assessment, and habitat in the immediate site vicinity is also shown in Figure 1-2.

3.2.2. Receptors and Pathways

Exposure pathways are considered complete if all of the following components are present (EPA, 1989; NMED, 2017):

- A source and mechanism for hazardous waste/constituent release into the environment;

- An environmental transport medium or mechanism;

- A point of contact directly between the receptor and site-related contaminated media, or indirectly via dietary ingestion of prey or forage items contaminated by contact with site related contaminants; and

- An exposure route leading to interaction of the contaminant with target organs within the receptor.

If any of the above components are missing from the exposure pathway, it is not a complete pathway for the site.

The primary potentially complete ecological exposure pathways are based on direct or indirect contact with surface soils. These include root uptake, incidental ingestion of soil, and biotic uptake leading to food-web transport. Exposure of plants and soil invertebrates is not related to dietary pathways but is the result of direct contact with, and uptake from, the surrounding medium. For terrestrial wildlife, most exposure is through the oral pathway from the diet and incidental ingestion of soil (Sample et al. 1998). The dermal contact and inhalation pathways are not typically assessed quantitatively in ecological risk assessments, based on guidance indicating the ingestion route is most important to terrestrial animals (EPA 1997; EPA 2003). Dermal exposure to wildlife is mitigated by the fur or feathers covering the bodies of most vertebrates and the incidental consumption of soil during grooming is included in the direct soil ingestion estimates.

Although inhalation is recognized to occur, it is typically considered insignificant relative to ingestion and only quantified for burrowing animals where volatile organics are present in the subsurface. Respirable dust particles are most likely ingested rather than inhaled, and this pathway is considered negligible (EPA 1997; EPA 2003), while non-respirable dust is ingested and accounted for in incidental soil ingestion values for wildlife species (EPA 1993; EPA 2003). Therefore, the exposure pathways considered in the development of the ESLs used in the risk-screening assessment capture the primary exposure for wildlife receptors.

A CSEM was developed for the site (Figure 3-1) showing the major receptor categories. The primary contaminant source is the testing of explosives and detonation of explosives for waste management at the site. Any uncombusted material, if present, could remain in soil or be released to air as fugitive dust. Materials in surface soil could potentially be carried by overland flow or percolate into the subsurface with rain, whereas material in air could be transported by wind. Receptors could contact contaminants within the immediate site area, up to the site boundary, or slightly beyond. The use of stormwater BMPs reduces the potential for migration beyond the Unit.

Terrestrial flora (i.e., plants) and fauna (e.g., invertebrates, birds, and mammals) are the general categories of ecological receptors that could be exposed. There are multiple avian and mammalian receptors evaluated in this ERA (Table 3-1). All receptors are evaluated if habitat is suitable. Habitat for the montane shrew (i.e., riparian areas) is not present, and this receptor is not evaluated.

3.2.3. Technical Decision Point and Recommendations

Because of the ecological habitat near the Unit boundaries, and because of the potential for exposure, the data were used to perform a quantitative screening level ecological evaluation.

3.3. SCREENING EVALUATION

The summary statistics for the data were presented in Table 2-1. Maximum detected concentrations of each analyte are used as the initial EPC. The EPCs and the screening results for the ecological screening assessment are presented in Table 3-2. Any analytes for which the measured maximum detected value exceeded the no effect (NE) ESL were considered COPECs and were evaluated further by calculating UCL95s and comparing the UCL95s to the LE ESLs (Table 3-3). The approach was as follows:

- An attribution analysis (NMED 2019) was conducted by comparing the inorganic site data to BVs. Analytes less than BVs were eliminated from further evaluation.

- The screening approach then used the maximum of all detected data for the initial screening evaluation. The maximum concentration of each analyte was divided by the NE ESL for each of the receptors.

- All analytes that exceeded the NE ESLs were considered to have “failed” the initial screen. These are considered to be COPECs.

- A refinement of the EPCs was performed. The maximum of each duplicate pair was retained prior to calculating a UCL95. The UCL95 concentrations were compared to LE ESLs, and any analytes above the LE ESLs are evaluated further with population area use factors (PAUFs).

3.3.1. Inorganics

There are two inorganics that exceed site BVs by a factor of 2 or more, and four that are slightly above background. All six inorganics exceeded background based on hypothesis tests. The maximum concentration of each of these was compared to the minimum no effect (NE) ESL, if one was available, to determine if the resulting HQ >0.1. The analytes that exceed ecological SLs are as follows (Table 3-1):

- Calcium – no ESLs, and only 1.2 times above BV. There were no adverse human health effects. Not evaluated further due to lack of ESLs and likelihood of low toxicity.
- Chromium – exceeds NE ESLs
- Copper – exceeds NE ESLs
- Mercury – exceeds NE ESLs
- Vanadium - exceeds NE ESLs
- Zinc– exceeds NE ESLs

If the maximum exceeded the BV and the ratio of the maximum to the risk-based SL was greater than 0.1, a UCL95 was calculated with the USEPA ProUCL 5.1.002 software (EPA 2015). This UCL95 was then compared to the LE ESLs (Table 3-3) consistent with the NMED (2017) Tier II approach. Note that comparison to the UCL95s was made prior to incorporating area use factors (AUFs) or PAUFs into the analysis. Receptor-specific dietary composition is built into the receptor-specific ESLs. The maximum concentration for each of the samples in the duplicate pair 1 and 1 dup (Figure 1-2) were retained and the minimum removed from the analysis, and the UCL95 calculated with a sample size of 12.

UCL95 values for chromium, copper, mercury, vanadium, and zinc exceeded the LE ESL with UCL95/ESL ratios above 0.1. This suggests some limited potential for adverse ecological effects at the Unit, and therefore the COPECs producing HQs above 1 are evaluated in more detail in the uncertainty analysis.

3.3.2. Dioxin and Furans

Dioxins and furans are evaluated in a multi-step process that takes the concentration of each congener in each sample and multiplies it by a TEF for mammals or birds (Table 3-4). The resulting TECi values (Table 3-5, Table 3-6) are summed to obtain TEQs for mammals and birds.

The maximum TEQ is divided by the mammalian and other receptor NE ESLs for species that could occur in the Unit (Table 3-2). Due to lack of its preferred riparian habitat and lack of dense cover, the montane shrew is not expected to occur. All other terrestrial receptors were retained for evaluation.

Dioxin and furans were detected in multiple samples in the September 2018 data set. The TEFs for birds and mammals were applied to calculate a mammal and bird TEQ for each sample. The HQ for the maximum TCDD TEQ exceeded 0.1 for avian species, deer mouse, and mountain cottontail. There was no ESL for plants. The TEQs were used to estimate a refined EPC with ProUCL (EPA 2015) based on the UCL95 statistic.

The potential for risk was then investigated further. There is no LE ESL for birds, and further ecological risk to avian species cannot be quantified. The HQ for deer mouse exceeds 0.1 (Table 3-3). The dioxin/furans are further evaluated in the Uncertainty Analysis (Section 3.4.3).

3.3.3. Other Organics

For this risk assessment, the highest concentration found, regardless of the method used, or whether the sample was a primary sample or a duplicate, was used as the basis of the EPC in the initial screening-level assessment. This is considered conservative for the evaluation of potential risks.

Organic analytes are not compared to any background values, although there are naturally occurring sources of organic constituents. Organics are compared to risk-based ESLs.

Maximum concentrations of four organics exceeded one or more ESLs (Table 3-2). These were benzoic acid, di-n-butylphthalate, HMX, and TATB. UCL95 values were calculated and compared to the LE ESLs (Table 3-3), and the refined EPCs were less than ESLs. The other organics do not contribute significantly to the HI.

There was only one detection of benzoic acid, fluoranthene, and pyrene, two detections of butylbenzylphthalate, and four detections of di-n-butylphthalate once duplicates are removed. The low detection frequency means that a robust UCL95 cannot be calculated for these organics. Therefore, a median of the detected concentrations and the reported detection limit values was calculated and used as the estimate of the EPC. This approach is consistent with ProUCL guidance (EPA 2015) that recommends use of alternative statistics when detection frequency is low.

3.4. UNCERTAINTY ANALYSIS

3.4.1. Chemical Form

Inorganic analytes can speciate into different forms with varying degrees of toxicity. The assumptions used in the ESL derivations are conservative and not necessarily representative of actual conditions. These assumptions include maximum chemical bioavailability, maximum receptor ingestion rates, minimum bodyweight, and additive effects of multiple COPECs. These factors tend to result in conservative ESL estimates, which may lead to an overestimation of the potential risk. Toxicological data are typically based on the most toxic and bioavailable chemical species, which may or may not be found in the environment. The ESLs were calculated to ensure a conservative indication of potential risk (LANL 2012a), and the values are biased toward overestimating the potential risk to receptors.

The chemical form of the individual COPECs was not determined as part of the investigation. COPECs may undergo natural processes, such as the adsorption of chemical constituents to matrix surfaces (e.g., soil) or rapid oxidation or reduction changes that render harmful chemical forms less available to biotic processes.

3.4.2. Reporting Limits

The evaluation was focused on detected values. Reporting limits were adequate (i.e., below ESLs) for all nondetected analytes with several exceptions, indicating that the data were adequate for use in the risk assessment:

Bis(2-ethylhexyl)phthalate –

- This analyte was not detected in any sample. Reporting limits were less than the cancer or noncancer based NMSSL for residents or workers.
- The maximum MDL (0.0101 mg/kg) produced an HQ of 2 for robin modeled as an insectivore.
- The maximum nondetected value was flagged as having blank contamination and may be biased high.
- This analyte is not considered further. This is not expected to bias the risk assessment results high or low.

Dinitrobenzene[1,3-] –

- This analyte was not detected in any sample. Reporting limits were less than the cancer or noncancer based NMSSL for residents or workers.
- The maximum reporting limit (0.15 mg/kg) was two times higher than the minimum NE ESL. All reporting limits were similar. The maximum HQ was 2 for robin modeled as an herbivore.
- This analyte is not considered further. This is not expected to bias the risk assessment results high or low.

Thallium -

- This analyte was not detected in any sample. Reporting limits were less than the cancer or noncancer based NMSSL for residents or workers.
- The highest HQ was 2. This was for plants.
- This analyte is not considered further. This is not expected to bias the risk assessment results high or low.
- This analyte is not considered further. This is not expected to bias the risk assessment results high or low.

3.4.3. Exposure Parameters and Risk Estimates

Exposure parameters including the EPC and the intakes likely bias risk estimates high because they presume no movement of receptors in and out of source areas. Sampling focused on areas of known or expected contamination, which biases the EPC high. Receptors are assumed to spend 100% of their time in the contaminated area which results in conservative estimates of exposure.

Another source of uncertainty is inherent in the calculation of exposure and risk estimates. Although the toxicity values are expressed to more than one significant figure, it is unlikely that the toxicity data are this accurate, especially given that the data are extrapolated from laboratory animal studies to wildlife receptors that are mobile in the environment. Likewise, given all the variables inherent in assessing exposure, exposure intakes by ecological receptors also should not be considered more accurate than one significant figure. This means that an HQ identified as 0.95 or 1.2 is actually 1, and an HQ identified as 1.5 is actually 2.

Calculating risk for dioxins is a multi-step process that involves multiplying the measured concentration by a TEF to obtain a value called the TECi that when summed adjusts the measured congener concentrations to that relative to TCDD, where the sum of all TECi is called the TEQ. ProUCL (EPA 2015) accommodates both detected and nondetected results, reducing bias and uncertainty by not ignoring the influence of nondetects on the EPC. Therefore, TEQs were calculated for each sample, then UCL95 was calculated from all the TEQs. This procedure of calculating UCL95s was considered to be slightly more accurate and similar to how sample data are used to estimate UCL95 values for other analytes.

3.4.4. Mixture Toxicity

The assumption of additive effects for multiple COPECs may result in an over- or under-estimation of the potential risk to receptors. Calculating the HI assumes additivity with respect to toxicity. Exposure to multiple contaminants may result in other than additive effects. Conservative assumptions made with regards to EPCs would tend to overestimate exposure to any given constituent, and this would suggest that the toxicity of multiple constituents would not be underestimated. Therefore, mixture toxicity is not likely to bias the risk results high or low.

3.4.5. COPECs without ESLs

ESLs were not available for the cations and anions generally regarded as nutrients such as calcium, magnesium, nitrate, potassium, and sodium. ESLs were also not available for iron, but human health risk ratios for residents were 0.4 or lower. Only calcium was above background levels established for the site with a ratio of site maximum to background of 1.2. There is no human health risk or hazard for calcium. Lack of ESLs for these inorganics is not expected to underestimate risk at the site.

Several organic chemicals do not have ESLs for any receptor in release 4.2 of the ECORISK Database (LANL 2020). Predominantly, the constituents lacking ESLs are nondetected organics. In the absence of a chemical-specific ESL, concentrations can be compared with the ESLs for a surrogate chemical, if available. Comparison to surrogate ESLs can provide an estimate of potential effects of a chemically related compound and a line of evidence to indicate the likelihood that ecological receptors are potentially impacted. Some chemicals without ESLs do not have chemical-specific toxicity data or surrogate chemicals to be used in the screening assessments and cannot be assessed quantitatively for potential ecological risk.

The chemical TATB was detected in six samples. TATB did not have any ESLs for use in the evaluation. The toxicity values for 1,3,5-trinitrobenzene for mammals and invertebrates were used as a surrogate based on structural similarity. There were no avian surrogates available.

Chemicals lacking ESLs are often infrequently detected across the site. In these cases, comparisons with human health SLs are presented as part of a qualitative assessment, if human health SLs are available. The comparison of concentrations to human health SLs is a viable alternative for several reasons. Animal studies are used as the basis of toxicity values for human health risk assessments and are the basic premise of modern toxicology (EPA 1989). In addition, toxicity values derived for the calculation of human health SLs (e.g., histopathology or biochemical changes) may be based on potential adverse effects more sensitive than the ones typically used to derive ESLs (e.g., survival, growth, or reproductive effects). EPA also applies uncertainty factors or modifying factors to ensure the toxicity values are protective (i.e., toxicity values are divided by uncertainty factors resulting in values much lower than initial study results).

Since there were no predicted adverse effects on human health, chemicals lacking ESLs are unlikely to pose an ecological risk.

3.4.6. Small-Mammal Field Investigations

Small mammal trapping and analysis of whole organisms were conducted in the area around the Unit in August and September 2010 to evaluate small mammal abundance and occurrence relative to background. Small-mammal community and population parameters were also measured across the site (Bennett and Robinson 2011). This information was considered useful for the current analysis as an additional line of evidence. Field mice were collected around the site and analyzed for dioxins and furans as well as metals, and for polychlorinated biphenyls (PCBs) (Fresquez 2011).

Small mammals that could occur at the Unit are the deer mouse (*Peromyscus maniculatus*), brush mouse (*Peromyscus boylii*), pinyon mouse (*Peromyscus truei*), silky pocket mouse (*Perognathus flavescens*), western harvest mouse (*Reithrodontomys megalotis*), white-throated woodrat (*Neotoma albigula*), and the Mexican woodrat (*Neotoma 16exicana*) (Bennett and Robinson 2011). The Unit is located at the bottom of Ancho Canyon. The vegetation community consists of piñon (*Pinus edulis Engelm.*)-juniper (*Juniperus monosperma [Englem.] Sarg.*) with scattered ponderosa pine (*Pinus ponderosa C. Lawson*) and gambel oak (*Quercus gambelii Nutt.*) (Bennett and Robinson 2011).

The capture rate was higher at the Unit relative to the control area, but the Unit exhibited lower diversity and lower eveness. There were five species captured, including the rock pocket mouse (*Chaetodipus intermedius*) which had never been caught at LANL before. In addition, Mexican woodrats, deer mice, harvest mice, and brush mice were collected. There were no differences in deer mouse sex ratios or body weight between the Unit and the control area. The authors of the study concluded that there was no apparent adverse effects on small mammal populations at the Unit relative to controls.

Radionuclides and chemical concentrations in biota were compared to regional statistical reference levels (RSRLs). RSRLs represent natural and fallout levels and are the upper-level background concentrations (mean plus three standard deviations = 99% confidence level) for radionuclides and chemicals calculated from biota that was collected from regional locations away from the influence of the Laboratory (over nine miles away) (Fresquez 2011). The only analytes that exceeded RSRLs were barium (two out of three samples) and lead (three out of three samples). Barium and lead soil concentrations were below BVs in the current data set. Dioxins/furans and explosives were not detected. These data suggest that there are no impacts to small mammal populations at the Unit.

3.4.7. Avian Field Investigations

One western bluebird (*Sialia 17exicana*) and one ash-throated flycatcher (*Myiarchus cinerascens*) egg sample were obtained in 2018 from the Unit and analyzed for inorganic elements (Gaukler and Stanek 2019). Concentrations of inorganic elements were compared with the upper-level bounds of background concentrations in bird eggs as represented by the RSRL. The data indicated aluminum, antimony, arsenic, beryllium, cadmium, chromium, lead, nickel, silver, thallium, or vanadium were not detected in eggs (Gaukler and Stanec 2019). Barium, cobalt, and zinc were detected, but were below the RSRL.

Calcium, copper, iron, magnesium, manganese, mercury, potassium, selenium and sodium, were detected in bluebird eggs above the RSRL for avian eggs. Whereas mercury and selenium egg concentrations were below LOAELs, no benchmarks were available for copper, iron, or manganese (Gaukler and Stanek 2019). The other inorganics are considered macronutrients. Most of these inorganics above RSRLs in eggs were either not detected in soils or were detected with maximum soil concentrations below soil BVs. Only copper, mercury, and vanadium soil UCL95 EPCs exceeded NE ESLs, and copper and vanadium soil UCL95s exceeded LE ESLs. In the current data set analyzed for this report, none of the UCL95 EPCs for soil for the detected inorganics above BVs were above NE ESLs once area use factors were incorporated into the analysis. One sample consisting of four western bluebird eggs was collected in 2019, and no detected analytes were above the RSRLs (Gaukler and Stanek 2020).

Avian population metrics also do not suggest that birds in the vicinity are being negatively impacted (Hathcock et al. 2018). The avian population transect at the Unit was in a canyon bottom, whereas the control areas were on mesa tops. This could lead to differences in species identified and population metrics between the Unit and control areas. Species diversity was significantly higher at the Unit in 2013, 2014, and 2016 than at the control areas. Abundance varied in the Unit and control areas annually, but abundance in the Unit compared to controls was similar over time. Combined, the egg concentration data and population metrics suggest that adverse health effects are not expected at the observed concentrations.

3.4.8. Area Use Factors

The Unit is very small with an aerial extent of 40 by 40 feet (0.037 acres or 0.015 hectares (ha)). This is less than the size of the home range (HR) of an individual robin or a deer mouse as shown in Table 3-7. The HR is used to calculate AUFs that are used in the EcoPRG equations (LANL 2017). Individual AUFs and PAUFs may be used to modify the estimate of risk to wildlife receptors to allow estimates to be more site-specific. The application of AUFs or PAUFs reduces potential overestimation of risks for those receptors with HRs larger than the area of contamination being evaluated. The estimated ecological risk as indicated by the HQ or HI is multiplied by the AUF or PAUF. HQs for plants or invertebrates are not adjusted by AUFs or PAUFs.

Table 3-7 presents the area use hazard analysis based on NE ESLs. The NE ESLs for each COPC that failed the screening evaluation (i.e., because EPCs exceeded the SLs) are shown for each receptor. The site specific AUF and PAUFs are shown for an area equivalent to the Unit. The UCL95 EPC is divided by the ESL and multiplied by the PAUF to obtain revised HQs. The habitat is not suitable for Mexican Spotted Owls or other special status species, and so an AUF evaluation was not conducted.

There were no HQs above 1, or even above 0.1, for birds or mammals based on comparison of UCL95 values as the EPC to the NE ESLs for each receptor (Table 3-7) when PAUFs were accounted for. The HQ for copper for plants was 2. The HI for earthworms and plants are 3 and 2, respectively.

Table 3-8 presents the area use hazard analysis based on comparison of the UCL95 values as the EPC to the LE ESLs for each receptor. There are no HQs or HIs above 1.

3.5. CONCLUSIONS

The ecological risk assessment used a tiered approach for determining if the Unit would present an ecological risk. The results of the initial and highly conservative screening step indicated several inorganics occurring above background concentrations, and several detected organics, would present an ecological risk. Maximum concentrations of six detected inorganics exceeded background (calcium, chromium, copper, mercury, vanadium, and zinc). There is no ESL for calcium, but there was no human health risk. Maximum concentrations of other inorganics exceeded NE ESLs.

Dioxin/furans, some polynuclear aromatic hydrocarbons (PAHs), phthalates, benzoic acid, benzyl alcohol, volatile organics, and two explosives were detected in the unit. Of the detected organics, only four (benzoic acid, di-n-butylphthalate, HMX, and TATB) exceeded ESLs in the initial screening level evaluation which compared maximum detected values to the NE ESLs. There were HQs above 1 for TCDD.

Further evaluation by statistically estimating UCL95's to use as EPCs in soil suggested organics would occur at concentrations hazardous to ecological receptors. Use of the UCL95 as the EPC provides a conservative estimate of average exposure across the Unit. Inorganics exceeded the LE ESLs. None of the UCL95's for organics exceeded ESLs.

Additional consideration of site ecology and receptor-specific adjustments to exposure by considering home range and site area further reduced the analytes exceeding NE ESLs. Only HQs for copper exceeded 1. This was for plants for which the area use evaluation is not relevant as they are immobile in the environment. However, the Unit is not vegetated because of its designated use as an OD area, and so plants have marginal habitat in the Unit. The LE ESLs are not exceeded for any receptor based on a LE ESL hazard analysis.

The results of the ERA indicate that the Unit does not present a significant ecological risk to any receptor evaluated.

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TABLES

Table 2-1. Summary Statistics for Fall 2018 Data

Analyte Name	n	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	SD (mg/kg)	Minimum MDL (mg/kg)	Maximum MDL (mg/kg)	Number of Detects
INORGANICS								
Aluminum	13	1.76E+03	5.28E+03	3.90E+03	8.48E+02	6.24E+00	6.82E+00	13
Antimony	13	3.07E-01	3.24E+00	1.82E+00	1.45E+00	3.07E-01	3.24E+00	0
Arsenic	13	3.65E-01	1.28E+00	8.13E-01	2.07E-01	3.10E-01	3.36E-01	13
Barium	13	1.68E+01	8.86E+01	4.29E+01	1.75E+01	9.17E-02	1.00E-01	13
Beryllium	13	1.43E-01	2.32E-01	1.90E-01	2.68E-02	1.83E-02	1.99E-02	13
Cadmium	13	9.17E-02	1.00E-01	9.52E-02	2.23E-03	9.17E-02	1.00E-01	0
Calcium	13	5.88E+02	7.16E+03	4.67E+03	1.76E+03	7.34E+00	8.02E+00	13
Chromium	13	3.22E+00	4.79E+01	1.64E+01	1.18E+01	1.38E-01	1.50E-01	13
Cobalt	13	2.25E+00	8.95E+00	5.59E+00	1.85E+00	1.38E-01	1.50E-01	13
Copper	13	4.92E+00	1.74E+02	5.78E+01	5.23E+01	2.75E-01	3.01E-01	13
Iron	13	9.03E+03	2.14E+04	1.49E+04	3.77E+03	7.34E+00	8.02E+00	13
Lead	13	5.83E+00	1.56E+01	8.98E+00	2.88E+00	3.03E-01	3.31E-01	13
Magnesium	13	3.75E+02	3.74E+03	2.40E+03	8.21E+02	7.80E+00	8.52E+00	13
Manganese	13	1.47E+02	2.81E+02	2.14E+02	3.80E+01	1.83E-01	2.01E-01	13
Mercury	13	3.55E-03	1.31E-01	3.37E-02	4.50E-02	3.48E-03	3.93E-03	7
Nickel	13	1.27E+00	1.38E+01	8.19E+00	2.94E+00	9.17E-02	9.95E-02	13
Perchlorate	13	4.86E-04	5.04E-04	4.94E-04	5.39E-06	4.86E-04	5.04E-04	0
Potassium	13	3.74E+02	8.12E+02	6.21E+02	1.18E+02	5.87E+00	6.42E+00	13
Selenium	13	3.30E-01	3.58E-01	3.46E-01	9.48E-03	3.30E-01	3.58E-01	0
Silver	13	1.67E-01	6.85E-01	3.77E-01	1.65E-01	9.17E-02	1.00E-01	0
Sodium	13	1.28E+02	3.99E+02	2.76E+02	6.65E+01	6.42E+00	7.02E+00	13
Thallium	13	1.28E-01	1.39E-01	1.34E-01	3.84E-03	1.28E-01	1.39E-01	0
Vanadium	13	1.14E+01	4.83E+01	3.17E+01	1.10E+01	9.17E-02	1.00E-01	13
Zinc	13	2.44E+01	6.25E+01	3.89E+01	1.15E+01	3.67E-01	4.01E-01	13
ORGANICS								
2,4-Diamino-6-nitrotoluene	13	4.93E-01	5.00E-01	4.97E-01	2.94E-03	4.93E-01	5.00E-01	0
2,6-Diamino-4-nitrotoluene	13	6.50E-01	6.60E-01	6.56E-01	4.17E-03	6.50E-01	6.60E-01	0
3,5-Dinitroaniline	13	2.96E-01	3.00E-01	2.98E-01	1.71E-03	2.96E-01	3.00E-01	0
Acenaphthene	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0
Acenaphthylene	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0
Acetone	13	1.64E-03	1.68E-03	1.66E-03	1.80E-05	1.64E-03	1.68E-03	0
Amino-2,6-dinitrotoluene[4-]	13	1.48E-01	1.50E-01	1.49E-01	8.01E-04	1.48E-01	1.50E-01	0
Amino-4,6-dinitrotoluene[2-]	13	1.48E-01	1.50E-01	1.49E-01	8.01E-04	1.48E-01	1.50E-01	0
Aniline	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Anthracene	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0
Azobenzene	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Benzene	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Benzo(a)anthracene	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0
Benzo(a)pyrene	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0

Table 2-1. Summary Statistics for Fall 2018 Data

Analyte Name	n	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	SD (mg/kg)	Minimum MDL (mg/kg)	Maximum MDL (mg/kg)	Number of Detects
Benzo(b)fluoranthene	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0
Benzo(g,h,i)perylene	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0
Benzo(k)fluoranthene	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0
Benzoic Acid	13	1.67E-01	4.83E-01	1.92E-01	8.75E-02	1.67E-01	1.68E-01	1
Benzyl Alcohol	13	1.00E-01	1.65E+00	3.93E-01	4.81E-01	1.00E-01	1.01E-01	7
Bis(2-chloroethoxy)methane	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Bis(2-chloroethyl)ether	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Bis(2-ethylhexyl)phthalate	13	1.00E-02	3.05E-02	1.23E-02	5.70E-03	1.00E-02	1.01E-02	0
Bromobenzene	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Bromochloromethane	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Bromodichloromethane	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Bromoform	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Bromomethane	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Bromophenyl-phenylether[4-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Butanone[2-]	13	1.64E-03	1.68E-03	1.66E-03	1.80E-05	1.64E-03	1.68E-03	0
Butylbenzene[n-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Butylbenzene[sec-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Butylbenzene[tert-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Butylbenzylphthalate	13	1.00E-02	6.35E-02	1.59E-02	1.56E-02	1.00E-02	1.01E-02	2
Carbon Disulfide	13	1.64E-03	1.68E-03	1.66E-03	1.80E-05	1.64E-03	1.68E-03	0
Carbon Tetrachloride	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Chloro-3-methylphenol[4-]	13	1.34E-01	1.34E-01	1.34E-01	3.73E-09	1.34E-01	1.34E-01	0
Chloroaniline[4-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Chlorobenzene	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Chlorodibromomethane	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Chloroethane	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Chloroform	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Chloromethane	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Chloronaphthalene[2-]	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0
Chlorophenol[2-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Chlorophenyl-phenyl[4-] Ether	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Chlorotoluene[2-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Chlorotoluene[4-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Chrysene	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0
Dibenz(a,h)anthracene	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0
Dibenzofuran	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Dibromo-3-Chloropropane[1,2-]	13	4.93E-04	5.04E-04	4.99E-04	4.97E-06	4.93E-04	5.04E-04	0
Dibromoethane[1,2-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Dibromomethane	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Dichlorobenzene[1,2-]	26	3.28E-04	1.01E-01	5.05E-02	5.11E-02	3.28E-04	1.01E-01	0

Table 2-1. Summary Statistics for Fall 2018 Data

Analyte Name	n	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	SD (mg/kg)	Minimum MDL (mg/kg)	Maximum MDL (mg/kg)	Number of Detects
Dichlorobenzene[1,3-]	26	3.28E-04	1.01E-01	5.05E-02	5.11E-02	3.28E-04	1.01E-01	0
Dichlorobenzene[1,4-]	26	3.28E-04	1.01E-01	5.05E-02	5.11E-02	3.28E-04	1.01E-01	0
Dichlorobenzidine[3,3'-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Dichlorodifluoromethane	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Dichloroethane[1,1-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Dichloroethane[1,2-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Dichloroethene[1,1-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Dichloroethene[cis-1,2-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Dichloroethene[trans-1,2-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Dichlorophenol[2,4-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Dichloropropane[1,2-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Dichloropropane[1,3-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Dichloropropane[2,2-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Dichloropropene[1,1-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Dichloropropene[cis-1,3-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Dichloropropene[trans-1,3-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Diethylphthalate	13	1.00E-02	1.28E-02	1.03E-02	7.62E-04	1.00E-02	1.01E-02	0
Dimethyl Phthalate	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0
Dimethylphenol[2,4-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Di-n-butylphthalate	13	1.00E-02	1.00E-01	2.30E-02	2.63E-02	1.00E-02	1.01E-02	5
Dinitro-2-methylphenol[4,6-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Dinitrobenzene[1,3-]	13	1.48E-01	1.50E-01	1.49E-01	8.01E-04	1.48E-01	1.50E-01	0
Dinitrophenol[2,4-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Dinitrotoluene[2,4-]	26	1.00E-01	1.50E-01	1.25E-01	2.48E-02	1.00E-01	1.50E-01	0
Dinitrotoluene[2,6-]	26	1.00E-01	1.50E-01	1.25E-01	2.48E-02	1.00E-01	1.50E-01	0
Di-n-octylphthalate	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0
Diphenylamine	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Ethylbenzene	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Fluoranthene	13	1.00E-02	1.87E-02	1.07E-02	2.39E-03	1.00E-02	1.01E-02	1
Fluorene	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	13	5.01E-07	1.17E-05	4.91E-06	3.79E-06	1.65E-06	1.67E-06	12
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	13	4.96E-07	2.21E-06	7.84E-07	4.81E-07	1.65E-06	1.67E-06	6
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	13	4.96E-07	5.02E-07	4.99E-07	2.02E-09	1.65E-06	1.67E-06	0
Heptachlorodibenzofurans (Total)	13	0.00E+00	1.22E-05	1.82E-06	3.35E-06			7
Hexachlorobenzene	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Hexachlorobutadiene	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Hexachlorocyclopentadiene	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	13	4.96E-07	5.02E-07	4.99E-07	2.02E-09	1.73E-06	1.75E-06	0
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	13	4.96E-07	5.02E-07	4.99E-07	2.02E-09	1.65E-06	1.67E-06	0
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	13	4.96E-07	5.02E-07	4.99E-07	2.02E-09	1.94E-06	1.97E-06	0

Table 2-1. Summary Statistics for Fall 2018 Data

Analyte Name	n	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	SD (mg/kg)	Minimum MDL (mg/kg)	Maximum MDL (mg/kg)	Number of Detects
Hexachlorodibenzofuran[1,2,3,4,7,8-]	13	4.96E-07	5.02E-07	4.99E-07	2.02E-09	1.65E-06	1.67E-06	0
Hexachlorodibenzofuran[1,2,3,6,7,8-]	13	4.96E-07	5.02E-07	4.99E-07	2.02E-09	1.65E-06	1.67E-06	0
Hexachlorodibenzofuran[1,2,3,7,8,9-]	13	4.96E-07	5.02E-07	4.99E-07	2.02E-09	1.71E-06	1.73E-06	0
Hexachlorodibenzofuran[2,3,4,6,7,8-]	13	4.96E-07	5.02E-07	4.99E-07	2.02E-09	1.65E-06	1.67E-06	0
Hexachloroethane	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Hexanone[2-]	13	1.64E-03	1.68E-03	1.66E-03	1.80E-05	1.64E-03	1.68E-03	0
HMX	13	1.48E-01	6.66E+00	9.80E-01	1.80E+00	1.48E-01	1.50E-01	7
Indeno(1,2,3-cd)pyrene	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0
Iodomethane	13	1.64E-03	1.68E-03	1.66E-03	1.80E-05	1.64E-03	1.68E-03	0
Isophorone	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Isopropylbenzene	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Isopropyltoluene[4-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Methyl-2-pentanone[4-]	13	1.64E-03	1.68E-03	1.66E-03	1.80E-05	1.64E-03	1.68E-03	0
Methylene Chloride	13	1.64E-03	1.68E-03	1.66E-03	1.80E-05	1.64E-03	1.68E-03	0
Methylnaphthalene[2-]	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0
Methylphenol[2-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Methylphenol[3-,4-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Naphthalene	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0
Nitroaniline[2-]	13	1.10E-01	1.11E-01	1.11E-01	4.39E-04	1.10E-01	1.11E-01	0
Nitroaniline[3-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Nitroaniline[4-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Nitrobenzene	26	1.00E-01	1.50E-01	1.25E-01	2.48E-02	1.00E-01	1.50E-01	0
Nitrophenol[2-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Nitrophenol[4-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Nitrosodimethylamine[N-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Nitroso-di-n-propylamine[N-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Nitrotoluene[2-]	13	1.48E-01	1.50E-01	1.49E-01	8.01E-04	1.48E-01	1.50E-01	0
Nitrotoluene[3-]	13	1.48E-01	1.50E-01	1.49E-01	8.01E-04	1.48E-01	1.50E-01	0
Nitrotoluene[4-]	13	1.48E-01	1.50E-01	1.49E-01	8.01E-04	1.48E-01	1.50E-01	0
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	13	1.96E-06	9.57E-05	4.10E-05	3.26E-05	3.31E-06	3.35E-06	13
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	13	9.93E-07	1.92E-05	2.99E-06	4.94E-06	3.31E-06	3.35E-06	7
Oxybis(1-chloropropane)[2,2'-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Pentachlorodibenzodioxin[1,2,3,7,8-]	13	4.96E-07	5.02E-07	4.99E-07	2.02E-09	1.65E-06	1.67E-06	0
Pentachlorodibenzofuran[1,2,3,7,8-]	13	4.96E-07	5.02E-07	4.99E-07	2.02E-09	1.65E-06	1.67E-06	0
Pentachlorodibenzofuran[2,3,4,7,8-]	13	4.96E-07	5.02E-07	4.99E-07	2.02E-09	1.75E-06	1.77E-06	0
Pentachlorophenol	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
PETN	13	2.46E-01	2.50E-01	2.49E-01	1.61E-03	2.46E-01	2.50E-01	0
Phenanthrene	13	1.00E-02	1.01E-02	1.01E-02	5.06E-05	1.00E-02	1.01E-02	0
Phenol	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Propylbenzene[1-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0

Table 2-1. Summary Statistics for Fall 2018 Data

Analyte Name	n	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	SD (mg/kg)	Minimum MDL (mg/kg)	Maximum MDL (mg/kg)	Number of Detects
Pyrene	13	1.00E-02	1.61E-02	1.05E-02	1.67E-03	1.00E-02	1.01E-02	1
Pyridine	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
RDX	13	1.48E-01	1.50E-01	1.49E-01	8.01E-04	1.48E-01	1.50E-01	0
Styrene	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
TATB	13	2.96E-01	6.76E+00	1.37E+00	1.97E+00	2.96E-01	3.00E-01	6
Tetrachlorodibenzodioxin[2,3,7,8-]	13	9.93E-08	1.00E-07	9.98E-08	2.18E-10	3.31E-07	3.35E-07	0
Tetrachlorodibenzofuran[2,3,7,8-]	13	1.05E-07	5.60E-07	2.67E-07	1.62E-07	3.31E-07	3.35E-07	11
Tetrachloroethane[1,1,1,2-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Tetrachloroethane[1,1,2,2-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Tetrachloroethene	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Tetryl	13	1.48E-01	1.50E-01	1.49E-01	8.01E-04	1.48E-01	1.50E-01	0
Toluene	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Trichloro-1,2,2-trifluoroethane[1,1,2-]	13	1.64E-03	1.68E-03	1.66E-03	1.80E-05	1.64E-03	1.68E-03	0
Trichlorobenzene[1,2,4-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Trichloroethane[1,1,1-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Trichloroethane[1,1,2-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Trichloroethene	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Trichlorofluoromethane	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Trichlorophenol[2,4,5-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Trichlorophenol[2,4,6-]	13	1.00E-01	1.01E-01	1.01E-01	5.06E-04	1.00E-01	1.01E-01	0
Trichloropropane[1,2,3-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Trimethylbenzene[1,2,4-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Trimethylbenzene[1,3,5-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Trinitrobenzene[1,3,5-]	13	1.48E-01	1.50E-01	1.49E-01	8.01E-04	1.48E-01	1.50E-01	0
Trinitrotoluene[2,4,6-]	13	1.48E-01	1.50E-01	1.49E-01	8.01E-04	1.48E-01	1.50E-01	0
Tris (o-cresyl) phosphate	13	2.96E-01	3.00E-01	2.98E-01	1.71E-03	2.96E-01	3.00E-01	0
Vinyl Chloride	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Xylene[1,2-]	13	3.28E-04	3.36E-04	3.32E-04	3.33E-06	3.28E-04	3.36E-04	0
Xylene[1,3-]+Xylene[1,4-]	13	6.57E-04	6.73E-04	6.65E-04	6.86E-06	6.57E-04	6.73E-04	0

Notes: Sample size (n) includes duplicate of WST39-18-162832 (WST39-18-162973) and multiple analytical methods.

Abbreviations:
MDL – method detection limit
mg/kg – milligram per kilogram
n – sample size
SD - standard deviation

Table 2-2. Comparison of Maximum Detected Exposure Point Concentrations To Background

Parameter Name	Maximum Result (mg/kg)	Number of Detected Values	Background Threshold Value (BV) (mg/kg)	Ratio of Maximum/ BV
Aluminum	5280.00	13	29200	0.2
Arsenic	1.28	13	8.17	0.2
Barium	88.60	13	295	0.3
Beryllium	0.23	13	1.83	0.1
Calcium	7160.00	13	6120	1.2
Chromium	47.90	13	19.3	2
Cobalt	8.95	13	8.64	1.0
Copper	174.00	13	14.7	12
Iron	21400.00	13	21500	1
Lead	15.60	13	22.3	0.7
Magnesium	3740.00	13	4610	0.8
Manganese	281.00	13	671	0.4
Mercury	0.13	7	0.1	1.3
Nickel	13.80	13	15.4	0.9
Potassium	812.00	13	3460	0.2
Sodium	399.00	13	915	0.4
Vanadium	48.30	13	39.6	1.2
Zinc	62.50	13	48.8	1.3

Notes:
All data in mg/kg. Shaded Max/BV cells indicate the maximum>BV
All inorganics above BVs carry forward on the basis of hypothesis testing. See Section 2.3.2.

Table 2-3. Verification of MDLs for Nondetects for Data Useability

Name	Max. MDL (mg/kg)	Res. Cancer NMSSL (mg/kg)	Res. Cancer Risk	CI Cancer NMSSL (mg/kg)	CI Cancer Risk	Con Cancer NMSSL (mg/kg)	Con Cancer Risk	Res. NC NMSSL (mg/kg)	Res. HQ	CI NC NMSSL	CI HQ	Con NC NMSSL	Con HQ
Antimony	3.24	NV	NA	NV	NA	NV	NA	3.13E+01	1E-01	5.19E+02	6E-03	1.42E+02	2E-02
Cadmium	0.10	8.59E+04	1E-11	4.17E+05	2E-12	3.61E+03	3E-10	7.05E+01	1E-03	1.11E+03	9E-05	7.21E+01	1E-03
Mercury	0.004	NV	NA	NV	NA	NV	NA	2.35E+01	2E-04	3.89E+02	1E-05	7.71E+01	5E-05
Perchlorate	0.0005	NV	NA	NV	NA	NV	NA	5.48E+01	9E-06	9.08E+02	6E-07	2.48E+02	2E-06
Selenium	0.36	NV	NA	NV	NA	NV	NA	3.91E+02	9E-04	6.49E+03	6E-05	1.75E+03	2E-04
Silver	0.69	NV	NA	NV	NA	NV	NA	3.91E+02	2E-03	6.49E+03	1E-04	1.77E+03	4E-04
Thallium	0.14	NV	NA	NV	NA	NV	NA	7.82E-01	2E-01	1.30E+01	1E-02	3.54E+00	4E-02
2,4-Diamino-6-nitrotoluene	5.00E-01	3.16E+01	2E-07	1.65E+02	3E-08	1.13E+03	4E-09	6.16E+00	8E-02	9.16E+01	5E-03	2.69E+01	2E-02
2,6-Diamino-4-nitrotoluene	6.60E-01	3.16E+01	2E-07	1.65E+02	4E-08	1.13E+03	6E-09	6.16E+00	1E-01	9.16E+01	7E-03	2.69E+01	2E-02
3,5-Dinitroaniline	3.00E-01	NV	NA	NV	NA	NV	NA	7.64E+00	4E-02	1.25E+02	2E-03	1.73E+01	2E-02
Acenaphthene	1.01E-02	NV	NA	NV	NA	NV	NA	3.48E+03	3E-06	5.05E+04	2E-07	1.51E+04	7E-07
Acenaphthylene	1.01E-02	NV	NA	NV	NA	NV	NA	3.48E+03	3E-06	5.05E+04	2E-07	1.51E+04	7E-07
Acetone	1.68E-03	NV	NA	NV	NA	NV	NA	6.63E+04	3E-08	9.60E+05	2E-09	2.42E+05	7E-09
Amino-2,6-dinitrotoluene[4-]	1.50E-01	NV	NA	NV	NA	NV	NA	7.64E+00	2E-02	1.25E+02	1E-03	1.73E+01	9E-03
Amino-4,6-dinitrotoluene[2-]	1.50E-01	NV	NA	NV	NA	NV	NA	7.70E+00	2E-02	1.27E+02	1E-03	1.73E+01	9E-03
Aniline	1.01E-01	9.50E+02	1E-09	4.00E+03	3E-10	4.00E+03	3E-10	4.40E+02	2E-04	5.70E+03	2E-05	5.70E+03	2E-05
Anthracene	1.01E-02	NV	NA	NV	NA	NV	NA	1.74E+04	6E-07	2.53E+05	4E-08	7.53E+04	1E-07
Azobenzene	1.01E-01	5.60E+01	2E-08	2.60E+02	4E-09	2.60E+02	4E-09	NV	NA	NV	NA	NV	NA
Benzene	3.36E-04	1.78E+01	2E-10	8.72E+01	4E-11	4.23E+02	8E-12	1.14E+02	3E-06	7.29E+02	5E-07	1.42E+02	2E-06
Benzo(a)anthracene	1.01E-02	1.53E+00	7E-08	3.23E+01	3E-09	2.40E+02	4E-10	NV	NA	NV	NA	NV	NA
Benzo(a)pyrene	1.01E-02	1.12E+00	9E-08	2.36E+01	4E-09	1.73E+02	6E-10	1.74E+01	6E-04	2.51E+02	4E-05	1.50E+01	7E-04
Benzo(g,h,i)perylene	1.01E-02	1.12E+00	9E-08	2.36E+01	4E-09	1.73E+02	6E-10	1.74E+01	6E-04	2.51E+02	4E-05	1.50E+01	7E-04
Benzo(k)fluoranthene	1.01E-02	1.53E+01	7E-09	3.23E+02	3E-10	2.31E+03	4E-11	NV	NA	NV	NA	NV	NA
Benzoic Acid	1.68E-01	NV	NA	NV	NA	NV	NA	2.50E+05	7E-07	3.30E+06	5E-08	3.30E+06	5E-08
Benzyl Alcohol	1.01E-01	NV	NA	NV	NA	NV	NA	6.30E+03	2E-05	8.20E+04	1E-06	8.20E+04	1E-06
Bis(2-chloroethoxy)methane	1.01E-01	NV	NA	NV	NA	NV	NA	1.90E+02	5E-04	2.50E+03	4E-05	2.50E+03	4E-05
Bis(2-chloroethyl)ether	1.01E-01	3.11E+00	3E-07	1.57E+01	6E-08	1.95E+00	5E-07	NV	NA	NV	NA	NV	NA

Name	Max. MDL (mg/kg)	Res. Cancer NMSSL (mg/kg)	Res. Cancer Risk	CI Cancer NMSSL (mg/kg)	CI Cancer Risk	Con Cancer NMSSL (mg/kg)	Con Cancer Risk	Res. NC NMSSL (mg/kg)	Res. HQ	CI NC NMSSL	CI HQ	Con NC NMSSL	Con HQ
Bis(2-ethylhexyl)phthalate	3.05E-02	3.80E+02	8E-10	1.83E+03	2E-10	1.34E+04	2E-11	1.23E+03	2E-05	1.83E+04	2E-06	5.38E+03	6E-06
Bromobenzene	3.36E-04	NV	NA	NV	NA	NV	NA	2.90E+02	1E-06	1.80E+03	2E-07	1.80E+03	2E-07
Bromochloromethane	3.36E-04	NV	NA	NV	NA	NV	NA	1.50E+02	2E-06	6.30E+02	5E-07	6.30E+02	5E-07
Bromodichloromethane	3.36E-04	6.19E+00	5E-10	3.02E+01	1E-10	1.43E+02	2E-11	1.56E+03	2E-07	2.60E+04	1E-08	7.08E+03	5E-08
Bromoform	3.36E-04	6.74E+02	5E-12	1.76E+03	2E-12	2.37E+04	1E-13	1.23E+03	3E-07	1.83E+04	2E-08	5.38E+03	6E-08
Bromomethane	3.36E-04	NV	NA	NV	NA	NV	NA	1.77E+01	2E-05	9.45E+01	4E-06	1.79E+01	2E-05
Bromophenyl-phenylether[4-]	1.01E-01	NV	NA	NV	NA	NV	NA	1.60E+02	6E-04	2.30E+03	4E-05	2.30E+03	4E-05
Butanone[2-]	1.68E-03	NV	NA	NV	NA	NV	NA	3.74E+04	4E-08	4.11E+05	4E-09	9.17E+04	2E-08
Butylbenzene[n-]	3.36E-04	NV	NA	NV	NA	NV	NA	3.90E+03	9E-08	5.80E+04	6E-09	5.80E+04	6E-09
Butylbenzene[sec-]	3.36E-04	NV	NA	NV	NA	NV	NA	7.80E+03	4E-08	1.20E+05	3E-09	1.20E+05	3E-09
Butylbenzene[tert-]	3.36E-04	NV	NA	NV	NA	NV	NA	7.80E+03	4E-08	1.20E+05	3E-09	1.20E+05	3E-09
Butylbenzylphthalate	1.01E-02	2.90E+03	3E-11	1.20E+04	8E-12	1.20E+04	8E-12	1.30E+04	8E-07	1.60E+05	6E-08	1.60E+05	6E-08
Carbon Disulfide	1.68E-03	NV	NA	NV	NA	NV	NA	1.55E+03	1E-06	8.54E+03	2E-07	1.62E+03	1E-06
Carbon Tetrachloride	3.36E-04	1.07E+01	3E-10	5.25E+01	6E-11	2.52E+02	1E-11	1.44E+02	2E-06	1.02E+03	3E-07	2.02E+02	2E-06
Chloro-3-methylphenol[4-]	1.34E-01	NV	NA	NV	NA	NV	NA	6.30E+03	2E-05	8.20E+04	2E-06	8.20E+04	2E-06
Chloroaniline[4-]	1.01E-01	2.70E+01	4E-08	1.10E+02	9E-09	1.10E+02	9E-09	3.20E+01	3E-03	4.10E+02	2E-04	4.10E+02	2E-04
Chlorobenzene	3.36E-04	NV	NA	NV	NA	NV	NA	3.78E+02	9E-07	2.16E+03	2E-07	4.12E+02	8E-07
Chlorodibromomethane	3.36E-04	1.39E+01	2E-10	6.74E+01	5E-11	3.40E+02	1E-11	1.23E+03	3E-07	1.83E+04	2E-08	5.38E+03	6E-08
Chloroethane	3.36E-04	NV	NA	NV	NA	NV	NA	1.90E+04	2E-08	8.95E+04	4E-09	1.66E+04	2E-08
Chloroform	3.36E-04	5.90E+00	6E-10	2.87E+01	1E-10	1.34E+02	3E-11	3.06E+02	1E-06	2.00E+03	2E-07	3.91E+02	9E-07
Chloromethane	3.36E-04	4.11E+01	8E-11	2.01E+02	2E-11	9.56E+02	4E-12	2.68E+02	1E-06	1.26E+03	3E-07	2.35E+02	1E-06
Chloronaphthalene[2-]	1.01E-02	NV	NA	NV	NA	NV	NA	6.26E+03	2E-06	1.04E+05	1E-07	2.83E+04	4E-07
Chlorophenol[2-]	1.01E-01	NV	NA	NV	NA	NV	NA	3.91E+02	3E-04	6.49E+03	2E-05	1.77E+03	6E-05
Chlorophenyl-phenyl[4-] Ether	1.01E-01	NV	NA	NV	NA	NV	NA	NV	NA	NV	NA	NV	NA
Chlorotoluene[2-]	3.36E-04	NV	NA	NV	NA	NV	NA	1.56E+03	2E-07	2.60E+04	1E-08	7.08E+03	5E-08
Chlorotoluene[4-]	3.36E-04	NV	NA	NV	NA	NV	NA	1.56E+03	2E-07	2.60E+04	1E-08	7.08E+03	5E-08
Chrysene	1.01E-02	1.53E+02	7E-10	3.23E+03	3E-11	2.31E+04	4E-12	NV	NA	NV	NA	NV	NA

Name	Max. MDL (mg/kg)	Res. Cancer NMSSL (mg/kg)	Res. Cancer Risk	CI Cancer NMSSL (mg/kg)	CI Cancer Risk	Con Cancer NMSSL (mg/kg)	Con Cancer Risk	Res. NC NMSSL (mg/kg)	Res. HQ	CI NC NMSSL	CI HQ	Con NC NMSSL	Con HQ
Dibenz(a,h)anthracene	1.01E-02	1.53E-01	7E-07	3.23E+00	3E-08	2.40E+01	4E-09	NV	NA	NV	NA	NV	NA
Dibenzofuran	1.01E-01	NV	NA	NV	NA	NV	NA	7.80E+01	1E-03	1.20E+03	8E-05	1.20E+03	8E-05
Dibromo-3-Chloropropane[1,2-]	5.04E-04	8.58E-02	6E-08	1.18E+00	4E-09	5.53E+00	9E-10	5.88E+00	9E-05	4.11E+01	1E-05	8.29E+00	6E-05
Dibromoethane[1,2-]	3.36E-04	6.72E-01	5E-09	3.31E+00	1E-09	1.63E+01	2E-10	1.35E+02	2E-06	7.38E+02	5E-07	1.40E+02	2E-06
Dibromomethane	3.36E-04	NV	NA	NV	NA	NV	NA	5.79E+01	6E-06	2.88E+02	1E-06	5.39E+01	6E-06
Dichlorobenzene[1,2-]	1.01E-01	NV	NA	NV	NA	NV	NA	2.15E+03	5E-05	1.30E+04	8E-06	2.50E+03	4E-05
Dichlorobenzene[1,3-]	1.01E-01	1.29E+03	8E-10	6.73E+03	2E-10	4.59E+04	2E-11	5.48E+03	2E-05	9.08E+04	1E-06	2.48E+04	4E-06
Dichlorobenzene[1,4-]	1.01E-01	1.29E+03	8E-10	6.73E+03	2E-10	4.59E+04	2E-11	5.48E+03	2E-05	9.08E+04	1E-06	2.48E+04	4E-06
Dichlorobenzidine[3,3'-]	1.01E-01	1.18E+01	9E-08	5.70E+01	2E-08	4.10E+02	2E-09	NV	NA	NV	NA	NV	NA
Dichlorodifluoromethane	3.36E-04	NV	NA	NV	NA	NV	NA	1.82E+02	2E-06	8.65E+02	4E-07	1.61E+02	2E-06
Dichloroethane[1,1-]	3.36E-04	7.86E+01	4E-11	3.83E+02	9E-12	1.82E+03	2E-12	1.56E+04	2E-08	2.60E+05	1E-09	7.08E+04	5E-09
Dichloroethane[1,2-]	3.36E-04	8.32E+00	4E-10	4.07E+01	8E-11	1.95E+02	2E-11	5.56E+01	6E-06	2.86E+02	1E-06	5.38E+01	6E-06
Dichloroethene[1,1-]	3.36E-04	NV	NA	NV	NA	NV	NA	4.40E+02	8E-07	2.26E+03	1E-07	4.24E+02	8E-07
Dichloroethene[cis-1,2-]	3.36E-04	NV	NA	NV	NA	NV	NA	1.56E+02	2E-06	2.60E+03	1E-07	7.08E+02	5E-07
Dichloroethene[trans-1,2-]	3.36E-04	NV	NA	NV	NA	NV	NA	2.10E+02	2E-06	1.10E+03	3E-07	2.06E+02	2E-06
Dichlorophenol[2,4-]	1.01E-01	NV	NA	NV	NA	NV	NA	1.85E+02	5E-04	2.75E+03	4E-05	8.07E+02	1E-04
Dichloropropane[1,2-]	3.36E-04	1.78E+01	2E-10	8.68E+01	4E-11	4.15E+02	8E-12	2.90E+01	1E-05	1.37E+02	2E-06	2.54E+01	1E-05
Dichloropropane[1,3-]	3.36E-04	1.78E+01	2E-10	8.68E+01	4E-11	4.15E+02	8E-12	2.90E+01	1E-05	1.37E+02	2E-06	2.54E+01	1E-05
Dichloropropane[2,2-]	3.36E-04	1.78E+01	2E-10	8.68E+01	4E-11	4.15E+02	8E-12	2.90E+01	1E-05	1.37E+02	2E-06	2.54E+01	1E-05
Dichloropropene[1,1-]	3.36E-04	2.93E+01	1E-10	1.46E+02	2E-11	7.81E+02	4E-12	1.41E+02	2E-06	6.95E+02	5E-07	1.30E+02	3E-06
Dichloropropene[cis-1,3-]	3.36E-04	2.93E+01	1E-10	1.46E+02	2E-11	7.81E+02	4E-12	1.41E+02	2E-06	6.95E+02	5E-07	1.30E+02	3E-06

Name	Max. MDL (mg/kg)	Res. Cancer NMSSL (mg/kg)	Res. Cancer Risk	CI Cancer NMSSL (mg/kg)	CI Cancer Risk	Con Cancer NMSSL (mg/kg)	Con Cancer Risk	Res. NC NMSSL (mg/kg)	Res. HQ	CI NC NMSSL	CI HQ	Con NC NMSSL	Con HQ
Dichloropropene[trans-1,3-]	3.36E-04	2.93E+01	1E-10	1.46E+02	2E-11	7.81E+02	4E-12	1.41E+02	2E-06	6.95E+02	5E-07	1.30E+02	3E-06
Diethylphthalate	1.28E-02	NV	NA	NV	NA	NV	NA	4.93E+04	3E-07	7.33E+05	2E-08	2.15E+05	6E-08
Dimethyl Phthalate	1.01E-02	NV	NA	NV	NA	NV	NA	4.93E+04	2E-07	7.33E+05	1E-08	2.15E+05	5E-08
Dimethylphenol[2,4-]	1.01E-01	NV	NA	NV	NA	NV	NA	1.23E+03	8E-05	1.83E+04	6E-06	5.38E+03	2E-05
Di-n-butylphthalate	1.01E-02	NV	NA	NV	NA	NV	NA	6.16E+03	2E-06	9.16E+04	1E-07	2.69E+04	4E-07
Dinitro-2-methylphenol[4,6-]	1.01E-01	NV	NA	NV	NA	NV	NA	4.93E+00	2E-02	7.33E+01	1E-03	2.15E+01	5E-03
Dinitrobenzene[1,3-]	1.50E-01	NV	NA	NV	NA	NV	NA	6.30E+00	2E-02	8.20E+01	2E-03	8.20E+01	2E-03
Dinitrophenol[2,4-]	1.01E-01	NV	NA	NV	NA	NV	NA	1.23E+02	8E-04	1.83E+03	6E-05	5.38E+02	2E-04
Dinitrotoluene[2,4-]	1.50E-01	1.71E+01	9E-08	8.23E+01	2E-08	6.00E+02	3E-09	1.23E+02	1E-03	1.82E+03	8E-05	5.36E+02	3E-04
Dinitrotoluene[2,6-]	1.50E-01	3.56E+00	4E-07	1.72E+01	9E-08	1.65E+02	9E-09	1.85E+01	8E-03	2.76E+02	5E-04	8.09E+01	2E-03
Di-n-octylphthalate	1.01E-02	NV	NA	NV	NA	NV	NA	6.30E+02	2E-05	8.20E+03	1E-06	8.20E+03	1E-06
Diphenylamine	1.01E-01	NV	NA	NV	NA	NV	NA	6.30E+03	2E-05	8.20E+04	1E-06	8.20E+04	1E-06
Ethylbenzene	3.36E-04	7.51E+01	4E-11	3.68E+02	9E-12	1.77E+03	2E-12	3.93E+03	9E-08	2.90E+04	1E-08	5.80E+03	6E-08
Fluoranthene	1.01E-02	NV	NA	NV	NA	NV	NA	2.32E+03	4E-06	3.37E+04	3E-07	1.00E+04	1E-06
Fluorene	1.01E-02	NV	NA	NV	NA	NV	NA	2.32E+03	4E-06	3.37E+04	3E-07	1.00E+04	1E-06
Hexachlorobenzene	1.01E-01	3.33E+00	3E-07	1.60E+01	6E-08	1.17E+02	9E-09	4.93E+01	2E-03	7.33E+02	1E-04	2.15E+02	5E-04
Hexachlorobutadiene	1.01E-01	6.83E+01	1E-08	5.21E+01	2E-08	2.40E+03	4E-10	6.16E+01	2E-03	9.16E+02	1E-04	2.69E+02	4E-04
Hexachlorocyclopentadiene	1.01E-01	NV	NA	NV	NA	NV	NA	2.30E+00	4E-02	5.49E+03	2E-05	8.67E+02	1E-04
Hexachloroethane	1.01E-01	1.33E+02	8E-09	6.41E+02	2E-09	4.67E+03	2E-10	4.31E+01	2E-03	6.41E+02	2E-04	1.88E+02	5E-04
Isopropylbenzene	3.36E-04	NV	NA	NV	NA	NV	NA	2.36E+03	1E-07	1.42E+04	2E-08	2.74E+03	1E-07
Isopropyltoluene[4-]	3.36E-04	NV	NA	NV	NA	NV	NA	5.23E+03	6E-08	6.13E+04	5E-09	1.40E+04	2E-08
Methyl-2-pentanone[4-]	1.68E-03	NV	NA	NV	NA	NV	NA	5.81E+03	3E-07	8.16E+04	2E-08	2.02E+04	8E-08
Nitrophenol[2-]	1.01E-01	NV	NA	NV	NA	NV	NA	1.85E+04	5E-06	2.75E+05	4E-07	7.74E+04	1E-06
Nitrophenol[4-]	1.01E-01	NV	NA	NV	NA	NV	NA	1.85E+04	5E-06	2.75E+05	4E-07	7.74E+04	1E-06
Nitrosodimethylamine[N-]	1.01E-01	2.34E-02	4E-05	5.03E-01	2E-06	3.66E+00	3E-07	4.93E-01	2E-01	7.33E+00	1E-02	2.14E+00	5E-02
Nitroso-di-n-propylamine[N-]	1.01E-01	7.80E-01	1E-06	3.30E+00	3E-07	3.30E+00	3E-07	NV	NA	NV	NA	NV	NA

Name	Max. MDL (mg/kg)	Res. Cancer NMSSL (mg/kg)	Res. Cancer Risk	CI Cancer NMSSL (mg/kg)	CI Cancer Risk	Con Cancer NMSSL (mg/kg)	Con Cancer Risk	Res. NC NMSSL (mg/kg)	Res. HQ	CI NC NMSSL	CI HQ	Con NC NMSSL	Con HQ
Nitrotoluene[2-]	1.50E-01	3.16E+01	5E-08	1.65E+02	9E-09	1.13E+03	1E-09	7.04E+01	2E-03	1.17E+03	1E-04	3.19E+02	5E-04
Nitrotoluene[3-]	1.50E-01	NV	NA	NV	NA	NV	NA	6.16E+00	2E-02	9.16E+01	2E-03	2.69E+01	6E-03
Nitrotoluene[4-]	1.50E-01	3.33E+02	5E-09	1.60E+03	9E-10	1.18E+04	1E-10	2.47E+02	6E-04	3.67E+03	4E-05	1.08E+03	1E-04
Oxybis(1-chloropropane)[2,2'-]	1.01E-01	9.93E+01	1E-08	5.19E+02	2E-09	3.54E+03	3E-10	NV	NA	NV	NA	NV	NA
Pentachlorophenol	1.01E-01	9.85E+00	1E-07	4.45E+01	2E-08	3.46E+02	3E-09	2.34E+02	4E-04	3.18E+03	3E-05	9.89E+02	1E-04
PETN	2.50E-01	1.30E+03	2E-09	5.30E+03	5E-10	5.30E+03	5E-10	NV	NA	NV	NA	NV	NA
Phenanthrene	1.01E-02	NV	NA	NV	NA	NV	NA	1.74E+03	6E-06	2.53E+04	4E-07	7.53E+03	1E-06
Phenol	1.01E-01	NV	NA	NV	NA	NV	NA	1.85E+04	5E-06	2.75E+05	4E-07	7.74E+04	1E-06
Propylbenzene[1-]	3.36E-04	NV	NA	NV	NA	NV	NA	3.80E+03	9E-08	2.40E+04	1E-08	2.40E+04	1E-08
Pyrene	1.01E-02	NV	NA	NV	NA	NV	NA	1.74E+03	6E-06	2.53E+04	4E-07	7.53E+03	1E-06
Pyridine	1.01E-01	NV	NA	NV	NA	NV	NA	7.80E+01	1E-03	1.20E+03	8E-05	1.20E+03	8E-05
RDX	1.50E-01	8.31E+01	2E-08	4.28E+02	4E-09	2.96E+03	5E-10	3.01E+02	5E-04	4.89E+03	3E-05	1.35E+03	1E-04
Styrene	3.36E-04	NV	NA	NV	NA	NV	NA	7.26E+03	5E-08	5.13E+04	7E-09	1.02E+04	3E-08
TATB	3.00E-01	NV	NA	NV	NA	NV	NA	2.20E+03	1E-04	3.20E+04	9E-06	3.20E+04	9E-06
Tetrachlorodibenzodioxin[2,3,7,8-]	1.00E-07	4.90E-05	2E-08	2.38E-04	4E-09	1.72E-03	6E-10	5.06E-05	2E-03	8.08E-04	1E-04	2.26E-04	4E-04
Trichloro-1,2,2-trifluoroethane[1,1,2-]	1.68E-03	NV	NA	NV	NA	NV	NA	5.08E+04	3E-08	2.43E+05	7E-09	4.53E+04	4E-08
Trichlorobenzene[1,2,4-]	1.01E-01	2.40E+02	4E-09	1.25E+03	8E-10	8.54E+03	1E-10	8.29E+01	1E-03	4.23E+02	2E-04	7.91E+01	1E-03
Trichloroethane[1,1,1-]	3.36E-04	NV	NA	NV	NA	NV	NA	1.44E+04	2E-08	7.25E+04	5E-09	1.36E+04	2E-08
Trichloroethane[1,1,2-]	3.36E-04	1.88E+01	2E-10	9.21E+01	4E-11	4.30E+03	8E-13	2.61E+00	1E-04	1.24E+01	3E-05	2.30E+00	1E-04
Trichloroethene	3.36E-04	1.55E+01	2E-10	1.12E+02	3E-11	5.37E+03	6E-13	6.77E+00	5E-05	3.65E+01	9E-06	6.90E+00	5E-05
Trichlorofluoromethane	3.36E-04	NV	NA	NV	NA	NV	NA	1.23E+03	3E-07	6.03E+03	6E-08	1.13E+03	3E-07
Trichlorophenol[2,4,5-]	1.01E-01	NV	NA	NV	NA	NV	NA	6.16E+03	2E-05	9.16E+04	1E-06	2.69E+04	4E-06
Trichlorophenol[2,4,6-]	1.01E-01	4.84E+02	2E-09	2.33E+03	4E-10	1.70E+04	6E-11	6.16E+01	2E-03	9.16E+02	1E-04	2.69E+02	4E-04
Trichloropropane[1,2,3-]	3.36E-04	5.10E-02	7E-08	1.21E+00	3E-09	8.26E+00	4E-10	7.09E+00	5E-05	3.40E+01	1E-05	6.31E+00	5E-05
Trimethylbenzene[1,2,4-]	3.36E-04	NV	NA	NV	NA	NV	NA	3.00E+02	1E-06	1.80E+03	2E-07	1.80E+03	2E-07
Trimethylbenzene[1,3,5-]	3.36E-04	NV	NA	NV	NA	NV	NA	2.70E+02	1E-06	1.50E+03	2E-07	1.50E+03	2E-07

Name	Max. MDL (mg/kg)	Res. Cancer NMSSL (mg/kg)	Res. Cancer Risk	CI Cancer NMSSL (mg/kg)	CI Cancer Risk	Con Cancer NMSSL (mg/kg)	Con Cancer Risk	Res. NC NMSSL (mg/kg)	Res. HQ	CI NC NMSSL	CI HQ	Con NC NMSSL	Con HQ
Vinyl Chloride	3.36E-04	7.42E-01	5E-09	2.84E+01	1E-10	1.61E+02	2E-11	1.13E+02	3E-06	8.16E+02	4E-07	1.62E+02	2E-06
Xylene[1,2-]	3.36E-04	NV	NA	NV	NA	NV	NA	8.05E+02	4E-07	3.94E+03	9E-08	7.36E+02	5E-07
Xylene[1,3-]+Xylene[1,4-]	6.73E-04	NV	NA	NV	NA	NV	NA	8.71E+02	8E-07	4.28E+03	2E-07	7.98E+02	8E-07

Notes: All cancer risks and HQs were below the target levels of $1x10^{-5}$ and 1, respectively
The maximum result is the highest method detection limit (MDL) reported

CI – Commercial/industrial worker
Con – Construction worker
HQ – Hazard quotient
Max – Maximum
mg/kg – Milligram per kilogram
NC - Noncancer
NMSSL – New Mexico soil screening level (NMED 2021)
NA – not applicable
NV – no value
Res - residential

Table 2-4. Human Health Risk Screening For Detected Analytes Above Background

Category	Name	Max Result (mg/kg)	Cancer						Noncancer					
			Res Cancer NMSSL (mg/kg)	Res Cancer Risk	CI Worker Cancer NMSSL (mg/kg)	CI Worker Cancer Risk	Con Worker Cancer NMSSL (mg/kg)	Con Worker Cancer Risk	Res Noncancer NMSSL (mg/kg)	Res HQ	CI NC NMSSL	CI HQ	Con NC NMSSL	Con HQ
Inorganic	Calcium	7160.00	NV	NA	NV	NA	NV	NA	1.30E+07	5E-04	3.24E+07	2E-04	8.85E+06	8E-04
	Chromium	47.90	NV	NA	NV	NA	NV	NA	1.17E+05	4E-04	1.95E+06	2E-05	5.31E+05	9E-05
	Copper	174.00	NV	NA	NV	NA	NV	NA	3.13E+03	6E-02	5.19E+04	3E-03	1.42E+04	1E-02
	Mercury	0.13	NV	NA	NV	NA	NV	NA	2.35E+01	6E-03	3.89E+02	3E-04	7.71E+01	2E-03
	Vanadium	48.30	NV	NA	NV	NA	NV	NA	3.94E+02	1E-01	6.53E+03	7E-03	6.14E+02	8E-02
	Zinc	62.50	NV	NA	NV	NA	NV	NA	2.35E+04	3E-03	3.89E+05	2E-04	1.06E+05	6E-04
Organic	Benzoic Acid	0.483	NV	NA	NV	NA	NV	NA	2.50E+05	2E-06	3.30E+06	1E-07	3.30E+06	1E-07
	Benzyl Alcohol	1.65	NV	NA	NV	NA	NV	NA	6.30E+03	3E-04	8.20E+04	2E-05	8.20E+04	2E-05
	Butylbenzyl-phthalate	0.0635	2.90E+03	2E-10	1.20E+04	5E-11	1.2E+04	5E-11	1.30E+04	5E-06	1.60E+05	4E-07	1.60E+05	4E-07
	Di-n-butylphthalate	0.1	NV	NA	NV	NA	NV	NA	6.16E+03	2E-05	9.16E+04	1E-06	2.69E+04	4E-06
	Fluoranthene	0.0187	NV	NA	NV	NA	NV	NA	2.32E+03	8E-06	3.37E+04	6E-07	1.00E+04	2E-06
	HMX	6.66	NV	NA	NV	NA	NV	NA	3.85E+03	2E-03	6.33E+04	1E-04	1.74E+04	4E-04
	Pyrene	0.0161	NV	NA	NV	NA	NV	NA	1.74E+03	9E-06	2.53E+04	6E-07	7.53E+03	2E-06
	TATB	6.76	NV	NA	NV	NA	NV	NA	2.20E+03	3E-03	3.20E+04	2E-04	3.20E+04	2E-04
	2,3,6,8 TCDD TEQ	1.33E-06	4.90E-05	3E-07	2.38E-04	6E-08	1.72E-03	8E-09	5.06E-05	3E-02	8.08E-04	2E-03	2.26E-4	6E-03
Cumulative Cancer Risk or Hazard Index				3E-07		6E-08		8E-09		2E-01		1E-02		1E-01

Notes: All cancer risks and HQs were below the target levels of 1×10^{-5} and 1, respectively
CI – Commercial/industrial worker
Con – Construction worker
HQ – Hazard quotient
Max – Maximum
mg/kg – Milligram per kilogram
NC – Noncancer
NMSSL – New Mexico soil screening level (NMED 2021)
NA – Not applicable
NV – No value
Res - Resident

Table 2-5. Dioxin/Furan Data and Human Health TEFs

Parameter Name	TEFs	Point 1 WST39-18-162832		Point 1 Dup WST39-18-162973		Point 2 WST39-18-162974		Point 3 WST39-18-162975		Point 4 WST39-18-162976		Point 5 WST39-18-162977	
		Result (mg/kg)	DC	Result (mg/kg)	DC	Result (mg/kg)	DC	Result (mg/kg)	DC	Result (mg/kg)	DC	Result (mg/kg)	DC
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	0.01	8.52E-06	1	9.83E-06	1	4.57E-06	1	3.49E-06	1	5.01E-07	0	8.28E-07	1
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	0.01	9.01E-07	1	1.00E-06	1	5.02E-07	0	4.98E-07	0	5.01E-07	0	5.01E-07	0
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	0.01	4.98E-07	0	5.02E-07	0	5.02E-07	0	4.98E-07	0	5.01E-07	0	5.01E-07	0
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	0.1	4.98E-07	0	5.02E-07	0	5.02E-07	0	4.98E-07	0	5.01E-07	0	5.01E-07	0
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	0.1	4.98E-07	0	5.02E-07	0	5.02E-07	0	4.98E-07	0	5.01E-07	0	5.01E-07	0
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	0.1	4.98E-07	0	5.02E-07	0	5.02E-07	0	4.98E-07	0	5.01E-07	0	5.01E-07	0
Hexachlorodibenzofuran[1,2,3,4,7,8-]	0.1	4.98E-07	0	5.02E-07	0	5.02E-07	0	4.98E-07	0	5.01E-07	0	5.01E-07	0
Hexachlorodibenzofuran[1,2,3,6,7,8-]	0.1	4.98E-07	0	5.02E-07	0	5.02E-07	0	4.98E-07	0	5.01E-07	0	5.01E-07	0
Hexachlorodibenzofuran[1,2,3,7,8,9-]	0.1	4.98E-07	0	5.02E-07	0	5.02E-07	0	4.98E-07	0	5.01E-07	0	5.01E-07	0
Hexachlorodibenzofuran[2,3,4,6,7,8-]	0.1	4.98E-07	0	5.02E-07	0	5.02E-07	0	4.98E-07	0	5.01E-07	0	5.01E-07	0
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	0.0003	7.21E-05	1	8.89E-05	1	3.58E-05	1	2.99E-05	1	1.96E-06	1	5.50E-06	1
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	0.0003	2.49E-06	1	2.73E-06	1	1.38E-06	1	9.97E-07	0	1.00E-06	0	1.00E-06	0
Pentachlorodibenzodioxin[1,2,3,7,8-]	1	4.98E-07	0	5.02E-07	0	5.02E-07	0	4.98E-07	0	5.01E-07	0	5.01E-07	0
Pentachlorodibenzofuran[1,2,3,7,8-]	0.03	4.98E-07	0	5.02E-07	0	5.02E-07	0	4.98E-07	0	5.01E-07	0	5.01E-07	0
Pentachlorodibenzofuran[2,3,4,7,8-]	0.3	4.98E-07	0	5.02E-07	0	5.02E-07	0	4.98E-07	0	5.01E-07	0	5.01E-07	0
Tetrachlorodibenzodioxin[2,3,7,8-]	1	9.97E-08	0	1.00E-07	0	1.00E-07	0	9.97E-08	0	1.00E-07	0	1.00E-07	0
Tetrachlorodibenzofuran[2,3,7,8-]	0.1	3.65E-07	1	3.63E-07	1	2.01E-07	1	2.57E-07	1	1.05E-07	0	1.36E-07	1

Table 2-5., Dioxin/Furan Data and Human Health TEFs, cont.

Name	Point 6 WST39-18-162978		Point 7 WST39-18-162979		Point 8 WST39-18-162980		Point 9 WST39-18-162981		Point 10 WST39-18-162982	
	Result (mg/kg)	DC	Result (mg/kg)	DC	Result (mg/kg)	DC	Result (mg/kg)	DC	Result (mg/kg)	DC
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	8.60E-06	1	5.86E-06	1	1.13E-06	1	6.07E-07	1	5.21E-06	1
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	7.97E-07	1	2.21E-06	1	4.98E-07	0	4.98E-07	0	6.88E-07	1
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	5.02E-07	0	4.98E-07	0	4.98E-07	0	4.98E-07	0	4.99E-07	0
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	5.02E-07	0	4.98E-07	0	4.98E-07	0	4.98E-07	0	4.99E-07	0
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	5.02E-07	0	4.98E-07	0	4.98E-07	0	4.98E-07	0	4.99E-07	0
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	5.02E-07	0	4.98E-07	0	4.98E-07	0	4.98E-07	0	4.99E-07	0
Hexachlorodibenzofuran[1,2,3,4,7,8-]	5.02E-07	0	4.98E-07	0	4.98E-07	0	4.98E-07	0	4.99E-07	0
Hexachlorodibenzofuran[1,2,3,6,7,8-]	5.02E-07	0	4.98E-07	0	4.98E-07	0	4.98E-07	0	4.99E-07	0
Hexachlorodibenzofuran[1,2,3,7,8,9-]	5.02E-07	0	4.98E-07	0	4.98E-07	0	4.98E-07	0	4.99E-07	0
Hexachlorodibenzofuran[2,3,4,6,7,8-]	5.02E-07	0	4.98E-07	0	4.98E-07	0	4.98E-07	0	4.99E-07	0
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	5.49E-05	1	6.84E-05	1	9.66E-06	1	3.91E-06	1	4.10E-05	1
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	2.51E-06	1	1.92E-05	1	9.97E-07	0	9.96E-07	0	1.18E-06	1
Pentachlorodibenzodioxin[1,2,3,7,8-]	5.02E-07	0	4.98E-07	0	4.98E-07	0	4.98E-07	0	4.99E-07	0
Pentachlorodibenzofuran[1,2,3,7,8-]	5.02E-07	0	4.98E-07	0	4.98E-07	0	4.98E-07	0	4.99E-07	0
Pentachlorodibenzofuran[2,3,4,7,8-]	5.02E-07	0	4.98E-07	0	4.98E-07	0	4.98E-07	0	4.99E-07	0
Tetrachlorodibenzodioxin[2,3,7,8-]	1.00E-07	0	9.97E-08	0	9.97E-08	0	9.96E-08	0	9.97E-08	0
Tetrachlorodibenzofuran[2,3,7,8-]	1.87E-07	1	1.16E-07	0	1.44E-07	1	1.06E-07	1	5.50E-07	1

Table 2-5., Dioxin/Furan Data and Human Health TEFs, cont.

Parameter Name	CAS	Point 11 WST39-18-162983		Point 12 WST39-18-162984	
		Result (mg/kg)	DC	Result (mg/kg)	DC
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	35822-46-9	1.17E-05	1	3.01E-06	1
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	67562-39-4	1.10E-06	1	4.96E-07	0
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	55673-89-7	4.98E-07	0	4.96E-07	0
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	39227-28-6	4.98E-07	0	4.96E-07	0
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	57653-85-7	4.98E-07	0	4.96E-07	0
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	19408-74-3	4.98E-07	0	4.96E-07	0
Hexachlorodibenzofuran[1,2,3,4,7,8-]	70648-26-9	4.98E-07	0	4.96E-07	0
Hexachlorodibenzofuran[1,2,3,6,7,8-]	57117-44-9	4.98E-07	0	4.96E-07	0
Hexachlorodibenzofuran[1,2,3,7,8,9-]	72918-21-9	4.98E-07	0	4.96E-07	0
Hexachlorodibenzofuran[2,3,4,6,7,8-]	60851-34-5	4.98E-07	0	4.96E-07	0
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	3268-87-9	9.57E-05	1	2.49E-05	1
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	39001-02-0	3.40E-06	1	9.93E-07	0
Pentachlorodibenzodioxin[1,2,3,7,8-]	40321-76-4	4.98E-07	0	4.96E-07	0
Pentachlorodibenzofuran[1,2,3,7,8-]	57117-41-6	4.98E-07	0	4.96E-07	0
Pentachlorodibenzofuran[2,3,4,7,8-]	57117-31-4	4.98E-07	0	4.96E-07	0
Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	9.96E-08	0	9.93E-08	0
Tetrachlorodibenzofuran[2,3,7,8-]	51207-31-9	5.60E-07	1	3.75E-07	1

Notes:
DC- Detect code (1 = detected, 0 = not detected)
mg/kg – milligram per kilogram
TEF – toxicity equivalent factor

Table 2-6. Human Health TECs and TEQs for Dioxin Furan Samples

	Point 1 WST39-18-162832	Point 1-Dup WST39-18-162973	Point 2 WST39-18-162974	Point 3 WST39-18-162975	Point 4 WST39-18-162976	Point 5 WST39-18-162977	Point 6 WST39-18-162978
Congener Name	**TECi**	**TECi**	**TECi**	**TECi**	**TECi**	**TECi**	**TECi**
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	8.52E-08	9.83E-08	4.57E-08	3.49E-08	5.01E-09	8.28E-09	8.60E-08
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	9.01E-09	1.00E-08	5.02E-09	4.98E-09	5.01E-09	5.01E-09	7.97E-09
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-09	5.02E-09	5.02E-09	4.98E-09	5.01E-09	5.01E-09	5.02E-09
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	2.16E-08	2.667E-08	1.074E-08	8.97E-09	5.88E-10	1.65E-09	1.65E-08
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	7.47E-10	8.19E-10	4.14E-10	2.99E-10	3.00E-10	3.00E-10	7.53E-10
Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	5.02E-07	5.02E-07	4.98E-07	5.01E-07	5.01E-07	5.02E-07
Pentachlorodibenzofuran[1,2,3,7,8-]	1.49E-08	1.506E-08	1.506E-08	1.49E-08	1.50E-08	1.50E-08	1.51E-08
Pentachlorodibenzofuran[2,3,4,7,8-]	1.49E-07	1.506E-07	1.506E-07	1.49E-07	1.50E-07	1.50E-07	1.51E-07
Tetrachlorodibenzodioxin[2,3,7,8-]	9.97E-08	1.00E-07	1.00E-07	9.97E-08	1.00E-07	1.00E-07	1.00E-07
Tetrachlorodibenzofuran[2,3,7,8-]	3.65E-08	3.63E-08	2.01E-08	2.57E-08	1.05E-08	1.36E-08	1.87E-08
TEQ	1.27E-06	1.30 E-06	1.21E-06	1.19E-06	1.14E-06	1.15E-06	1.25E-06

Notes: The TECi are summed in each column to obtain the TEQ.

Table 2-6. Human Health TECs and TEQs for Dioxin Furan Samples, cont.

Congener Name	Point 7 WST39-18-162979	Point 8 WST39-18-162980	Point 9 WST39-18-162981	Point 10 WST39-18-162982	Point 11 WST39-18-162983	Point 12 WST39-18-162984
	TECi	TECi	TECi	TECi	TECi	TECi
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	5.86E-08	1.13E-08	6.07E-09	5.21E-08	1.17E-07	3.01E-08
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	2.21E-08	4.98E-09	4.98E-09	6.88E-09	1.10E-08	4.96E-09
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-09	4.98E-09	4.98E-09	4.99E-09	4.98E-09	4.96E-09
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	2.05E-08	2.90E-09	1.17E-09	1.23E-08	2.87E-08	7.47E-09
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	5.76E-09	2.99E-10	2.99E-10	3.54E-10	1.02E-09	2.98E-10
Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	4.98E-07	4.98E-07	4.99E-07	4.98E-07	4.96E-07
Pentachlorodibenzofuran[1,2,3,7,8-]	1.49E-08	1.49E-08	1.49E-08	1.50E-08	1.49E-08	1.49E-08
Pentachlorodibenzofuran[2,3,4,7,8-]	1.49E-07	1.49E-07	1.49E-07	1.50E-07	1.49E-07	1.49E-07
Tetrachlorodibenzodioxin[2,3,7,8-]	9.97E-08	9.97E-08	9.96E-08	9.97E-08	9.96E-08	9.93E-08
Tetrachlorodibenzofuran[2,3,7,8-]	1.16E-08	1.44E-08	1.06E-08	5.50E-08	5.60E-08	3.75E-08
TEQ	1.23E-06	1.15E-06	1.14E-06	1.24E-06	1.33E-06	1.19E-06

Notes: Shaded cell indicates the maximum TEQ
TECi – toxicity equivalent concentration for each congener (product of measured concentration or MDL for nondetects and the TEF)
TEF – toxicity equivalent factor
TEQ – toxicity equivalent quotient (sum of the TECi values)

Table 2-7. Maximum 2,3,7,8 TCDD TEQ Cancer Risk and Hazard by Receptor

Receptor	Maximum TCDD TEQ (mg/kg)	NMSSL TCDD-Cancer (mg/kg)	Cancer Risk	NMSSL – TCDD Noncancer (mg/kg)	HQ
Residential	1.33E-06	4.90E-05	3E-07	5.06E-05	3E-02
Commercial/Industrial	1.33E-06	2.38E-04	6E-08	8.08E-04	2E-03
Construction Worker	1.33E-06	1.72E-03	8E-09	2.26E-04	6E-03

Table 2-8. Comparison of Maximum EPCs to Groundwater Protection Screening Levels

Category	Name	Maximum Result (mg/kg)	MTGW SL (mg/kg)	Maximum/ MTGW Ratio
Inorganics	Calcium	7160.00	NV	NA
	Chromium	47.90	4.91E+08	1E-07
	Copper	174.00	9.15E+02	2E-01
	Mercury	0.13	5.13E+00	3E-02
	Vanadium	48.30	1.26E+03	4E-02
	Zinc	62.50	7.41E+03	8E-03
Organics	Benzoic Acid	0.483	3.00E+02	2E-03
	Benzyl Alcohol	1.65	9.60E+00	2E-01
	Butylbenzylphthalate	0.0635	4.80E+01	1E-03
	Di-n-butylphthalate	0.1	3.38E+01	3E-03
	Fluoranthene	0.0187	1.34E+03	1E-05
	HMX	6.66	1.94E+01	3E-01
	Pyrene	0.0161	1.92E+02	8E-05
	TATB	6.76	4.20E+01	2E-01
Dioxin/Furans	2,3,7,8 TCDD TEQ	1.33E-06	2.24E-04	6E-03

Notes: Ratios are less than 1 indicating maximum values are below MTGW SLs
mg/kg- milligram per kilogram
MTGW SL – NMED (2021) groundwater protection screening level

Table 3-1. Ecological Screening Levels

Group	Name	No Effect ESL									
		American kestrel (Avian top carnivore)	American kestrel (insectivore / carnivore)	American robin (Avian herbivore)	American robin (Avian insectivore)	American robin (Avian omnivore)	Deer mouse (Mammalian omnivore)	Earthworm (Soil-dwelling invertebrate)	Generic plant (Terrestrial autotroph - producer)	Gray fox (Mammalian top carnivore)	Mountain cottontail (Mammalian herbivore)
Inorganics	Chromium (total)	8.60E+02	1.70E+02	5.10E+01	2.30E+01	3.20E+01	1.10E+02			1.80E+03	4.10E+02
	Copper	1.10E+03	8.00E+01	3.40E+01	1.40E+01	2.00E+01	6.30E+01	8.00E+01	7.00E+01	4.00E+03	2.60E+02
	Mercury (inorganic)	3.20E-01	5.80E-02	6.70E-02	1.30E-02	2.20E-02	3.00E+00	5.00E-02	3.40E+01	7.60E+01	2.30E+01
	Vanadium	1.10E+02	5.60E+01	6.80E+00	4.70E+00	5.50E+00	4.70E+02		6.00E+01	3.20E+03	7.40E+02
	Zinc	2.60E+03	2.20E+02	3.30E+02	4.70E+01	8.30E+01	1.70E+02	1.20E+02	1.60E+02	9.60E+03	1.80E+03
Dioxin/ Furan	Tetrachlorodibenzo dioxin[2,3,7,8-]	4.10E-06	4.10E-06	4.10E-06	4.10E-06	4.10E-06	5.80E-07	5.00E+00		1.00E-04	4.00E-05
Explosive	HMX						2.90E+02	1.60E+01	2.70E+03	5.90E+04	4.10E+02
	TATB						1.10E+02	1.00E+01		1.00E+04	1.50E+02
PA Hs	Fluoranthene						3.80E+01	1.00E+01		3.90E+03	2.70E+02
	Pyrene	3.00E+03	1.60E+02	6.80E+01	3.30E+01	4.40E+01	3.10E+01	1.00E+01		3.10E+03	1.10E+02
SVOCs	Benzoic Acid						1.30E+00			2.00E+03	4.60E+00
	Butyl Benzyl Phthalate						1.60E+02			2.30E+04	2.40E+03
	Di-n-Butyl Phthalate	2.00E+00	5.20E-02	3.80E-01	1.10E-02	2.10E-02	3.60E+02		1.60E+02	6.20E+04	1.70E+04
VOC	Benzyl Alcohol						1.20E+02			1.10E+05	1.90E+02

Group	Analyte Name	Low Effect ESL									
		American kestrel (Avian top carnivore)	**American kestrel (insectivore / carnivore)**	**American robin (Avian herbivore)**	**American robin (Avian insectivore)**	**American robin (Avian omnivore)**	**Deer mouse (Mammalian omnivore)**	**Earthworm (Soil-dwelling invertebrate)**	**Generic plant (Terrestrial autotroph - producer)**	**Gray fox (Mammalian top carnivore)**	**Mountain cottontail (Mammalian herbivore)**
Inorganics	Chromium (total)	2.70E+03	5.60E+02	1.60E+02	7.30E+01	1.00E+02	1.10E+04			1.80E+05	4.10E+04
	Copper	3.50E+03	2.40E+02	1.00E+02	4.30E+01	6.00E+01	1.00E+02	5.30E+02	4.90E+02	6.70E+03	4.30E+02
	Mercury (inorganic)	3.20E+00	5.80E-01	6.70E-01	1.30E-01	2.20E-01	3.00E+01	5.00E-01	6.40E+01	7.60E+02	2.30E+02
	Vanadium	2.30E+02	1.10E+02	1.30E+01	9.50E+00	1.10E+01	1.00E+03		8.00E+01	6.90E+03	1.50E+03
	Zinc	7.00E+03	5.90E+02	1.20E+02	1.20E+02	2.20E+02	1.70E+03	9.30E+02	8.10E+02	9.40E+04	1.80E+04
Dioxin/ Furan	2,3,7,8 TCDD						3.80E-06	1.00E+01		6.80E-04	2.70E-04
Explosive	HMX						7.90E+02	1.60E+02	3.50E+03	1.50E+05	1.10E+03
	TATB						1.10E+03	2.80E+01		1.00E+05	1.50E+03
PAH	Fluoranthene						3.80E+02	2.30E+01		3.90E+04	2.70E+03
	Pyrene	3.00E+04	1.60E+03	6.80E+02	3.30E+02	4.40E+02	3.10E+02	2.00E+01		3.10E+04	1.10E+03
SVOC	Benzoic Acid						1.30E+01			2.00E+04	4.60E+01
	Butyl Benzyl Phthalate						1.60E+03			2.30E+05	2.40E+04
	Di-n-Butyl Phthalate	2.00E+01	5.20E-01	3.80E+00	1.10E-01	2.10E-01	8.60E+02		6.00E+02	1.40E+05	4.00E+04
VOC	Benzyl Alcohol						1.20E+03			1.10E+06	1.90E+03

Notes: ESL source LANL (2020)
Only detected analytes and inorganics above background are reported.

Abbreviations:
BV – Background Value
ESL – Ecological Screening Value
Max– Maximum Exposure Point Concentration
mg/kg – Milligram per Kilogram
LE – Low Effect
NE – No Effect

Table 3-2. Ecological Risk Evaluation For Maximum EPCs and NE ESLs

Category	Parameter Name	Maximum EPC (mg/kg)	Number of Detects	American kestrel (Avian top carnivore)	American kestrel (insectivore / carnivore)	American robin (Avian herbivore)	American robin (Avian insectivore)	American robin (Avian omnivore)	Deer mouse (Mammalian omnivore)	Earthworm (Soil-dwelling invertebrate)	Generic plant (Terrestrial autotroph - producer)	Gray fox (Mammalian top carnivore)	Mountain cottontail (Mammalian herbivore)
Inorganic	Calcium	7160	13	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV
	Chromium	47.9	13	6E-02	3E-01	9E-01	2E+00	1E+00	4E-01	NV	NV	3E-02	1E-01
	Copper	174	13	2E-01	2E+00	5E+00	1E+01	9E+00	3E+00	2E+00	2E+00	4E-02	7E-01
	Mercury	0.131	7	4E-01	2E+00	2E+00	1E+01	6E+00	4E-02	3E+00	4E-03	2E-03	6E-03
	Vanadium	48.3	13	4E-01	9E-01	7E+00	1E+01	9E+00	1E-01	NV	8E-01	2E-02	7E-02
	Zinc	62.5	13	2E-02	3E-01	2E-01	1E+00	8E-01	4E-01	5E-01	4E-01	7E-03	3E-02
Organic	Benzoic Acid	0.483	1	NV	NV	NV	NV	NV	4E-01	NV	NV	2E-04	1E-01
	Benzyl Alcohol	1.65	7	NV	NV	NV	NV	NV	1E-02	NV	NV	2E-05	9E-03
	Butylbenzylphthalate	0.0635	2	NV	NV	NV	NV	NV	4E-04	NV	NV	3E-06	3E-05
	Di-n-butylphthalate	0.1	5	5E-02	2E+00	3E-01	9E+00	5E+00	3E-04	NV	6E-04	2E-06	6E-06
	Fluoranthene	0.0187	1	NV	NV	NV	NV	NV	5E-04	2E-03	NV	5E-06	7E-05
	HMX	6.66	7	NV	NV	NV	NV	NV	2E-02	4E-01	2E-03	1E-04	2E-02
	Pyrene	0.0161	1	5E-06	1E-04	2E-04	5E-04	4E-04	5E-04	2E-03	NV	5E-06	1E-04
	TATB	6.76	6	NV	NV	NV	NV	NV	6E-02	7E-01	NV	7E-04	5E-02
	2,3,7,8 TCDD TEQ [Bird]	2.02E-06	NA	5E-01	5E-01	5E-01	5E-01	5E-01	NV	NV	NV	NV	NV
	2,3,7,8 TCDD TEQ [Mammal]	1.33E-06	NA	NV	NV	NV	NV	NV	2E+00	3E-07	NV	1E-02	5E+00
	Hazard Index (HI)			2E+00	8E+00	2E+01	5E+01	3E+01	6E+00	6E+00	4E+00	1E-01	6E+00

Notes:
Shaded cells indicate the ratio > 0.1 for initial screening evaluation
HI is the sum of all HQs

Abbreviations:
EPC – exposure point concentration
ESL – ecological screening level
HI – hazard Index
mg/kg – milligram per kilogram
NE – no effect
NV – No value

Table 3-3. Ecological Risk Evaluation For Refined EPCs and LE ESLs

Analyte Name	Refined EPC (mg/kg)	Hazard Quotients (HQs) for Refined EPCs and LE ESLs									
		American kestrel (Avian top carnivore)	American kestrel (insectivore / carnivore)	American robin (Avian herbivore)	American robin (Avian insectivore)	American robin (Avian omnivore)	Deer mouse (Mammalian omnivore)	Earthworm (Soil-dwelling invertebrate)	Generic plant (Terrestrial autotroph - producer)	Gray fox (Mammalian top carnivore)	Mountain cottontail (Mammalian herbivore)
Calcium	5624	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV
Chromium (total)	23.27	9E-03	4E-02	1E-01	3E-01	2E-01	2E-03	NV	NV	1E-04	6E-04
Copper	109.4	3E-02	5E-01	1E+00	3E+00	2E+00	1E+00	2E-01	2E-01	2E-02	3E-01
Mercury (inorganic)	0.054	2E-02	9E-02	8E-02	4E-01	2E-01	2E-03	1E-01	8E-04	7E-05	2E-04
Vanadium	38.2	2E-01	3E-01	3E+00	4E+00	3E+00	4E-02	NV	5E-01	6E-03	3E-02
Zinc	45.51	7E-03	8E-02	4E-01	4E-01	2E-01	3E-02	5E-02	6E-02	5E-04	3E-03
Benzoic Acid	0.168	NV	NV	NV	NV	NV	1E-02	NV	NV	8E-06	4E-03
Benzyl Alcohol	0.683	NV	NV	NV	NV	NV	6E-04	NV	NV	6E-07	4E-04
Butyl Benzyl Phthalate	0.010	NV	NV	NV	NV	NV	6E-06	NV	NV	4E-08	4E-07
Di-n-Butyl Phthalate	0.010	5E-04	2E-02	3E-03	9E-02	5E-02	1E-05	NV	2E-05	7E-08	3E-07
Fluoranthene	0.010	NV	NV	NV	NV	NV	3E-05	4E-04	NV	3E-07	4E-06
HMX	3.874	NV	NV	NV	NV	NV	5E-03	2E-02	1E-03	3E-05	4E-03
Pyrene	0.010	3E-07	6E-06	1E-05	3E-05	2E-05	3E-05	5E-04	NV	3E-07	9E-06
TATB	2.938	NV	NV	NV	NV	NV	3E-03	1E-01	NV	3E-05	2E-03
2,3,7,8 TCDD TEQ	1.8E-06 (bird) 1.24-06 (mammal)	NV	NV	NV	NV	NV	3E-01	1E-07	NV	2E-03	5E-03
Hazard Index		2E-01	1E+00	5E+00	8E+00	6E+00	1E+00	5E-01	8E-01	2E-02	3E-01

Notes:Shaded cells indicate the ratio > 0.1
Hazard Index is the sum of all HQs

Abbreviations:
EPC – Exposure point concentration
ESL – Ecological Screening Level
HQ – Hazard quotient
LE – Low Effect
mg/kg – milligram per kilogram
NV – No value

Table 3-4. Toxic Equivalency Factors (TEFs) Used for Calculating Ecological TCDD Equivalent Concentrations

Name	CAS	Mammalian TEF[a]	Avian TEF[b]
Chlorinated dibenzo-p-dioxins			
2,3,7,8-TCDD	1746-01-6	1	1
1,2,3,7,8-PeCDD	40321-76-4	1	1
1,2,3,4,7,8-HxCDD	39227-28-6	0.1	0.05
1,2,3,6,7,8-HxCDD	57653-85-7	0.1	0.01
1,2,3,7,8,9-HxCDD	19408-74-3	0.1	0.1
1,2,3,4,6,7,8-HpCDD	35822-46-9	0.01	0.001
OCDD	3268-87-9	0.0003	0.0001
Chlorinated dibenzofurans			
2,3,7,8-TCDF	51207-31-9	0.1	1
1,2,3,7,8-PeCDF	57117-41-6	0.03	0.1
2,3,4,7,8-PeCDF	57117-31-4	0.3	0.1
1,2,3,4,7,8-HxCDF	70648-26-9	0.1	1
1,2,3,6,7,8-HxCDF	57117-44-9	0.1	0.1
1,2,3,7,8,9-HxCDF	72918-21-9	0.1	0.1
2,3,4,6,7,8-HxCDF	60851-34-5	0.1	0.1
1,2,3,4,6,7,8-HpCDF	67562-39-4	0.01	0.01
1,2,3,4,7,8,9-HpCDF	55673-89-7	0.01	0.01
OCDF	39001-02-0	0.0003	0.0001

[a] EPA (2010a,b); WHO (2009)
[b] Van den Berg et al. (1998)

Table 3-5. Dioxin-Furan Mammal TECi, and TEQs by Sample

Congener Name	Point 1 WST39-18-162832 TECi	Point 1-Dup WST39-18-162973 TECi	Point 2 WST39-18-162974 TECi	Point 3 WST39-18-162975 TECi	Point 4 WST39-18-162976 TECi	Point 5 WST39-18-162977 TECi	Point 6 WST39-18-162978 TECi
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	8.52E-08	9.83E-08	4.57E-08	3.49E-08	5.01E-09	8.28E-09	8.60E-08
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	9.01E-09	1.00E-08	5.02E-09	4.98E-09	5.01E-09	5.01E-09	7.97E-09
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-09	5.02E-09	5.02E-09	4.98E-09	5.01E-09	5.01E-09	5.02E-09
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	2.16E-08	2.67E-08	1.07E-08	8.97E-09	5.88E-10	1.65E-09	1.65E-08
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	7.47E-10	8.19E-10	4.14E-10	2.99E-10	3.00E-10	3.00E-10	7.53E-10
Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	5.02E-07	5.02E-07	4.98E-07	5.01E-07	5.01E-07	5.02E-07
Pentachlorodibenzofuran[1,2,3,7,8-]	1.49E-08	1.51E-08	1.51E-08	1.49E-08	1.50E-08	1.50E-08	1.51E-08
Pentachlorodibenzofuran[2,3,4,7,8-]	1.49E-07	1.51E-07	1.51E-07	1.49E-07	1.50E-07	1.50E-07	1.51E-07
Tetrachlorodibenzodioxin[2,3,7,8-]	9.97E-08	1.00E-07	1.00E-07	9.97E-08	1.00E-07	1.00E-07	1.00E-07
Tetrachlorodibenzofuran[2,3,7,8-]	3.65E-08	3.63E-08	2.01E-08	2.57E-08	1.05E-08	1.36E-08	1.87E-08
TEQ	**1.27E-06**	**1.30E-06**	**1.21E-06**	**1.19E-06**	**1.14E-06**	**1.15E-06**	**1.25E-06**

Table 3-5. Dioxin-Furan Mammal TECi, and TEQs by Sample, cont.

Congener Name	Point 7 WST39-18-162979 TECi	Point 8 WST39-18-162980 TECi	Point 9 WST39-18-162981 TECi	Point 10 WST39-18-162982 TECi	Point 11 WST39-18-162983 TECi	Point 12 WST39-18-162984 TECi
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	5.86E-08	1.13E-08	6.07E-09	5.21E-08	1.17E-07	3.01E-08
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	2.21E-08	4.98E-09	4.98E-09	6.88E-09	1.10E-08	4.96E-09
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-09	4.98E-09	4.98E-09	4.99E-09	4.98E-09	4.96E-09
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	2.05E-08	2.90E-09	1.17E-09	1.23E-08	2.87E-08	7.47E-09
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	5.76E-09	2.99E-10	2.99E-10	3.54E-10	1.02E-09	2.98E-10
Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	4.98E-07	4.98E-07	4.99E-07	4.98E-07	4.96E-07
Pentachlorodibenzofuran[1,2,3,7,8-]	1.49E-08	1.49E-08	1.49E-08	1.50E-08	1.49E-08	1.49E-08
Pentachlorodibenzofuran[2,3,4,7,8-]	1.49E-07	1.49E-07	1.49E-07	1.50E-07	1.49E-07	1.49E-07
Tetrachlorodibenzodioxin[2,3,7,8-]	9.97E-08	9.97E-08	9.96E-08	9.97E-08	9.96E-08	9.93E-08
Tetrachlorodibenzofuran[2,3,7,8-]	1.16E-08	1.44E-08	1.06E-08	5.50E-08	5.60E-08	3.75E-08
TEQ	**1.23E-06**	**1.15E-06**	**1.14E-06**	**1.24E-06**	**1.33E-06**	**1.19E-06**

Notes: The data and detection status were reported in Table 2-5. The TEFs for mammals are reported in Table 3-4.
All data in mg/kg.

Abbreviations:
TECi – Toxicity Equivalent Concentration for Congener i;
TEF – Toxicity Equivalency Factor;
TEQ – Toxicity Equivalent Quotient

Table 3-6. Dioxin-Furan Avian TECs and TEQs by Sample	**Point 1 WST39-18-162832**	**Point 1-Dup WST39-18-162973**	**Point 2 WST39-18-162974**	**Point 3 WST39-18-162975**	**Point 4 WST39-18-162976**	**Point 5 WST39-18-162977**	**Point 6 WST39-18-162978**
Congener Name	**TECi**	**TECi**	**TECi**	**TECi**	**TECi**	**TECi**	**TECi**
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	8.52E-09	9.83E-09	4.57E-09	3.49E-09	5.01E-10	8.28E-10	8.60E-09
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	9.01E-09	1.00E-08	5.02E-09	4.98E-09	5.01E-09	5.01E-09	7.97E-09
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-09	5.02E-09	5.02E-09	4.98E-09	5.01E-09	5.01E-09	5.02E-09
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	2.49E-08	2.51E-08	2.51E-08	2.49E-08	2.51E-08	2.51E-08	2.51E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.98E-09	5.02E-09	5.02E-09	4.98E-09	5.01E-09	5.01E-09	5.02E-09
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-07	5.02E-07	5.02E-07	4.98E-07	5.01E-07	5.01E-07	5.02E-07
Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	7.21E-09	8.89E-09	3.58E-09	2.99E-09	1.96E-10	5.50E-10	5.49E-09
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	2.49E-10	2.73E-10	1.38E-10	9.97E-11	1.00E-10	1.00E-10	2.51E-10
Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	5.02E-07	5.02E-07	4.98E-07	5.01E-07	5.01E-07	5.02E-07
Pentachlorodibenzofuran[1,2,3,7,8-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Pentachlorodibenzofuran[2,3,4,7,8-]	4.98E-08	5.02E-08	5.02E-08	4.98E-08	5.01E-08	5.01E-08	5.02E-08
Tetrachlorodibenzodioxin[2,3,7,8-]	9.97E-08	1.00E-07	1.00E-07	9.97E-08	1.00E-07	1.00E-07	1.00E-07
Tetrachlorodibenzofuran[2,3,7,8-]	3.65E-07	3.63E-07	2.01E-07	2.57E-07	1.05E-07	1.36E-07	1.87E-07
TEQ	**1.82E-06**	**1.83E-06**	**1.65E-06**	**1.70E-06**	**1.55E-06**	**1.58E-06**	**1.65E-06**

Table 3-6. Dioxin-Furan Avian TECs and TEQs by Sample, cont.

Congener Name	Point 7 WST39-18-162979	Point 8 WST39-18-162980	Point 9 WST39-18-162981	Point 10 WST39-18-162982	Point 11 WST39-18-162983	Point 12 WST39-18-162984
	TECi	TECi	TECi	TECi	TECi	TECi
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	5.86E-09	1.13E-09	6.07E-10	5.21E-09	1.17E-08	3.01E-09
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	2.21E-08	4.98E-09	4.98E-09	6.88E-09	1.10E-08	4.96E-09
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	4.98E-09	4.98E-09	4.98E-09	4.99E-09	4.98E-09	4.96E-09
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	2.49E-08	2.49E-08	2.49E-08	2.50E-08	2.49E-08	2.48E-08
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	4.98E-09	4.98E-09	4.98E-09	4.99E-09	4.98E-09	4.96E-09
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Hexachlorodibenzofuran[1,2,3,4,7,8-]	4.98E-07	4.98E-07	4.98E-07	4.99E-07	4.98E-07	4.96E-07
Hexachlorodibenzofuran[1,2,3,6,7,8-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Hexachlorodibenzofuran[1,2,3,7,8,9-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Hexachlorodibenzofuran[2,3,4,6,7,8-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	6.84E-09	9.66E-10	3.91E-10	4.10E-09	9.57E-09	2.49E-09
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	1.92E-09	9.97E-11	9.96E-11	1.18E-10	3.40E-10	9.93E-11
Pentachlorodibenzodioxin[1,2,3,7,8-]	4.98E-07	4.98E-07	4.98E-07	4.99E-07	4.98E-07	4.96E-07
Pentachlorodibenzofuran[1,2,3,7,8-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Pentachlorodibenzofuran[2,3,4,7,8-]	4.98E-08	4.98E-08	4.98E-08	4.99E-08	4.98E-08	4.96E-08
Tetrachlorodibenzodioxin[2,3,7,8-]	9.97E-08	9.97E-08	9.96E-08	9.97E-08	9.96E-08	9.93E-08
Tetrachlorodibenzofuran[2,3,7,8-]	1.16E-07	1.44E-07	1.06E-07	5.50E-07	5.60E-07	3.75E-07
TEQ	**1.58E-06**	**1.58E-06**	**1.54E-06**	**2.00E-06**	**2.02E-06**	**1.81E-06**

Notes: The data and detection status were reported in Table 2-5. The TEFs for birds are reported in Table 3-4.
All data in mg/kg.

Abbreviations:
TECi – Toxicity Equivalent Concentration for Congener i;
TEF – Toxicity Equivalency Factor;
TEQ – Toxicity Equivalent Quotient

Table 3-7. Area Use Factors for TA 39-6 and Risks based on the NE ESL

COPC Name	CAS	No Effect Ecological Screening Levels (ESLs) for Terrestrial Receptors (mg/kg)									
		American kestrel (Avian top carnivore)	American kestrel (insectivore / carnivore)	American robin (Avian herbivore)	American robin (Avian insectivore)	American robin (Avian omnivore)	Deer mouse (Mammalian omnivore)	Earthworm (Soil-dwelling invertebrate)	Generic plant (Terrestrial autotroph - producer)	Gray fox (Mammalian top carnivore)	Mountain cottontail (Mammalian herbivore)
Calcium	Ca	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL
Chromium (total)	16065-83-1	860	170	51	23	32	110	No ESL	No ESL	1800	410
Copper	7440-50-8	1100	80	34	14	20	63	80	70	4000	260
Mercury (inorganic)	7487-94-7	0.32	0.058	0.067	0.013	0.022	3	0.05	34	76	23
Vanadium	7440-62-2	110	56	6.8	4.7	5.5	470	No ESL	60	3200	740
Zinc	7440-66-6	2600	220	330	47	83	170	120	160	9600	1800
Benzoic Acid	65-85-0	No ESL	No ESL	No ESL	No ESL	No ESL	1.3	No ESL	No ESL	2000	4.6
Benzyl Alcohol	100-51-6	No ESL	No ESL	No ESL	No ESL	No ESL	120	No ESL	No ESL	110000	190
Butylbenzylphthalate	85-68-7	No ESL	No ESL	No ESL	No ESL	No ESL	160	No ESL	No ESL	23000	2400
Di-n-butylphthalate	84-74-2	2	0.052	0.38	0.011	0.021	360	No ESL	160	62000	17000
Fluoranthene	206-44-0	No ESL	No ESL	No ESL	No ESL	No ESL	38	10	No ESL	3900	270
HMX	2691-41-0	No ESL	No ESL	No ESL	No ESL	No ESL	290	16	2700	59000	410
Pyrene	129-00-0	3000	160	68	33	44	31	10	No ESL	3100	110
TATB	3058-38-6	No ESL	No ESL	No ESL	No ESL	No ESL	110	10	No ESL	10000	150
2,3,7,8 TCDD	1746-01-6	4.10E-06	4.10E-06	4.10E-06	4.10E-06	4.10E-06	5.80E-07	5.00E+00	No ESL	1.00E-04	4.00E-05

HR (ha)[a]	106	106	0.42	0.42	0.42	0.077	NA	NA	1038	3.1
Population Area[b]	4240	4240	16.8	16.8	16.8	3.08	NA	NA	41520	124
PAUF[c]	0.000004	0.000004	0.001	0.001	0.001	0.005	NA	NA	2.41E-07	0.0001
AUF[d]	0.0001	0.0001	0.04	0.04	0.04	0.19	NA	NA	9.63E-06	0.005

COPC Name	UCL95 EPC (mg/kg)	Population Area Use Adjusted NE ESL Hazard Quotients									
		American kestrel (Avian top carnivore)	American kestrel (insectivore / carnivore)	American robin (Avian herbivore)	American robin (Avian insectivore)	American robin (Avian omnivore)	Deer mouse (Mammalian omnivore)	Earthworm (Soil-dwelling invertebrate)	Generic plant (Terrestrial autotroph - producer)	Gray fox (Mammalian top carnivore)	Mountain cottontail (Mammalian herbivore)
Inorganics											
Calcium	5624.00	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL
Chromium	23.27	1E-07	5E-07	4E-04	9E-04	6E-04	1E-03	No ESL	No ESL	3E-09	7E-06
Copper	109.40	4E-07	5E-06	3E-03	7E-03	5E-03	8E-03	1E+00	2E+00	7E-09	5E-05
Mercury	0.0536	6E-07	3E-06	7E-04	4E-03	2E-03	9E-05	1E+00	2E-03	2E-10	3E-07
Vanadium	38.20	1E-06	2E-06	5E-03	7E-03	6E-03	4E-04	No ESL	6E-01	3E-09	6E-06
Zinc	45.51	6E-08	7E-07	1E-04	9E-04	5E-04	1E-03	4E-01	3E-01	1E-09	3E-06
Organics											
Benzoic Acid	0.168	No ESL	No ESL	No ESL	No ESL	No ESL	6E-04	No ESL	No ESL	2E-11	4E-06
Benzyl Alcohol	0.683	No ESL	No ESL	No ESL	No ESL	No ESL	3E-05	No ESL	No ESL	1E-12	4E-07
Butylbenzylphthalate	0.01	No ESL	No ESL	No ESL	No ESL	No ESL	3E-07	No ESL	No ESL	1E-13	5E-10
Di-n-butylphthalate	0.01	2E-08	7E-07	2E-05	8E-04	4E-04	1E-07	No ESL	6E-05	4E-14	7E-11
Fluoranthene	0.01	No ESL	No ESL	No ESL	No ESL	No ESL	1E-06	1E-03	No ESL	6E-13	4E-09
HMX	3.874	No ESL	No ESL	No ESL	No ESL	No ESL	7E-05	2E-01	1E-03	2E-11	1E-06
Pyrene	0.01	1E-11	2E-10	1E-07	3E-07	2E-07	2E-06	1E-03	No ESL	8E-13	1E-08
TATB	2.938	No ESL	No ESL	No ESL	No ESL	No ESL	1E-04	3E-01	No ESL	7E-11	2E-06
2,3,7,8 TCDD (bird)	1.80E-06	2E-06	2E-06	4E-04	4E-04	4E-04	NA	NA	NA	NA	NA
2,3,7,8 TCDD (mammal)	1.24E-06	NA	NA	NA	NA	NA	1E-02	2E-07	No ESL	3E-09	4E-06
Hazard Index		4E-06	1E-05	1E-02	2E-02	2E-02	2E-02	3E+00	2E+00	2E-08	8E-05

Notes: the mammal TCDD TEQ is used for earthworms
Area of Site (ha): 0.015

NA - Not applicable
ESLs - Ecological screening level
PAUF - Population area use factor
AUF - Area use factor
HR - Home range

a - Values from USEPA (1993)
b - Derived as 40*HR
c - PAUF is the area of site divided by the Population Area
d - AUF is the area of the site divided by the HR; AUF cannot exceed 1 and value is set to 1 if calculation results in a higher value

Table 3-8. Area Use Factors for TA 39-6 and Risks based on the LE ESL.

COPC Name	CAS	Low Effect Ecological Screening Levels (LE ESLs) for Terrestrial Receptors (mg/kg)									
		American kestrel (Avian top carnivore)	American kestrel (insectivore / carnivore)	American robin (Avian herbivore)	American robin (Avian insectivore)	American robin (Avian omnivore)	Deer mouse (Mammalian omnivore)	Earthworm (Soil-dwelling invertebrate)	Generic plant (Terrestrial autotroph - producer)	Gray fox (Mammalian top carnivore)	Mountain cottontail (Mammalian herbivore)
Calcium	Ca	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL
Chromium (total)	16065-83-1	2700	560	160	73	100	11000	No ESL	No ESL	180000	41000
Copper	7440-50-8	3500	240	100	43	60	100	530	490	6700	430
Mercury (inorganic)	7487-94-7	3.2	0.58	0.67	0.13	0.22	30	0.5	64	760	230
Vanadium	7440-62-2	230	110	13	9.5	11	1000	No ESL	80	6900	1500
Zinc	7440-66-6	7000	590	120	120	220	1700	930	810	94000	18000
Benzoic Acid	65-85-0	No ESL	No ESL	No ESL	No ESL	No ESL	13	No ESL	No ESL	20000	46
Benzyl Alcohol	100-51-6	No ESL	No ESL	No ESL	No ESL	No ESL	1200	No ESL	No ESL	1100000	1900
Butylbenzylphthalate	85-68-7	No ESL	No ESL	No ESL	No ESL	No ESL	1600	No ESL	No ESL	230000	24000
Di-n-butylphthalate	84-74-2	20	0.52	3.8	0.11	0.21	860	No ESL	600	140000	40000
Fluoranthene	206-44-0	No ESL	No ESL	No ESL	No ESL	No ESL	380	23	No ESL	39000	2700
HMX	2691-41-0	No ESL	No ESL	No ESL	No ESL	No ESL	790	160	3500	150000	1100
Pyrene	129-00-0	30000	1600	680	330	440	310	20	No ESL	31000	1100
TATB	3058-38-6	No ESL	No ESL	No ESL	No ESL	No ESL	1100	28	No ESL	100000	1500
2,3,7,8 TCDD	1746-01-6	No ESL	No ESL	No ESL	No ESL	No ESL	0.0000038	10	No ESL	0.00068	0.00027

HR (ha)[a]	106	106	0.42	0.42	0.42	0.077	NA	NA	1038	3.1
Population Area[b]	4240	4240	16.8	16.8	16.8	3.08	NA	NA	41520	124
PAUF[c]	0.000004	0.000004	0.001	0.001	0.001	0.005	NA	NA	2.41E-07	0.0001
AUF[d]	0.0001	0.0001	0.04	0.04	0.04	0.19	NA	NA	9.63E-06	0.005

COPC Name	UCL95 EPC (mg/kg)	Population Area Use Adjusted LE ESL Hazard Quotients									
		American kestrel (Avian top carnivore)	American kestrel (insectivore / carnivore)	American robin (Avian herbivore)	American robin (Avian insectivore)	American robin (Avian omnivore)	Deer mouse (Mammalian omnivore)	Earthworm (Soil-dwelling invertebrate)	Generic plant (Terrestrial autotroph - producer)	Gray fox (Mammalian top carnivore)	Mountain cottontail (Mammalian herbivore)
Inorganics											
Calcium	5624.00	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL	No ESL
Chromium	23.27	3E-08	1E-07	1E-04	3E-04	2E-04	1E-05	No ESL	No ESL	3E-11	7E-08
Copper	109.40	1E-07	2E-06	1E-03	2E-03	2E-03	5E-03	2E-01	2E-01	4E-09	3E-05
Mercury	0.0536	6E-08	3E-07	7E-05	4E-04	2E-04	9E-06	1E-01	8E-04	2E-11	3E-08
Vanadium	38.20	6E-07	1E-06	3E-03	4E-03	3E-03	2E-04	No ESL	5E-01	1E-09	3E-06
Zinc	45.51	2E-08	3E-07	3E-04	3E-04	2E-04	1E-04	5E-02	6E-02	1E-10	3E-07
Organics											
Benzoic Acid	0.168	No ESL	No ESL	No ESL	No ESL	No ESL	6E-05	No ESL	No ESL	2E-12	4E-07
Benzyl Alcohol	0.683	No ESL	No ESL	No ESL	No ESL	No ESL	3E-06	No ESL	No ESL	1E-13	4E-08
Butylbenzylphthalate	0.01	No ESL	No ESL	No ESL	No ESL	No ESL	3E-08	No ESL	No ESL	1E-14	5E-11
Di-n-butylphthalate	0.01	2E-09	7E-08	2E-06	8E-05	4E-05	6E-08	No ESL	2E-05	2E-14	3E-11
Fluoranthene	0.01	No ESL	No ESL	No ESL	No ESL	No ESL	1E-07	4E-04	No ESL	6E-14	4E-10
HMX	3.874	No ESL	No ESL	No ESL	No ESL	No ESL	2E-05	2E-02	1E-03	6E-12	4E-07
Pyrene	0.01	1E-12	2E-11	1E-08	3E-08	2E-08	2E-07	5E-04	No ESL	8E-14	1E-09
TATB	2.938	No ESL	No ESL	No ESL	No ESL	No ESL	1E-05	1E-01	No ESL	7E-12	2E-07
2,3,7,8 TCDD TEQ (mammal)	1.24E-06	No ESL	No ESL	No ESL	No ESL	No ESL	2E-03	1E-07	No ESL	4E-10	6E-07
Hazard Index		8E-07	4E-06	4E-03	7E-03	5E-03	7E-03	5E-01	8E-01	6E-09	4E-05

Notes: the mammal TCDD TEQ is used for earthworms
Area of Site (ha): 0.015

NA - Not applicable
ESLs - Ecological screening level
PAUF - Population area use factor
AUF - Area use factor
HR - Home range

a - Values from USEPA (1993)
b - Derived as 40*HR
c - PAUF is the area of site divided by the Population Area
d - AUF is the area of the site divided by the HR; AUF cannot exceed 1 and value is set to 1 if calculation results in a higher value

FIGURES

Figure 1-1. Location of TA-39 at the Los Alamos National Laboratory

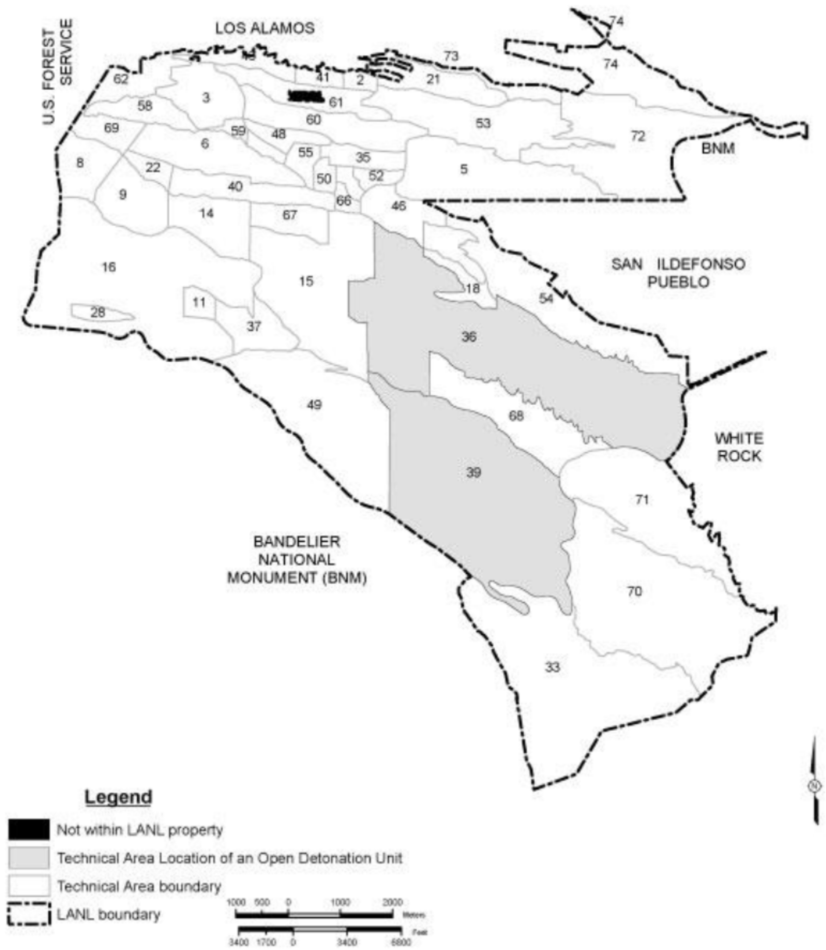


Figure 1-2. Sample Location Map for TA-39-6 OD Area

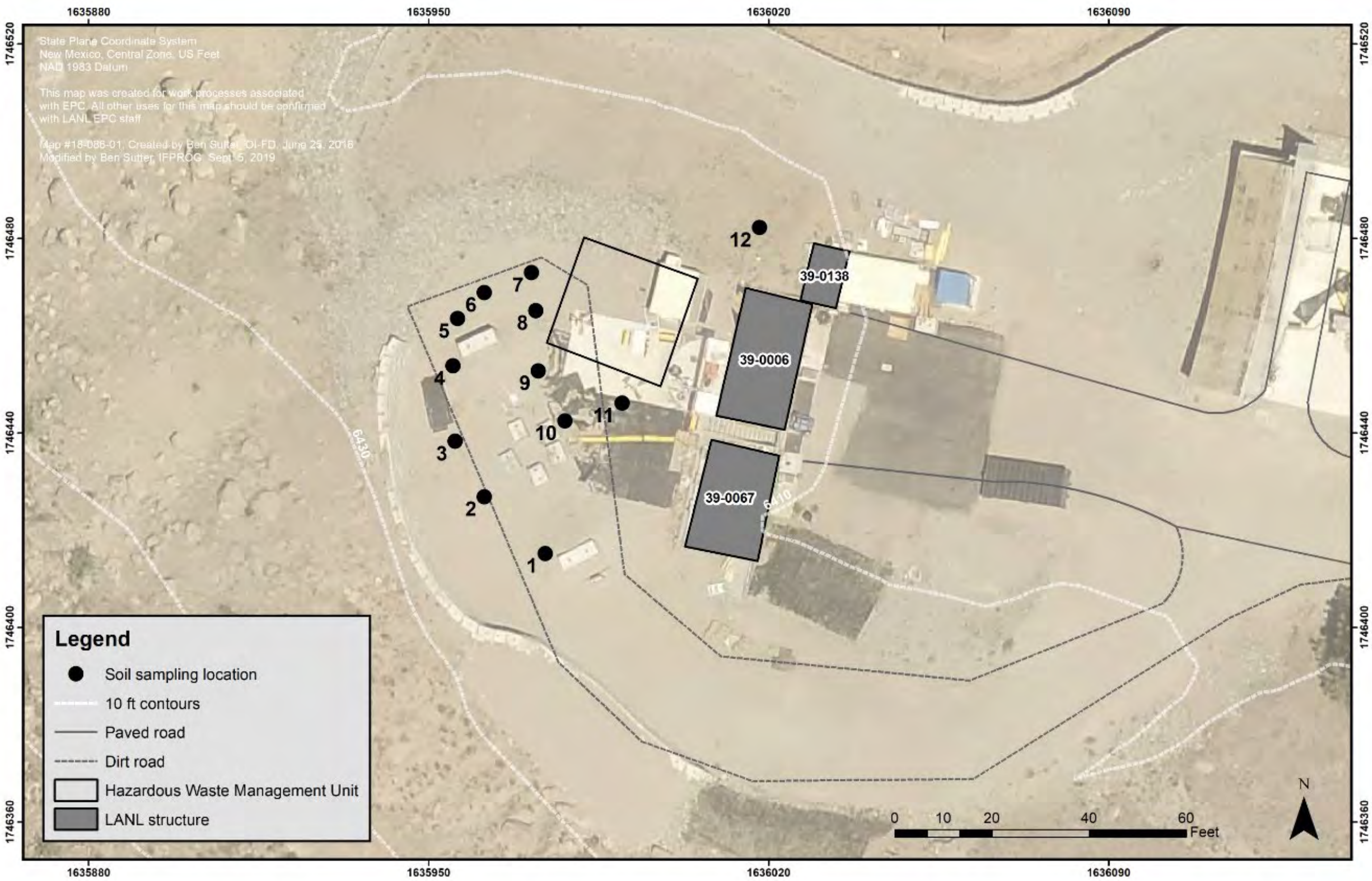
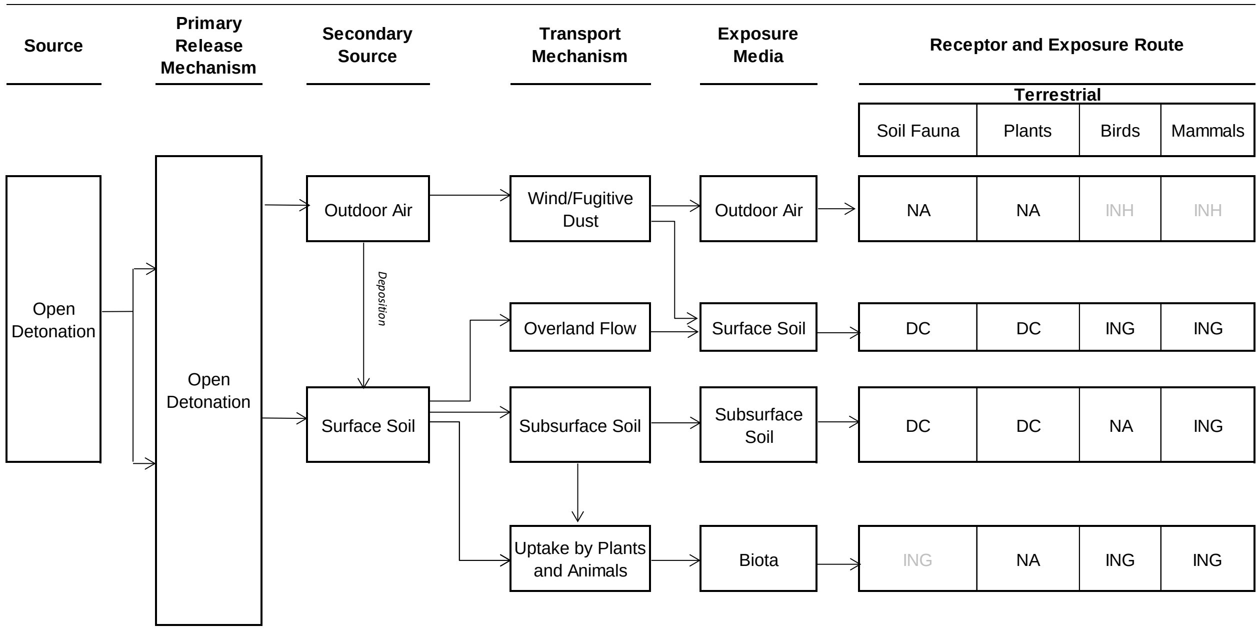


Figure 3-1. Conceptual Site Exposure Model for the ERA



Abbreviations

DC	Direct contact; applies to receptors for which toxic effects are addressed by exposure concentration and not dose
ING	Ingestion; typically quantified as dose for birds and mammals only
INH	Inhalation; recognized to occur, but not typically quantified as standard practice with the exception of evaluating burrow air exposure by burrowing mammals
NA	Pathway considered incomplete; not applicable

Notes:

Grayed text indicates pathways are recognized to potentially exist but are not quantified. Inhalation is considered minimal relative to dietary exposure. Ingestion by invertebrates is not typically quantified due to absence of accurate exposure parameters.

ATTACHMENT A. PROUCL OUTPUT FOR UPPER CONFIDENCE LIMIT CALCULATIONS

Summary of UCL95s Used in ERA. ProUCL output is reported below.

ERA	UCL95 (mg/kg)	UCL Type	Distribution
Calcium	5624.00	95% Student's-t UCL	Normal
Chromium	23.27	95% Student's-t UCL	Normal
Copper	109.40	95% Adjusted Gamma UCL (use when n<50)	Gamma
Mercury	0.0536	95% KM (t) UCL	Normal
Vanadium	38.20	95% Student's-t UCL	Normal
Zinc	45.51	95% Student's-t UCL	Normal
Benzoic Acid	0.168	Median all	1 detect
Benzyl Alcohol	0.683	95% KM (t) UCL	Normal
Butyl Benzyl Phthalate	0.01	Median all	2 detects
Di-n-Butyl Phthalate	0.01	Median all	4 detects
Fluoranthene	0.01	Median all	1 detect
HMX	3.874	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	Gamma
Pyrene	0.01	Median all	1 detect
TATB	2.938	95% Gamma Adjusted KM-UCL (use when n<50)	Gamma
Tetrachlorodibenzofuran[2,3,7,8-] (mammal)	1.24E-06	95% Student's-t UCL	Normal

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects - Max of Duplicate pair

User Selected Options		
Date/Time of Computation	ProUCL 5.14/27/2022 12:50:06 PM	
From File	BKG data for ProUCL tests.xls	
Full Precision	OFF	
Confidence Coefficient	95%	
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)	
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median	
Sample 1 Data: Ca(ta39 6)		
Sample 2 Data: Ca(bkg)		
Raw Statistics		
	Sample 1	Sample 2
Number of Valid Data	12	173
Number of Non-Detects	0	0
Number of Detect Data	12	173
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non-detects	0.00%	0.00%
Minimum Detect	588	500
Maximum Detect	7160	14000
Mean of Detects	4669	2644
Median of Detects	4925	2100
SD of Detects	1841	1771
Wilcoxon-Mann-Whitney (WMW) Test		
H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2		
Sample 1 Rank Sum W-Stat	1782	
Standardized WMW U-Stat	3.712	
Mean (U)	1038	
SD(U) - Adj ties	179.3	
Approximate U-Stat Critical Value (0.05)	1.645	
P-Value (Adjusted for Ties)	1.03E-04	

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.14/27/2022 12:53:54 PM
From File	BKG data for ProUCL tests.xls
Full Precision	OFF
Confidence Coefficient	95%

Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)	
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median	

Sample 1 Data: Cr(ta39 6)
Sample 2 Data: Cr(bkg)
Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	12	173
Number of Non-Detects	0	0
Number of Detect Data	12	173
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non-detects	0.00%	0.00%
Minimum Detect	3.22	1.9
Maximum Detect	47.9	36.5
Mean of Detects	16.95	9.04
Median of Detects	12.25	8.6
SD of Detects	12.19	4.363

Wilcoxon-Mann-Whitney (WMW) Test
H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	1687
Standardized WMW U-Stat	3.182
Mean (U)	1038
SD(U) - Adj ties	179.3
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	7.31E-04

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.14/27/2022 12:55:29 PM
From File	BKG data for ProUCL tests.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Cu(ta39 6)
Sample 2 Data: Cu(bkg)
Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	12	174
Number of Non-Detects	0	2
Number of Detect Data	12	172
Minimum Non-Detect	N/A	0.5
Maximum Non-Detect	N/A	0.5
Percent Non-detects	0.00%	1.15%
Minimum Detect	4.92	0.6
Maximum Detect	174	16
Mean of Detects	60.27	6.125
Median of Detects	52.1	5.8
SD of Detects	53.77	2.523

Wilcoxon-Mann-Whitney (WMW) Test
H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	2046
Standardized WMW U-Stat	5.12
Mean (U)	1044
SD(U) - Adj ties	180.4
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	1.52E-07

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.14/27/2022 12:57:44 PM
From File	BKG data for ProUCL tests.xls

Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: V(ta39 6)
Sample 2 Data: V(bkg)

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	12	174
Number of Non-Detects	0	0
Number of Detect Data	12	174
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non-detects	0.00%	0.00%
Minimum Detect	11.4	4
Maximum Detect	48.3	56.5
Mean of Detects	32.33	21.26
Median of Detects	30.05	21
SD of Detects	11.21	8.925

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	1740
Standardized WMW U-Stat	3.423
Mean (U)	1044
SD(U) - Adj ties	180.3
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	3.10E-04

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.14/27/2022 1:01:09 PM
From File	BKG data for ProUCL tests.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Hg(ta39 6)
Sample 2 Data: Hg(bkg)

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	12	39
Number of Non-Detects	6	37
Number of Detect Data	6	2
Minimum Non-Detect	0.00355	0.1
Maximum Non-Detect	0.0039	0.1
Percent Non-detects	50.00%	94.87%
Minimum Detect	0.00507	0.1
Maximum Detect	0.131	0.1
Mean of Detects	0.0554	0.1
Median of Detects	0.038	0.1
SD of Detects	0.0522	0
KM Mean	0.0295	0.1
KM SD	0.0425	0

Sample 1 vs Sample 2 Gehan Test

H0: Mean/Median of Sample 1 <= Mean/Median of background

Gehan z Test Value	1.363
Critical z (0.05)	1.645
P-Value	0.0865

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.14/27/2022 1:02:44 PM
From File	BKG data for ProUCL tests.xls

Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Zn(ta39 6)
Sample 2 Data: Zn(bkg)

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	12	172
Number of Non-Detects	0	0
Number of Detect Data	12	172
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non-detects	0.00%	0.00%
Minimum Detect	24.4	14
Maximum Detect	62.5	75.5
Mean of Detects	39.34	31.52
Median of Detects	37.95	30.75
SD of Detects	11.9	9.002

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	1540
Standardized WMW U-Stat	2.41
Mean (U)	1032
SD(U) - Adj ties	178.2
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.00798

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

UCL Statistics for Data Sets with Non-Detects — Maximum of duplicate pair used in analysis

User Selected Options	
Date/Time of Computation	ProUCL 5.1 5/11/2022 9:03:53 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Ca

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	1
Minimum	588	Mean	4669
Maximum	7160	Median	4925
SD	1841	Std. Error of Mean	531.6
Coefficient of Variation	0.394	Skewness	-0.813

Normal GOF Test

Shapiro Wilk Test Statistic	0.952	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.859	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.118	Lilliefors GOF Test
5% Lilliefors Critical Value	0.243	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	5624	95% Adjusted-CLT UCL (Chen-1995)	5410
		95% Modified-t UCL (Johnson-1978)	5603

Gamma GOF Test

A-D Test Statistic	0.79	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.19	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.247	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.829	k star (bias corrected MLE)	2.927
Theta hat (MLE)	1219	Theta star (bias corrected MLE)	1595
nu hat (MLE)	91.89	nu star (bias corrected)	70.25
MLE Mean (bias corrected)	4669	MLE Sd (bias corrected)	2729
		Approximate Chi Square Value (0.05)	51.96
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	49.56

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	6313	95% Adjusted Gamma UCL (use when n<50)	6618
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.717	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.242	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.243	Data appear Lognormal at 5% Significance Level	
Data appear Approximate Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	6.377	Mean of logged Data	8.312
Maximum of Logged Data	8.876	SD of logged Data	0.669
Assuming Lognormal Distribution			
95% H-UCL	8222	90% Chebyshev (MVUE) UCL	7991
95% Chebyshev (MVUE) UCL	9352	97.5% Chebyshev (MVUE) UCL	11240
99% Chebyshev (MVUE) UCL	14950		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	5543	95% Jackknife UCL	5624
95% Standard Bootstrap UCL	5502	95% Bootstrap-t UCL	5488
95% Hall's Bootstrap UCL	5458	95% Percentile Bootstrap UCL	5499
95% BCA Bootstrap UCL	5389		
90% Chebyshev(Mean, Sd) UCL	6264	95% Chebyshev(Mean, Sd) UCL	6986
97.5% Chebyshev(Mean, Sd) UCL	7989	99% Chebyshev(Mean, Sd) UCL	9958
Suggested UCL to Use			
95% Student's-t UCL	5624		

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Cr

General Statistics			
Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	1
Minimum	3.22	Mean	16.95
Maximum	47.9	Median	12.25
SD	12.19	Std. Error of Mean	3.519
Coefficient of Variation	0.719	Skewness	1.748
Normal GOF Test			
Shapiro Wilk Test Statistic	0.818	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.233	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.243	Data appear Normal at 5% Significance Level	
Data appear Approximate Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	23.27	95% Adjusted-CLT UCL (Chen-1995)	24.63
		95% Modified-t UCL (Johnson-1978)	23.56
Gamma GOF Test			
A-D Test Statistic	0.431	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.74	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.186	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.248	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	2.558	k star (bias corrected MLE)	1.974
Theta hat (MLE)	6.624	Theta star (bias corrected MLE)	8.584
nu hat (MLE)	61.4	nu star (bias corrected)	47.38
MLE Mean (bias corrected)	16.95	MLE Sd (bias corrected)	12.06
		Approximate Chi Square Value (0.05)	32.58
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	30.72
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	24.64	95% Adjusted Gamma UCL (use when n<50)	26.14
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.951	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.181	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.243	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	1.169	Mean of logged Data	2.622
Maximum of Logged Data	3.869	SD of logged Data	0.683
Assuming Lognormal Distribution			
95% H-UCL	28.41	90% Chebyshev (MVUE) UCL	27.43
95% Chebyshev (MVUE) UCL	32.17	97.5% Chebyshev (MVUE) UCL	38.73
99% Chebyshev (MVUE) UCL	51.64		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	22.73	95% Jackknife UCL	23.27
95% Standard Bootstrap UCL	22.49	95% Bootstrap-t UCL	28.51
95% Hall's Bootstrap UCL	53.81	95% Percentile Bootstrap UCL	22.75
95% BCA Bootstrap UCL	23.77		
90% Chebyshev(Mean, Sd) UCL	27.5	95% Chebyshev(Mean, Sd) UCL	32.28
97.5% Chebyshev(Mean, Sd) UCL	38.92	99% Chebyshev(Mean, Sd) UCL	51.96
Suggested UCL to Use			
95% Student's-t UCL	23.27		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Cu			
General Statistics			
Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	1
Minimum	4.92	Mean	60.27
Maximum	174	Median	52.1
SD	53.77	Std. Error of Mean	15.52
Coefficient of Variation	0.892	Skewness	1.407
Normal GOF Test			
Shapiro Wilk Test Statistic	0.818	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.234	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.243	Data appear Normal at 5% Significance Level	
Data appear Approximate Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	88.14	95% Adjusted-CLT UCL (Chen-1995)	92.54
		95% Modified-t UCL (Johnson-1978)	89.19
Gamma GOF Test			
A-D Test Statistic	0.29	Anderson-Darling Gamma GOF Test	
		Detected data appear Gamma Distributed at	
5% A-D Critical Value	0.747	5% Significance Level	
K-S Test Statistic	0.132	Kolmogorov-Smirnov Gamma GOF Test	
		Detected data appear Gamma Distributed at	
5% K-S Critical Value	0.25	5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	1.425	k star (bias corrected MLE)	1.124
Theta hat (MLE)	42.3	Theta star (bias corrected MLE)	53.61
nu hat (MLE)	34.2	nu star (bias corrected)	26.98
MLE Mean (bias corrected)	60.27	MLE Sd (bias corrected)	56.84
		Approximate Chi Square Value (0.05)	16.14
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	14.87
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	100.8	95% Adjusted Gamma UCL (use when n<50)	109.4
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.955	Shapiro Wilk Lognormal GOF Test	
		Data appear Lognormal at 5% Significance	
5% Shapiro Wilk Critical Value	0.859	Level	
Lilliefors Test Statistic	0.176	Lilliefors Lognormal GOF Test	
		Data appear Lognormal at 5% Significance	
5% Lilliefors Critical Value	0.243	Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	1.593	Mean of logged Data	3.709
Maximum of Logged Data	5.159	SD of logged Data	0.999
Assuming Lognormal Distribution			
95% H-UCL	161.4	90% Chebyshev (MVUE) UCL	122.2
95% Chebyshev (MVUE) UCL	148.8	97.5% Chebyshev (MVUE) UCL	185.7
99% Chebyshev (MVUE) UCL	258.2		

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level
Nonparametric Distribution Free UCLs

95% CLT UCL	85.8	95% Jackknife UCL	88.14
95% Standard Bootstrap UCL	84.61	95% Bootstrap-t UCL	108.3
95% Hall's Bootstrap UCL	254.5	95% Percentile Bootstrap UCL	86.16
95% BCA Bootstrap UCL	91.64		
90% Chebyshev(Mean, Sd) UCL	106.8	95% Chebyshev(Mean, Sd) UCL	127.9
97.5% Chebyshev(Mean, Sd) UCL	157.2	99% Chebyshev(Mean, Sd) UCL	214.7

Suggested UCL to Use

95% Student's-t UCL	88.14

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Hg

General Statistics

Total Number of Observations	12	Number of Distinct Observations	11
		Number of Missing Observations	1
Number of Detects	6	Number of Non-Detects	6
Number of Distinct Detects	6	Number of Distinct Non-Detects	5
Minimum Detect	0.00507	Minimum Non-Detect	0.00355
Maximum Detect	0.131	Maximum Non-Detect	0.0039
Variance Detects	0.00273	Percent Non-Detects	50%
Mean Detects	0.0554	SD Detects	0.0522
Median Detects	0.038	CV Detects	0.944
Skewness Detects	0.663	Kurtosis Detects	-1.594
Mean of Logged Detects	-3.431	SD of Logged Detects	1.261

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.879	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.256	Lilliefors GOF Test
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0295	KM Standard Error of Mean	0.0134
KM SD	0.0425	95% KM (BCA) UCL	0.0501
95% KM (t) UCL	0.0536	95% KM (Percentile Bootstrap) UCL	0.052
95% KM (z) UCL	0.0516	95% KM Bootstrap t UCL	0.079
90% KM Chebyshev UCL	0.0698	95% KM Chebyshev UCL	0.0881
97.5% KM Chebyshev UCL	0.113	99% KM Chebyshev UCL	0.163

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.29	Anderson-Darling GOF Test
5% A-D Critical Value	0.714	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.221	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.34	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.067	k star (bias corrected MLE)	0.645
Theta hat (MLE)	0.0519	Theta star (bias corrected MLE)	0.0859
nu hat (MLE)	12.8	nu star (bias corrected)	7.735
Mean (detects)	0.0554		

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00507	Mean	0.0327
Maximum	0.131	Median	0.01
SD	0.0424	CV	1.299
k hat (MLE)	0.97	k star (bias corrected MLE)	0.783
Theta hat (MLE)	0.0337	Theta star (bias corrected MLE)	0.0417
nu hat (MLE)	23.29	nu star (bias corrected)	18.8
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (18.80, α)	9.97	Adjusted Chi Square Value (18.80, β)	9.004
95% Gamma Approximate UCL (use when n>=50)	0.0616	95% Gamma Adjusted UCL (use when n<50)	0.0682

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0295	SD (KM)	0.0425
Variance (KM)	0.00181	SE of Mean (KM)	0.0134
k hat (KM)	0.48	k star (KM)	0.415
nu hat (KM)	11.52	nu star (KM)	9.97
theta hat (KM)	0.0614	theta star (KM)	0.0709
80% gamma percentile (KM)	0.0477	90% gamma percentile (KM)	0.0826
95% gamma percentile (KM)	0.121	99% gamma percentile (KM)	0.216
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (9.97, α)	3.923	Adjusted Chi Square Value (9.97, β)	3.365
95% Gamma Approximate KM-UCL (use when n>=50)	0.0749	95% Gamma Adjusted KM-UCL (use when n<50)	0.0873
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.938	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.172	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0282	Mean in Log Scale	-5.236
SD in Original Scale	0.0453	SD in Log Scale	2.089
95% t UCL (assumes normality of ROS data)	0.0516	95% Percentile Bootstrap UCL	0.0507
95% BCA Bootstrap UCL	0.057	95% Bootstrap t UCL	0.0848
95% H-UCL (Log ROS)	1.212		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.536	KM Geo Mean	0.0107
KM SD (logged)	1.372	95% Critical H Value (KM-Log)	3.633
KM Standard Error of Mean (logged)	0.434	95% H-UCL (KM -Log)	0.124
KM SD (logged)	1.372	95% Critical H Value (KM-Log)	3.633
KM Standard Error of Mean (logged)	0.434		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0286	Mean in Log Scale	-4.857
SD in Original Scale	0.045	SD in Log Scale	1.715
95% t UCL (Assumes normality)	0.0519	95% H-Stat UCL	0.32
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0536		
V			
General Statistics			
Total Number of Observations	12	Number of Distinct Observations	11
		Number of Missing Observations	1
Minimum	11	Mean	32.31
Maximum	48	Median	30
SD	11.37	Std. Error of Mean	3.281
Coefficient of Variation	0.352	Skewness	-0.147
Normal GOF Test			
Shapiro Wilk Test Statistic	0.942	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.859	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.16	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.243	Data appear Normal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	38.2	95% Adjusted-CLT UCL (Chen-1995)	37.56
		95% Modified-t UCL (Johnson-1978)	38.18
Gamma GOF Test			
A-D Test Statistic	0.376	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.731	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.158	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.246	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	7.35	k star (bias corrected MLE)	5.568
Theta hat (MLE)	4.396	Theta star (bias corrected MLE)	5.802

nu hat (MLE)	176.4	nu star (bias corrected)	133.6
MLE Mean (bias corrected)	32.31	MLE Sd (bias corrected)	13.69
		Approximate Chi Square Value (0.05)	107.9
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	104.4
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	40	95% Adjusted Gamma UCL (use when n<50)	41.35
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.89	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.17	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.243	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	2.398	Mean of logged Data	3.406
Maximum of Logged Data	3.871	SD of logged Data	0.416
Assuming Lognormal Distribution			
95% H-UCL	42.48	90% Chebyshev (MVUE) UCL	44.58
95% Chebyshev (MVUE) UCL	50	97.5% Chebyshev (MVUE) UCL	57.52
99% Chebyshev (MVUE) UCL	72.29		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	37.71	95% Jackknife UCL	38.2
95% Standard Bootstrap UCL	37.4	95% Bootstrap-t UCL	38.39
95% Hall's Bootstrap UCL	37.55	95% Percentile Bootstrap UCL	37.08
95% BCA Bootstrap UCL	37.14		
90% Chebyshev(Mean, Sd) UCL	42.15	95% Chebyshev(Mean, Sd) UCL	46.61
97.5% Chebyshev(Mean, Sd) UCL	52.8	99% Chebyshev(Mean, Sd) UCL	64.96
Suggested UCL to Use			
95% Student's-t UCL	38.2		

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Zn

General Statistics			
Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	1
Minimum	24.4	Mean	39.34
Maximum	62.5	Median	37.95
SD	11.9	Std. Error of Mean	3.435
Coefficient of Variation	0.302	Skewness	0.686
Normal GOF Test			
Shapiro Wilk Test Statistic	0.933	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.859	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.161	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.243	Data appear Normal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	45.51	95% Adjusted-CLT UCL (Chen-1995)	45.72
		95% Modified-t UCL (Johnson-1978)	45.62
Gamma GOF Test			
A-D Test Statistic	0.253	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.731	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.123	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.245	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	12.41	k star (bias corrected MLE)	9.36
Theta hat (MLE)	3.171	Theta star (bias corrected MLE)	4.203
nu hat (MLE)	297.7	nu star (bias corrected)	224.6
MLE Mean (bias corrected)	39.34	MLE Sd (bias corrected)	12.86
		Approximate Chi Square Value (0.05)	191
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	186.2
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	46.28	95% Adjusted Gamma UCL (use when n<50)	47.46
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.958	Shapiro Wilk Lognormal GOF Test	

5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.121	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.243	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	3.195	Mean of logged Data	3.631
Maximum of Logged Data	4.135	SD of logged Data	0.298
Assuming Lognormal Distribution			
95% H-UCL	46.93	90% Chebyshev (MVUE) UCL	49.57
95% Chebyshev (MVUE) UCL	54.2	97.5% Chebyshev (MVUE) UCL	60.64
99% Chebyshev (MVUE) UCL	73.28		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	44.99	95% Jackknife UCL	45.51
95% Standard Bootstrap UCL	44.88	95% Bootstrap-t UCL	47.07
95% Hall's Bootstrap UCL	47.53	95% Percentile Bootstrap UCL	45.31
95% BCA Bootstrap UCL	45.88		
90% Chebyshev(Mean, Sd) UCL	49.65	95% Chebyshev(Mean, Sd) UCL	54.31
97.5% Chebyshev(Mean, Sd) UCL	60.79	99% Chebyshev(Mean, Sd) UCL	73.52
Suggested UCL to Use			
95% Student's-t UCL	45.51		
Benzyl Alchohol			
General Statistics			
Total Number of Observations	12	Number of Distinct Observations	9
		Number of Missing Observations	1
Number of Detects	7	Number of Non-Detects	5
Number of Distinct Detects	7	Number of Distinct Non-Detects	2
Minimum Detect	0.127	Minimum Non-Detect	0.1
Maximum Detect	1.65	Maximum Non-Detect	0.101
Variance Detects	0.304	Percent Non-Detects	41.67%
Mean Detects	0.644	SD Detects	0.552
Median Detects	0.434	CV Detects	0.856
Skewness Detects	1.097	Kurtosis Detects	0.574
Mean of Logged Detects	-0.794	SD of Logged Detects	0.952
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.893	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.22	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.418	KM Standard Error of Mean	0.148
KM SD	0.473	95% KM (BCA) UCL	0.669
95% KM (t) UCL	0.683	95% KM (Percentile Bootstrap) UCL	0.674
95% KM (z) UCL	0.66	95% KM Bootstrap t UCL	0.863
90% KM Chebyshev UCL	0.86	95% KM Chebyshev UCL	1.061
97.5% KM Chebyshev UCL	1.339	99% KM Chebyshev UCL	1.886
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.212	Anderson-Darling GOF Test	
5% A-D Critical Value	0.721	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.155	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.317	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.557	k star (bias corrected MLE)	0.985
Theta hat (MLE)	0.414	Theta star (bias corrected MLE)	0.654
nu hat (MLE)	21.8	nu star (bias corrected)	13.79
Mean (detects)	0.644		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	0.38
Maximum	1.65	Median	0.144
SD	0.522	CV	1.374
k hat (MLE)	0.456	k star (bias corrected MLE)	0.397
Theta hat (MLE)	0.834	Theta star (bias corrected MLE)	0.956
nu hat (MLE)	10.94	nu star (bias corrected)	9.536
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (9.54, α)	3.654	Adjusted Chi Square Value (9.54, β)	3.119
95% Gamma Approximate UCL (use when n>=50)	0.992	95% Gamma Adjusted UCL (use when n<50)	1.162
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.418	SD (KM)	0.473
Variance (KM)	0.224	SE of Mean (KM)	0.148
k hat (KM)	0.778	k star (KM)	0.639
nu hat (KM)	18.66	nu star (KM)	15.33
theta hat (KM)	0.537	theta star (KM)	0.654
80% gamma percentile (KM)	0.688	90% gamma percentile (KM)	1.071
95% gamma percentile (KM)	1.469	99% gamma percentile (KM)	2.427
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (15.33, α)	7.491	Adjusted Chi Square Value (15.33, β)	6.671
95% Gamma Approximate KM-UCL (use when n>=50)	0.854	95% Gamma Adjusted KM-UCL (use when n<50)	0.959
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.959	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.148	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.391	Mean in Log Scale	-1.889
SD in Original Scale	0.514	SD in Log Scale	1.565
95% t UCL (assumes normality of ROS data)	0.658	95% Percentile Bootstrap UCL	0.628
95% BCA Bootstrap UCL	0.702	95% Bootstrap t UCL	0.909
95% H-UCL (Log ROS)	3.447		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.422	KM Geo Mean	0.241
KM SD (logged)	1.003	95% Critical H Value (KM-Log)	2.921
KM Standard Error of Mean (logged)	0.313	95% H-UCL (KM -Log)	0.964
KM SD (logged)	1.003	95% Critical H Value (KM-Log)	2.921
KM Standard Error of Mean (logged)	0.313		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.397	Mean in Log Scale	-1.709
SD in Original Scale	0.509	SD in Log Scale	1.331
95% t UCL (Assumes normality)	0.661	95% H-Stat UCL	1.827
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.683		
HMX			
General Statistics			
Total Number of Observations	12	Number of Distinct Observations	9
		Number of Missing Observations	1
Number of Detects	7	Number of Non-Detects	5
Number of Distinct Detects	7	Number of Distinct Non-Detects	2
Minimum Detect	0.172	Minimum Non-Detect	0.149
Maximum Detect	6.66	Maximum Non-Detect	0.15
Variance Detects	5.265	Percent Non-Detects	41.67%
Mean Detects	1.683	SD Detects	2.295
Median Detects	1.14	CV Detects	1.363
Skewness Detects	2.198	Kurtosis Detects	5.159
Mean of Logged Detects	-0.217	SD of Logged Detects	1.34
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.704	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level	

Lilliefors Test Statistic	0.314	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.304	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	1.044	KM Standard Error of Mean	0.558
KM SD	1.79	95% KM (BCA) UCL	2.103
95% KM (t) UCL	2.046	95% KM (Percentile Bootstrap) UCL	1.964
95% KM (z) UCL	1.962	95% KM Bootstrap t UCL	3.731
90% KM Chebyshev UCL	2.718	95% KM Chebyshev UCL	3.477
97.5% KM Chebyshev UCL	4.53	99% KM Chebyshev UCL	6.598
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.394	Anderson-Darling GOF Test	
5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.22	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.322	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.804	k star (bias corrected MLE)	0.555
Theta hat (MLE)	2.093	Theta star (bias corrected MLE)	3.034
nu hat (MLE)	11.26	nu star (bias corrected)	7.766
Mean (detects)	1.683		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	0.986
Maximum	6.66	Median	0.194
SD	1.901	CV	1.928
k hat (MLE)	0.334	k star (bias corrected MLE)	0.306
Theta hat (MLE)	2.955	Theta star (bias corrected MLE)	3.225
nu hat (MLE)	8.007	nu star (bias corrected)	7.339
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (7.34, α)	2.358	Adjusted Chi Square Value (7.34, β)	1.951
95% Gamma Approximate UCL (use when n>=50)	3.068	95% Gamma Adjusted UCL (use when n<50)	3.709
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1.044	SD (KM)	1.79
Variance (KM)	3.204	SE of Mean (KM)	0.558
k hat (KM)	0.34	k star (KM)	0.311
nu hat (KM)	8.162	nu star (KM)	7.455
theta hat (KM)	3.07	theta star (KM)	3.361
80% gamma percentile (KM)	1.614	90% gamma percentile (KM)	3.066
95% gamma percentile (KM)	4.722	99% gamma percentile (KM)	9.009
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (7.45, α)	2.423	Adjusted Chi Square Value (7.45, β)	2.009
95% Gamma Approximate KM-UCL (use when n>=50)	3.211	95% Gamma Adjusted KM-UCL (use when n<50)	3.874
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.927	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.202	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.993	Mean in Log Scale	-1.753
SD in Original Scale	1.897	SD in Log Scale	2.196
95% t UCL (assumes normality of ROS data)	1.976	95% Percentile Bootstrap UCL	1.953
95% BCA Bootstrap UCL	2.558	95% Bootstrap t UCL	3.902
95% H-UCL (Log ROS)	68.69		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.92	KM Geo Mean	0.399
KM SD (logged)	1.26	95% Critical H Value (KM-Log)	3.41
KM Standard Error of Mean (logged)	0.393	95% H-UCL (KM -Log)	3.223
KM SD (logged)	1.26	95% Critical H Value (KM-Log)	3.41
KM Standard Error of Mean (logged)	0.393		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.013	Mean in Log Scale	-1.207
SD in Original Scale	1.886	SD in Log Scale	1.573
95% t UCL (Assumes normality)	1.991	95% H-Stat UCL	7.039

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	3.731	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	3.874

TATB

General Statistics

Total Number of Observations	12	Number of Distinct Observations	8
		Number of Missing Observations	1
Number of Detects	5	Number of Non-Detects	7
Number of Distinct Detects	5	Number of Distinct Non-Detects	3
Minimum Detect	0.791	Minimum Non-Detect	0.296
Maximum Detect	5.535	Maximum Non-Detect	0.3
Variance Detects	3.981	Percent Non-Detects	58.33%
Mean Detects	2.042	SD Detects	1.995
Median Detects	1.06	CV Detects	0.977
Skewness Detects	2.017	Kurtosis Detects	4.113
Mean of Logged Detects	0.424	SD of Logged Detects	0.786

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.713	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.336	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.024	KM Standard Error of Mean	0.464
KM SD	1.438	95% KM (BCA) UCL	1.863
95% KM (t) UCL	1.857	95% KM (Percentile Bootstrap) UCL	1.789
95% KM (z) UCL	1.787	95% KM Bootstrap t UCL	2.976
90% KM Chebyshev UCL	2.416	95% KM Chebyshev UCL	3.047
97.5% KM Chebyshev UCL	3.922	99% KM Chebyshev UCL	5.642

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.595	Anderson-Darling GOF Test	
5% A-D Critical Value	0.685	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.31	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.361	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.873	k star (bias corrected MLE)	0.883
Theta hat (MLE)	1.09	Theta star (bias corrected MLE)	2.314
nu hat (MLE)	18.73	nu star (bias corrected)	8.826
Mean (detects)	2.042		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.857
Maximum	5.535	Median	0.01
SD	1.595	CV	1.861
k hat (MLE)	0.294	k star (bias corrected MLE)	0.276
Theta hat (MLE)	2.916	Theta star (bias corrected MLE)	3.105
nu hat (MLE)	7.051	nu star (bias corrected)	6.622
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (6.62, α)	1.965	Adjusted Chi Square Value (6.62, β)	1.603
95% Gamma Approximate UCL (use when n>=50)	2.887	95% Gamma Adjusted UCL (use when n<50)	3.539

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.024	SD (KM)	1.438
Variance (KM)	2.068	SE of Mean (KM)	0.464
k hat (KM)	0.507	k star (KM)	0.436
nu hat (KM)	12.16	nu star (KM)	10.45

theta hat (KM)	2.02	theta star (KM)	2.35
80% gamma percentile (KM)	1.666	90% gamma percentile (KM)	2.846
95% gamma percentile (KM)	4.129	99% gamma percentile (KM)	7.325
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (10.45, α)	4.226	Adjusted Chi Square Value (10.45, β)	3.642
95% Gamma Approximate KM-UCL (use when n>=50)	2.531	95% Gamma Adjusted KM-UCL (use when n<50)	2.938
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.851	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.279	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.93	Mean in Log Scale	-1.077
SD in Original Scale	1.554	SD in Log Scale	1.48
95% t UCL (assumes normality of ROS data)	1.736	95% Percentile Bootstrap UCL	1.733
95% BCA Bootstrap UCL	2.079	95% Bootstrap t UCL	3.229
95% H-UCL (Log ROS)	5.697		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.533	KM Geo Mean	0.587
KM SD (logged)	0.928	95% Critical H Value (KM-Log)	2.786
KM Standard Error of Mean (logged)	0.299	95% H-UCL (KM -Log)	1.967
KM SD (logged)	0.928	95% Critical H Value (KM-Log)	2.786
KM Standard Error of Mean (logged)	0.299		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.938	Mean in Log Scale	-0.933
SD in Original Scale	1.548	SD in Log Scale	1.288
95% t UCL (Assumes normality)	1.741	95% H-Stat UCL	3.464
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1.857		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			

UCL Statistics for Uncensored Full Data Sets	Dioxin/Furan TEQ		
User Selected Options			
Date/Time of Computation	ProUCL 5.15/12/2022 4:38:07 PM		
From File	WorkSheet.xls		
Full Precision	OFF		
Confidence Coefficient	95%		
Number of Bootstrap Operations	2000		
Bird TEQ			
General Statistics			
Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	0
Minimum	1.54E-06	Mean	1.71E-06
Maximum	2.02E-06	Median	1.65E-06
SD	1.70E-07	Std. Error of Mean	4.90E-08
Coefficient of Variation	N/A	Skewness	0.964
Normal GOF Test			
Shapiro Wilk Test Statistic	0.851	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.207	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.243	Data appear Normal at 5% Significance Level	
Data appear Approximate Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1.80E-06	95% Adjusted-CLT UCL (Chen-1995)	1.80E-06
		95% Modified-t UCL (Johnson-1978)	1.80E-06
Gamma GOF Test			
A-D Test Statistic	0.714	Anderson-Darling Gamma GOF Test	

		Detected data appear Gamma Distributed at	
5% A-D Critical Value	0.731	5% Significance Level	
K-S Test Statistic	0.205	Kolmogorov-Smirnov Gamma GOF Test	
		Detected data appear Gamma Distributed at	
5% K-S Critical Value	0.245	5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	1.16E+02	k star (bias corrected MLE)	8.69E+01
Theta hat (MLE)	1.47E-08	Theta star (bias corrected MLE)	1.96E-08
nu hat (MLE)	2.78E+03	nu star (bias corrected)	2.09E+03
MLE Mean (bias corrected)	1.71E-06	MLE Sd (bias corrected)	1.83E-07
		Approximate Chi Square Value (0.05)	1981
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	1965
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	1.80E-06	95% Adjusted Gamma UCL (use when n<50)	1.81E-06
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.864	Shapiro Wilk Lognormal GOF Test	
		Data appear Lognormal at 5% Significance	
5% Shapiro Wilk Critical Value	0.859	Level	
Lilliefors Test Statistic	0.196	Lilliefors Lognormal GOF Test	
		Data appear Lognormal at 5% Significance	
5% Lilliefors Critical Value	0.243	Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-13.38	Mean of logged Data	-13.28
Maximum of Logged Data	-13.11	SD of logged Data	0.096
Assuming Lognormal Distribution			
95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	1.85E-06
95% Chebyshev (MVUE) UCL	1.91E-06	97.5% Chebyshev (MVUE) UCL	2.00E-06
99% Chebyshev (MVUE) UCL	2.18E-06		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1.79E-06	95% Jackknife UCL	1.80E-06
95% Standard Bootstrap UCL	1.78E-06	95% Bootstrap-t UCL	1.82E-06
95% Hall's Bootstrap UCL	1.81E-06	95% Percentile Bootstrap UCL	1.79E-06
95% BCA Bootstrap UCL	1.80E-06		
90% Chebyshev(Mean, Sd) UCL	1.86E-06	95% Chebyshev(Mean, Sd) UCL	1.92E-06
97.5% Chebyshev(Mean, Sd) UCL	2.01E-06	99% Chebyshev(Mean, Sd) UCL	2.20E-06
Suggested UCL to Use			
95% Student's-t UCL	1.80E-06		

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Mammal TEQ

General Statistics			
Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	0
Minimum	1.14E-06	Mean	1.21E-06
Maximum	1.33E-06	Median	1.20E-06
SD	6.23E-08	Std. Error of Mean	1.80E-08
Coefficient of Variation	N/A	Skewness	0.579
Normal GOF Test			
Shapiro Wilk Test Statistic	0.926	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.859	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.165	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.243	Data appear Normal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1.24E-06	95% Adjusted-CLT UCL (Chen-1995)	1.24E-06
		95% Modified-t UCL (Johnson-1978)	1.24E-06
Gamma GOF Test			
A-D Test Statistic	0.358	Anderson-Darling Gamma GOF Test	
		Detected data appear Gamma Distributed at	
5% A-D Critical Value	0.731	5% Significance Level	
K-S Test Statistic	0.177	Kolmogorov-Smirnov Gamma GOF Test	

5% K-S Critical Value	0.245	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	417.5	k star (bias corrected MLE)	313.1
Theta hat (MLE)	2.90E-09	Theta star (bias corrected MLE)	3.87E-09
nu hat (MLE)	10019	nu star (bias corrected)	7516
MLE Mean (bias corrected)	1.21E-06	MLE Sd (bias corrected)	6.84E-08
		Approximate Chi Square Value (0.05)	7315
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	7285
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	1.24E-06	95% Adjusted Gamma UCL (use when n<50)	1.25E-06
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.929	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.168	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.243	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-13.69	Mean of logged Data	-13.63
Maximum of Logged Data	-13.53	SD of logged Data	0.051
Assuming Lognormal Distribution			
95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	1.26E-06
95% Chebyshev (MVUE) UCL	1.29E-06	97.5% Chebyshev (MVUE) UCL	1.32E-06
99% Chebyshev (MVUE) UCL	1.39E-06		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1.24E-06	95% Jackknife UCL	1.24E-06
95% Standard Bootstrap UCL	1.24E-06	95% Bootstrap-t UCL	1.24E-06
95% Hall's Bootstrap UCL	1.25E-06	95% Percentile Bootstrap UCL	1.24E-06
95% BCA Bootstrap UCL	1.24E-06		
90% Chebyshev(Mean, Sd) UCL	1.26E-06	95% Chebyshev(Mean, Sd) UCL	1.29E-06
97.5% Chebyshev(Mean, Sd) UCL	1.32E-06	99% Chebyshev(Mean, Sd) UCL	1.39E-06
Suggested UCL to Use			
95% Student's-t UCL	1.24E-06		

ATTACHMENT B. LANL ECORISK 4.2 DATABASE (MG/KG) FOR ORGANICS AND INORGANICS ABOVE BACKGROUND- SOIL

Analyte Group	Analyte Name	Analyte Code	ESL Receptor	No Effect ESL	Low Effect ESL	Note	ESL ID
Dioxin/ Furan	Tetrachlorodibenzodioxin [2,3,7,8-]	1746-01-6	Deer mouse (Mammalian omnivore)	0.00000058	0.0000038		SOIL_DM(ip)_1746-01-6
Dioxin/ Furan	Tetrachlorodibenzodioxin [2,3,7,8-]	1746-01-6	Earthworm (Soil-dwelling invertebrate)	5	10		SOIL_EW_1746-01-6
Dioxin/ Furan	Tetrachlorodibenzodioxin [2,3,7,8-]	1746-01-6	Gray fox (Mammalian top carnivore)	0.0001	0.00068		SOIL_RF(f)_1746-01-6
Dioxin/ Furan	Tetrachlorodibenzodioxin [2,3,7,8-]	1746-01-6	Montane shrew (Mammalian insectivore)	0.00000029	0.0000019		SOIL_MS(i)_1746-01-6
Dioxin/ Furan	Tetrachlorodibenzodioxin [2,3,7,8-]	1746-01-6	Mountain cottontail (Mammalian herbivore)	0.00004	0.00027		SOIL_DC(p)_1746-01-6
Dioxin/ Furan	Tetrachlorodibenzodioxin [2,3,7,8-]	1746-01-6	American kestrel (Avian top carnivore)	4.10E-06			
Dioxin/ Furan	Tetrachlorodibenzodioxin [2,3,7,8-]	1746-01-6	American kestrel (insectivore / carnivore)	4.10E-06			
Dioxin/ Furan	Tetrachlorodibenzodioxin [2,3,7,8-]	1746-01-6	American robin (Avian herbivore)	4.10E-06			
Dioxin/ Furan	Tetrachlorodibenzodioxin [2,3,7,8-]	1746-01-6	American robin (Avian insectivore)	4.10E-06			
Dioxin/ Furan	Tetrachlorodibenzodioxin [2,3,7,8-]	1746-01-6	American robin (Avian omnivore)	4.10E-06			
HE	3,5-Dinitroaniline	618-87-1	Deer mouse (Mammalian omnivore)	23	230	Use amino-2,6-dinitrotoluene [4-	SOIL_DM(ip)_19406-51-0
HE	3,5-Dinitroaniline	618-87-1	Earthworm (Soil-dwelling invertebrate)	18	180	Use amino-2,6-dinitrotoluene [4-	SOIL_EW_19406-51-0
HE	3,5-Dinitroaniline	618-87-1	Generic plant (Terrestrial autotroph - producer)	33	330	Use amino-2,6-dinitrotoluene [4-	SOIL_GP_19406-51-0
HE	3,5-Dinitroaniline	618-87-1	Gray fox (Mammalian top carnivore)	6700	67000	Use amino-2,6-dinitrotoluene [4-	SOIL_RF(f)_19406-51-0
HE	3,5-Dinitroaniline	618-87-1	Montane shrew (Mammalian insectivore)	12	120	Use amino-2,6-dinitrotoluene [4-	SOIL_MS(i)_19406-51-0
HE	3,5-Dinitroaniline	618-87-1	Mountain cottontail (Mammalian herbivore)	320	3200	Use amino-2,6-dinitrotoluene [4-	SOIL_DC(p)_19406-51-0
HE	Amino-2,6-dinitrotoluene[4-]	19406-51-0	Deer mouse (Mammalian omnivore)	23	230		SOIL_DM(ip)_19406-51-0
HE	Amino-2,6-dinitrotoluene[4-]	19406-51-0	Earthworm (Soil-dwelling invertebrate)	18	180		SOIL_EW_19406-51-0
HE	Amino-2,6-dinitrotoluene[4-]	19406-51-0	Generic plant (Terrestrial autotroph - producer)	33	330		SOIL_GP_19406-51-0
HE	Amino-2,6-dinitrotoluene[4-]	19406-51-0	Gray fox (Mammalian top carnivore)	6700	67000		SOIL_RF(f)_19406-51-0
HE	Amino-2,6-dinitrotoluene[4-]	19406-51-0	Montane shrew (Mammalian insectivore)	12	120		SOIL_MS(i)_19406-51-0
HE	Amino-2,6-dinitrotoluene[4-]	19406-51-0	Mountain cottontail (Mammalian herbivore)	320	3200		SOIL_DC(p)_19406-51-0

Analyte Group	Analyte Name	Analyte Code	ESL Receptor	No Effect ESL	Low Effect ESL	Note	ESL ID
HE	Amino-4,6-dinitrotoluene[2-]	35572-78-2	Deer mouse (Mammalian omnivore)	23	230		SOIL_DM(ip)_35572-78-2
HE	Amino-4,6-dinitrotoluene[2-]	35572-78-2	Earthworm (Soil-dwelling invertebrate)	43	430		SOIL_EW_35572-78-2
HE	Amino-4,6-dinitrotoluene[2-]	35572-78-2	Generic plant (Terrestrial autotroph - producer)	14	140		SOIL_GP_35572-78-2
HE	Amino-4,6-dinitrotoluene[2-]	35572-78-2	Gray fox (Mammalian top carnivore)	9700	97000		SOIL_RF(f)_35572-78-2
HE	Amino-4,6-dinitrotoluene[2-]	35572-78-2	Montane shrew (Mammalian insectivore)	16	160		SOIL_MS(i)_35572-78-2
HE	Amino-4,6-dinitrotoluene[2-]	35572-78-2	Mountain cottontail (Mammalian herbivore)	110	1100		SOIL_DC(p)_35572-78-2
HE	Dinitrobenzene[1,3-]	99-65-0	American kestrel (Avian top carnivore)	120	1200		SOIL_AK(f)_99-65-0
HE	Dinitrobenzene[1,3-]	99-65-0	American kestrel (insectivore / carnivore)	9.3	93		SOIL_AK(fi)_99-65-0
HE	Dinitrobenzene[1,3-]	99-65-0	American robin (Avian herbivore)	0.079	0.79		SOIL_AR(p)_99-65-0
HE	Dinitrobenzene[1,3-]	99-65-0	American robin (Avian insectivore)	1.6	16		SOIL_AR(i)_99-65-0
HE	Dinitrobenzene[1,3-]	99-65-0	American robin (Avian omnivore)	0.15	1.5		SOIL_AR(ip)_99-65-0
HE	Dinitrobenzene[1,3-]	99-65-0	Deer mouse (Mammalian omnivore)	0.072	0.16		SOIL_DM(ip)_99-65-0
HE	Dinitrobenzene[1,3-]	99-65-0	Gray fox (Mammalian top carnivore)	82	190		SOIL_RF(f)_99-65-0
HE	Dinitrobenzene[1,3-]	99-65-0	Montane shrew (Mammalian insectivore)	0.95	2.2		SOIL_MS(i)_99-65-0
HE	Dinitrobenzene[1,3-]	99-65-0	Mountain cottontail (Mammalian herbivore)	0.091	0.21		SOIL_DC(p)_99-65-0
HE	Dinitrotoluene[2,4-]	121-14-2	Deer mouse (Mammalian omnivore)	20	200		SOIL_DM(ip)_121-14-2
HE	Dinitrotoluene[2,4-]	121-14-2	Earthworm (Soil-dwelling invertebrate)	18	180		SOIL_EW_121-14-2
HE	Dinitrotoluene[2,4-]	121-14-2	Generic plant (Terrestrial autotroph - producer)	6	60		SOIL_GP_121-14-2
HE	Dinitrotoluene[2,4-]	121-14-2	Gray fox (Mammalian top carnivore)	2000	20000		SOIL_RF(f)_121-14-2
HE	Dinitrotoluene[2,4-]	121-14-2	Montane shrew (Mammalian insectivore)	14	140		SOIL_MS(i)_121-14-2
HE	Dinitrotoluene[2,4-]	121-14-2	Mountain cottontail (Mammalian herbivore)	74	740		SOIL_DC(p)_121-14-2
HE	Dinitrotoluene[2,6-]	606-20-2	American kestrel (Avian top carnivore)	18000	180000		SOIL_AK(f)_606-20-2
HE	Dinitrotoluene[2,6-]	606-20-2	American kestrel (insectivore / carnivore)	680	6800		SOIL_AK(fi)_606-20-2
HE	Dinitrotoluene[2,6-]	606-20-2	American robin (Avian herbivore)	52	520		SOIL_AR(p)_606-20-2
HE	Dinitrotoluene[2,6-]	606-20-2	American robin (Avian insectivore)	130	1300		SOIL_AR(i)_606-20-2
HE	Dinitrotoluene[2,6-]	606-20-2	American robin (Avian omnivore)	74	740		SOIL_AR(ip)_606-20-2
HE	Dinitrotoluene[2,6-]	606-20-2	Deer mouse (Mammalian omnivore)	4	40		SOIL_DM(ip)_606-20-2
HE	Dinitrotoluene[2,6-]	606-20-2	Earthworm (Soil-dwelling invertebrate)	30	44		SOIL_EW_606-20-2
HE	Dinitrotoluene[2,6-]	606-20-2	Gray fox (Mammalian top carnivore)	1300	13000		SOIL_RF(f)_606-20-2
HE	Dinitrotoluene[2,6-]	606-20-2	Montane shrew (Mammalian insectivore)	7.6	76		SOIL_MS(i)_606-20-2
HE	Dinitrotoluene[2,6-]	606-20-2	Mountain cottontail (Mammalian herbivore)	6.7	67		SOIL_DC(p)_606-20-2
HE	HMX	2691-41-0	Deer mouse (Mammalian omnivore)	290	790		SOIL_DM(ip)_2691-41-0
HE	HMX	2691-41-0	Earthworm (Soil-dwelling invertebrate)	16	160		SOIL_EW_2691-41-0
HE	HMX	2691-41-0	Generic plant (Terrestrial autotroph - producer)	2700	3500		SOIL_GP_2691-41-0
HE	HMX	2691-41-0	Gray fox (Mammalian top carnivore)	59000	150000		SOIL_RF(f)_2691-41-0
HE	HMX	2691-41-0	Montane shrew (Mammalian insectivore)	1100	2900		SOIL_MS(i)_2691-41-0
HE	HMX	2691-41-0	Mountain cottontail (Mammalian herbivore)	410	1100		SOIL_DC(p)_2691-41-0
HE	Nitroglycerine	55-63-0	Deer mouse (Mammalian omnivore)	70	740		SOIL_DM(ip)_55-63-0
HE	Nitroglycerine	55-63-0	Earthworm (Soil-dwelling invertebrate)	13	130		SOIL_EW_55-63-0
HE	Nitroglycerine	55-63-0	Generic plant (Terrestrial autotroph - producer)	21	210		SOIL_GP_55-63-0
HE	Nitroglycerine	55-63-0	Gray fox (Mammalian top carnivore)	69000	730000		SOIL_RF(f)_55-63-0
HE	Nitroglycerine	55-63-0	Montane shrew (Mammalian insectivore)	1200	13000		SOIL_MS(i)_55-63-0
HE	Nitroglycerine	55-63-0	Mountain cottontail (Mammalian herbivore)	88	930		SOIL_DC(p)_55-63-0
HE	Nitrotoluene[2-]	88-72-2	Deer mouse (Mammalian omnivore)	9.8	98		SOIL_DM(ip)_88-72-2
HE	Nitrotoluene[2-]	88-72-2	Gray fox (Mammalian top carnivore)	6000	60000		SOIL_RF(f)_88-72-2
HE	Nitrotoluene[2-]	88-72-2	Montane shrew (Mammalian insectivore)	22	220		SOIL_MS(i)_88-72-2
HE	Nitrotoluene[2-]	88-72-2	Mountain cottontail (Mammalian herbivore)	15	150		SOIL_DC(p)_88-72-2
HE	Nitrotoluene[3-]	99-08-1	Deer mouse (Mammalian omnivore)	12	120		SOIL_DM(ip)_99-08-1
HE	Nitrotoluene[3-]	99-08-1	Gray fox (Mammalian top carnivore)	7000	70000		SOIL_RF(f)_99-08-1
HE	Nitrotoluene[3-]	99-08-1	Montane shrew (Mammalian insectivore)	19	190		SOIL_MS(i)_99-08-1

Analyte Group	Analyte Name	Analyte Code	ESL Receptor	No Effect ESL	Low Effect ESL	Note	ESL ID
HE	Nitrotoluene[3-]	99-08-1	Mountain cottontail (Mammalian herbivore)	21	210		SOIL_DC(p)_99-08-1
HE	Nitrotoluene[4-]	99-99-0	Deer mouse (Mammalian omnivore)	21	210		SOIL_DM(ip)_99-99-0
HE	Nitrotoluene[4-]	99-99-0	Gray fox (Mammalian top carnivore)	13000	130000		SOIL_RF(f)_99-99-0
HE	Nitrotoluene[4-]	99-99-0	Montane shrew (Mammalian insectivore)	41	410		SOIL_MS(i)_99-99-0
HE	Nitrotoluene[4-]	99-99-0	Mountain cottontail (Mammalian herbivore)	36	360		SOIL_DC(p)_99-99-0
HE	PETN	78-11-5	Deer mouse (Mammalian omnivore)	100	1000		SOIL_DM(ip)_78-11-5
HE	PETN	78-11-5	Gray fox (Mammalian top carnivore)	47000	470000		SOIL_RF(f)_78-11-5
HE	PETN	78-11-5	Montane shrew (Mammalian insectivore)	1000	10000		SOIL_MS(i)_78-11-5
HE	PETN	78-11-5	Mountain cottontail (Mammalian herbivore)	120	1200		SOIL_DC(p)_78-11-5
HE	RDX	121-82-4	American kestrel (Avian top carnivore)	780	1400		SOIL_AK(f)_121-82-4
HE	RDX	121-82-4	American kestrel (insectivore / carnivore)	11	22		SOIL_AK(fi)_121-82-4
HE	RDX	121-82-4	American robin (Avian herbivore)	2.3	4.3		SOIL_AR(p)_121-82-4
HE	RDX	121-82-4	American robin (Avian insectivore)	2.4	4.5		SOIL_AR(i)_121-82-4
HE	RDX	121-82-4	American robin (Avian omnivore)	2.3	4.4		SOIL_AR(ip)_121-82-4
HE	RDX	121-82-4	Deer mouse (Mammalian omnivore)	16	51		SOIL_DM(ip)_121-82-4
HE	RDX	121-82-4	Earthworm (Soil-dwelling invertebrate)	8.4	15		SOIL_EW_121-82-4
HE	RDX	121-82-4	Gray fox (Mammalian top carnivore)	7000	22000		SOIL_RF(f)_121-82-4
HE	RDX	121-82-4	Montane shrew (Mammalian insectivore)	16	53		SOIL_MS(i)_121-82-4
HE	RDX	121-82-4	Mountain cottontail (Mammalian herbivore)	38	120		SOIL_DC(p)_121-82-4
HE	Tetryl	479-45-8	Deer mouse (Mammalian omnivore)	1.5	7.2		SOIL_DM(ip)_479-45-8
HE	Tetryl	479-45-8	Gray fox (Mammalian top carnivore)	960	4600		SOIL_RF(f)_479-45-8
HE	Tetryl	479-45-8	Montane shrew (Mammalian insectivore)	60	280		SOIL_MS(i)_479-45-8
HE	Tetryl	479-45-8	Mountain cottontail (Mammalian herbivore)	1.8	8.9		SOIL_DC(p)_479-45-8
HE	TATB	3058-38-6	Deer mouse (Mammalian omnivore)	110	1100	Use 1,3,5-TNB for all	SOIL_DM(ip)_99-35-4
HE	TATB	3058-38-6	Earthworm (Soil-dwelling invertebrate)	10	28	Use 1,3,5-TNB for all	SOIL_EW_99-35-4
HE	TATB	3058-38-6	Gray fox (Mammalian top carnivore)	10000	100000	Use 1,3,5-TNB for all	SOIL_RF(f)_99-35-4
HE	TATB	3058-38-6	Montane shrew (Mammalian insectivore)	720	7200	Use 1,3,5-TNB for all	SOIL_MS(i)_99-35-4
HE	TATB	3058-38-6	Mountain cottontail (Mammalian herbivore)	150	1500	Use 1,3,5-TNB for all	SOIL_DC(p)_99-35-4
HE	Trinitrobenzene[1,3,5-]	99-35-4	Deer mouse (Mammalian omnivore)	110	1100		SOIL_DM(ip)_99-35-4
HE	Trinitrobenzene[1,3,5-]	99-35-4	Earthworm (Soil-dwelling invertebrate)	10	28		SOIL_EW_99-35-4
HE	Trinitrobenzene[1,3,5-]	99-35-4	Gray fox (Mammalian top carnivore)	10000	100000		SOIL_RF(f)_99-35-4
HE	Trinitrobenzene[1,3,5-]	99-35-4	Montane shrew (Mammalian insectivore)	720	7200		SOIL_MS(i)_99-35-4
HE	Trinitrobenzene[1,3,5-]	99-35-4	Mountain cottontail (Mammalian herbivore)	150	1500		SOIL_DC(p)_99-35-4
HE	Trinitrotoluene[2,4,6-]	118-96-7	American kestrel (Avian top carnivore)	3100	5700		SOIL_AK(f)_118-96-7
HE	Trinitrotoluene[2,4,6-]	118-96-7	American kestrel (insectivore / carnivore)	1300	2400		SOIL_AK(fi)_118-96-7
HE	Trinitrotoluene[2,4,6-]	118-96-7	American robin (Avian herbivore)	7.5	13		SOIL_AR(p)_118-96-7
HE	Trinitrotoluene[2,4,6-]	118-96-7	American robin (Avian insectivore)	120	220		SOIL_AR(i)_118-96-7
HE	Trinitrotoluene[2,4,6-]	118-96-7	American robin (Avian omnivore)	14	26		SOIL_AR(ip)_118-96-7
HE	Trinitrotoluene[2,4,6-]	118-96-7	Deer mouse (Mammalian omnivore)	95	440		SOIL_DM(ip)_118-96-7
HE	Trinitrotoluene[2,4,6-]	118-96-7	Earthworm (Soil-dwelling invertebrate)	32	58		SOIL_EW_118-96-7
HE	Trinitrotoluene[2,4,6-]	118-96-7	Generic plant (Terrestrial autotroph - producer)	62	120		SOIL_GP_118-96-7
HE	Trinitrotoluene[2,4,6-]	118-96-7	Gray fox (Mammalian top carnivore)	26000	120000		SOIL_RF(f)_118-96-7
HE	Trinitrotoluene[2,4,6-]	118-96-7	Montane shrew (Mammalian insectivore)	1900	9100		SOIL_MS(i)_118-96-7
HE	Trinitrotoluene[2,4,6-]	118-96-7	Mountain cottontail (Mammalian herbivore)	110	540		SOIL_DC(p)_118-96-7

Analyte Group	Analyte Name	Analyte Code	ESL Receptor	No Effect ESL	Low Effect ESL	Note	ESL ID
Inorganic	Chromium (total)	16065-83-1	American kestrel (Avian top carnivore)	860	2700		SOIL_AK(f)_CR
Inorganic	Chromium (total)	16065-83-1	American kestrel (insectivore / carnivore)	170	560		SOIL_AK(fi)_CR
Inorganic	Chromium (total)	16065-83-1	American robin (Avian herbivore)	51	160		SOIL_AR(p)_CR
Inorganic	Chromium (total)	16065-83-1	American robin (Avian insectivore)	23	73		SOIL_AR(i)_CR
Inorganic	Chromium (total)	16065-83-1	American robin (Avian omnivore)	32	100		SOIL_AR(ip)_CR
Inorganic	Chromium (total)	16065-83-1	Deer mouse (Mammalian omnivore)	110	11000		SOIL_DM(ip)_CR
Inorganic	Chromium (total)	16065-83-1	Gray fox (Mammalian top carnivore)	1800	180000		SOIL_RF(f)_CR
Inorganic	Chromium (total)	16065-83-1	Montane shrew (Mammalian insectivore)	63	6300		SOIL_MS(i)_CR
Inorganic	Chromium (total)	16065-83-1	Mountain cottontail (Mammalian herbivore)	410	41000		SOIL_DC(p)_CR
Inorganic	Copper	7440-50-8	American kestrel (Avian top carnivore)	1100	3500		SOIL_AK(f)_CU
Inorganic	Copper	7440-50-8	American kestrel (insectivore / carnivore)	80	240		SOIL_AK(fi)_CU
Inorganic	Copper	7440-50-8	American robin (Avian herbivore)	34	100		SOIL_AR(p)_CU
Inorganic	Copper	7440-50-8	American robin (Avian insectivore)	14	43		SOIL_AR(i)_CU
Inorganic	Copper	7440-50-8	American robin (Avian omnivore)	20	60		SOIL_AR(ip)_CU
Inorganic	Copper	7440-50-8	Deer mouse (Mammalian omnivore)	63	100		SOIL_DM(ip)_CU
Inorganic	Copper	7440-50-8	Earthworm (Soil-dwelling invertebrate)	80	530		SOIL_EW_CU
Inorganic	Copper	7440-50-8	Generic plant (Terrestrial autotroph - producer)	70	490		SOIL_GP_CU
Inorganic	Copper	7440-50-8	Gray fox (Mammalian top carnivore)	4000	6700		SOIL_RF(f)_CU
Inorganic	Copper	7440-50-8	Montane shrew (Mammalian insectivore)	42	70		SOIL_MS(i)_CU
Inorganic	Copper	7440-50-8	Mountain cottontail (Mammalian herbivore)	260	430		SOIL_DC(p)_CU
Inorganic	Mercury (inorganic)	7487-94-7	American kestrel (Avian top carnivore)	0.32	3.2		SOIL_AK(f)_HGI
Inorganic	Mercury (inorganic)	7487-94-7	American kestrel (insectivore / carnivore)	0.058	0.58		SOIL_AK(fi)_HGI
Inorganic	Mercury (inorganic)	7487-94-7	American robin (Avian herbivore)	0.067	0.67		SOIL_AR(p)_HGI
Inorganic	Mercury (inorganic)	7487-94-7	American robin (Avian insectivore)	0.013	0.13		SOIL_AR(i)_HGI
Inorganic	Mercury (inorganic)	7487-94-7	American robin (Avian omnivore)	0.022	0.22		SOIL_AR(ip)_HGI
Inorganic	Mercury (inorganic)	7487-94-7	Deer mouse (Mammalian omnivore)	3	30		SOIL_DM(ip)_HGI
Inorganic	Mercury (inorganic)	7487-94-7	Earthworm (Soil-dwelling invertebrate)	0.05	0.5		SOIL_EW_HGI
Inorganic	Mercury (inorganic)	7487-94-7	Generic plant (Terrestrial autotroph - producer)	34	64		SOIL_GP_HGI
Inorganic	Mercury (inorganic)	7487-94-7	Gray fox (Mammalian top carnivore)	76	760		SOIL_RF(f)_HGI
Inorganic	Mercury (inorganic)	7487-94-7	Montane shrew (Mammalian insectivore)	1.7	17		SOIL_MS(i)_HGI
Inorganic	Mercury (inorganic)	7487-94-7	Mountain cottontail (Mammalian herbivore)	23	230		SOIL_DC(p)_HGI
Inorganic	Perchlorate	14797-73-0	American kestrel (Avian top carnivore)	2	4		SOIL_AK(f)_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	American kestrel (insectivore / carnivore)	3.9	8		SOIL_AK(fi)_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	American robin (Avian herbivore)	0.12	0.24		SOIL_AR(p)_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	American robin (Avian insectivore)	31	64		SOIL_AR(i)_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	American robin (Avian omnivore)	0.24	0.49		SOIL_AR(ip)_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	Deer mouse (Mammalian omnivore)	0.21	1		SOIL_DM(ip)_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	Earthworm (Soil-dwelling invertebrate)	3.5	35		SOIL_EW_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	Generic plant (Terrestrial autotroph - producer)	40	80		SOIL_GP_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	Gray fox (Mammalian top carnivore)	3.3	16		SOIL_RF(f)_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	Montane shrew (Mammalian insectivore)	31	150		SOIL_MS(i)_ClO4(-1)
Inorganic	Perchlorate	14797-73-0	Mountain cottontail (Mammalian herbivore)	0.26	1.3		SOIL_DC(p)_ClO4(-1)
Inorganic	Vanadium	7440-62-2	American kestrel (Avian top carnivore)	110	230		SOIL_AK(f)_V
Inorganic	Vanadium	7440-62-2	American kestrel (insectivore / carnivore)	56	110		SOIL_AK(fi)_V
Inorganic	Vanadium	7440-62-2	American robin (Avian herbivore)	6.8	13		SOIL_AR(p)_V
Inorganic	Vanadium	7440-62-2	American robin (Avian insectivore)	4.7	9.5		SOIL_AR(i)_V
Inorganic	Vanadium	7440-62-2	American robin (Avian omnivore)	5.5	11		SOIL_AR(ip)_V
Inorganic	Vanadium	7440-62-2	Deer mouse (Mammalian omnivore)	470	1000		SOIL_DM(ip)_V
Inorganic	Vanadium	7440-62-2	Generic plant (Terrestrial autotroph - producer)	60	80		SOIL_GP_V
Inorganic	Vanadium	7440-62-2	Gray fox (Mammalian top carnivore)	3200	6900		SOIL_RF(f)_V
Inorganic	Vanadium	7440-62-2	Montane shrew (Mammalian insectivore)	290	610		SOIL_MS(i)_V
Inorganic	Vanadium	7440-62-2	Mountain cottontail (Mammalian herbivore)	740	1500		SOIL_DC(p)_V
Inorganic	Zinc	7440-66-6	American kestrel (Avian top carnivore)	2600	7000		SOIL_AK(f)_ZN
Inorganic	Zinc	7440-66-6	American kestrel (insectivore / carnivore)	220	590		SOIL_AK(fi)_ZN
Inorganic	Zinc	7440-66-6	American robin (Avian herbivore)	330	120		SOIL_AR(p)_ZN
Inorganic	Zinc	7440-66-6	American robin (Avian insectivore)	47	120		SOIL_AR(i)_ZN
Inorganic	Zinc	7440-66-6	American robin (Avian omnivore)	83	220		SOIL_AR(ip)_ZN

Analyte Group	Analyte Name	Analyte Code	ESL Receptor	No Effect ESL	Low Effect ESL	Note	ESL ID
Inorganic	Zinc	7440-66-6	Deer mouse (Mammalian omnivore)	170	1700		SOIL_DM(ip)_ZN
Inorganic	Zinc	7440-66-6	Earthworm (Soil-dwelling invertebrate)	120	930		SOIL_EW_ZN
Inorganic	Zinc	7440-66-6	Generic plant (Terrestrial autotroph - producer)	160	810		SOIL_GP_ZN
Inorganic	Zinc	7440-66-6	Gray fox (Mammalian top carnivore)	9600	94000		SOIL_RF(f)_ZN
Inorganic	Zinc	7440-66-6	Montane shrew (Mammalian insectivore)	99	980		SOIL_MS(i)_ZN
Inorganic	Zinc	7440-66-6	Mountain cottontail (Mammalian herbivore)	1800	18000		SOIL_DC(p)_ZN
Organic	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	Earthworm (Soil-dwelling invertebrate)	1.8	81.5		SOIL_EW_1763-23-1
Organic	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	Generic plant (Terrestrial autotroph - producer)	62.2	80.8		SOIL_GP_1763-23-1
Organic	Perfluorooctanoic acid (PFOA)	335-67-1	Earthworm (Soil-dwelling invertebrate)	12.2	101.1		SOIL_EW_335-67-1
Organic	Perfluorooctanoic acid (PFOA)	335-67-1	Generic plant (Terrestrial autotroph - producer)	41.1	62.1		SOIL_GP_335-67-1
Organic	Total Petroleum Hydrocarbon (Fraction 2, Fraction 3)	TPH F2F3	Earthworm (Soil-dwelling invertebrate)	198	1977		SOIL_EW_TPH F2F3
Organic	Total Petroleum Hydrocarbon (Fraction 2, Fraction 3)	TPH F2F3	Generic plant (Terrestrial autotroph - producer)	81.2	419		SOIL_GP_TPH F2F3
Organic	Total Petroleum Hydrocarbon DRO	TPH-DRO	Earthworm (Soil-dwelling invertebrate)	198	1977		SOIL_EW_TPH F2F3
Organic	Total Petroleum Hydrocarbon DRO	TPH-DRO	Generic plant (Terrestrial autotroph - producer)	81.2	419		SOIL_GP_TPH F2F3
PAH	Acenaphthene	83-32-9	Deer mouse (Mammalian omnivore)	160	1600		SOIL_DM(ip)_83-32-9
PAH	Acenaphthene	83-32-9	Generic plant (Terrestrial autotroph - producer)	0.25	2		SOIL_GP_83-32-9
PAH	Acenaphthene	83-32-9	Gray fox (Mammalian top carnivore)	29000	290000		SOIL_RF(f)_83-32-9
PAH	Acenaphthene	83-32-9	Montane shrew (Mammalian insectivore)	130	1300		SOIL_MS(i)_83-32-9
PAH	Acenaphthene	83-32-9	Mountain cottontail (Mammalian herbivore)	530	5300		SOIL_DC(p)_83-32-9
PAH	Acenaphthylene	208-96-8	Deer mouse (Mammalian omnivore)	160	1600		SOIL_DM(ip)_208-96-8
PAH	Acenaphthylene	208-96-8	Gray fox (Mammalian top carnivore)	28000	280000		SOIL_RF(f)_208-96-8
PAH	Acenaphthylene	208-96-8	Montane shrew (Mammalian insectivore)	120	1200		SOIL_MS(i)_208-96-8
PAH	Acenaphthylene	208-96-8	Mountain cottontail (Mammalian herbivore)	540	5400		SOIL_DC(p)_208-96-8
PAH	Anthracene	120-12-7	Deer mouse (Mammalian omnivore)	300	3000		SOIL_DM(ip)_120-12-7
PAH	Anthracene	120-12-7	Generic plant (Terrestrial autotroph - producer)	6.8	9		SOIL_GP_120-12-7
PAH	Anthracene	120-12-7	Gray fox (Mammalian top carnivore)	38000	380000		SOIL_RF(f)_120-12-7
PAH	Anthracene	120-12-7	Montane shrew (Mammalian insectivore)	210	2100		SOIL_MS(i)_120-12-7
PAH	Anthracene	120-12-7	Mountain cottontail (Mammalian herbivore)	1200	12000		SOIL_DC(p)_120-12-7
PAH	Benzo(a)anthracene	56-55-3	American kestrel (Avian top carnivore)	28	280		SOIL_AK(f)_56-55-3
PAH	Benzo(a)anthracene	56-55-3	American kestrel (insectivore / carnivore)	6.4	64		SOIL_AK(fi)_56-55-3
PAH	Benzo(a)anthracene	56-55-3	American robin (Avian herbivore)	0.73	7.3		SOIL_AR(p)_56-55-3
PAH	Benzo(a)anthracene	56-55-3	American robin (Avian insectivore)	0.88	8.8		SOIL_AR(i)_56-55-3
PAH	Benzo(a)anthracene	56-55-3	American robin (Avian omnivore)	0.8	8		SOIL_AR(ip)_56-55-3
PAH	Benzo(a)anthracene	56-55-3	Deer mouse (Mammalian omnivore)	3.4	34		SOIL_DM(ip)_56-55-3
PAH	Benzo(a)anthracene	56-55-3	Generic plant (Terrestrial autotroph - producer)	18	180		SOIL_GP_56-55-3
PAH	Benzo(a)anthracene	56-55-3	Gray fox (Mammalian top carnivore)	110	1100		SOIL_RF(f)_56-55-3
PAH	Benzo(a)anthracene	56-55-3	Montane shrew (Mammalian insectivore)	4	40		SOIL_MS(i)_56-55-3
PAH	Benzo(a)anthracene	56-55-3	Mountain cottontail (Mammalian herbivore)	6.1	61		SOIL_DC(p)_56-55-3
PAH	Benzo(a)pyrene	50-32-8	Deer mouse (Mammalian omnivore)	84	260		SOIL_DM(ip)_50-32-8
PAH	Benzo(a)pyrene	50-32-8	Gray fox (Mammalian top carnivore)	3400	11000		SOIL_RF(f)_50-32-8
PAH	Benzo(a)pyrene	50-32-8	Montane shrew (Mammalian insectivore)	62	190		SOIL_MS(i)_50-32-8
PAH	Benzo(a)pyrene	50-32-8	Mountain cottontail (Mammalian herbivore)	260	830		SOIL_DC(p)_50-32-8
PAH	Benzo(b)fluoranthene	205-99-2	Deer mouse (Mammalian omnivore)	51	510		SOIL_DM(ip)_205-99-2
PAH	Benzo(b)fluoranthene	205-99-2	Generic plant (Terrestrial autotroph - producer)	18	180		SOIL_GP_205-99-2
PAH	Benzo(b)fluoranthene	205-99-2	Gray fox (Mammalian top carnivore)	2400	24000		SOIL_RF(f)_205-99-2
PAH	Benzo(b)fluoranthene	205-99-2	Montane shrew (Mammalian insectivore)	44	440		SOIL_MS(i)_205-99-2

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PAH	Benzo(b)fluoranthene	205-99-2	Mountain cottontail (Mammalian herbivore)	130	1300		SOIL_DC(p)_205-99-2
PAH	Benzo(g,h,i)perylene	191-24-2	Deer mouse (Mammalian omnivore)	46	460		SOIL_DM(ip)_191-24-2
PAH	Benzo(g,h,i)perylene	191-24-2	Gray fox (Mammalian top carnivore)	3600	36000		SOIL_RF(f)_191-24-2
PAH	Benzo(g,h,i)perylene	191-24-2	Montane shrew (Mammalian insectivore)	25	250		SOIL_MS(i)_191-24-2
PAH	Benzo(g,h,i)perylene	191-24-2	Mountain cottontail (Mammalian herbivore)	470	4700		SOIL_DC(p)_191-24-2
PAH	Benzo(k)fluoranthene	207-08-9	Deer mouse (Mammalian omnivore)	99	990		SOIL_DM(ip)_207-08-9
PAH	Benzo(k)fluoranthene	207-08-9	Gray fox (Mammalian top carnivore)	4300	43000		SOIL_RF(f)_207-08-9
PAH	Benzo(k)fluoranthene	207-08-9	Montane shrew (Mammalian insectivore)	71	710		SOIL_MS(i)_207-08-9
PAH	Benzo(k)fluoranthene	207-08-9	Mountain cottontail (Mammalian herbivore)	330	3300		SOIL_DC(p)_207-08-9
PAH	Chrysene	218-01-9	Deer mouse (Mammalian omnivore)	3.1	31		SOIL_DM(ip)_218-01-9
PAH	Chrysene	218-01-9	Gray fox (Mammalian top carnivore)	110	1100		SOIL_RF(f)_218-01-9
PAH	Chrysene	218-01-9	Montane shrew (Mammalian insectivore)	3.1	31		SOIL_MS(i)_218-01-9
PAH	Chrysene	218-01-9	Mountain cottontail (Mammalian herbivore)	6.3	63		SOIL_DC(p)_218-01-9
PAH	Dibenzo(a,h)anthracene	53-70-3	Deer mouse (Mammalian omnivore)	22	220		SOIL_DM(ip)_53-70-3
PAH	Dibenzo(a,h)anthracene	53-70-3	Gray fox (Mammalian top carnivore)	850	8500		SOIL_RF(f)_53-70-3
PAH	Dibenzo(a,h)anthracene	53-70-3	Montane shrew (Mammalian insectivore)	14	140		SOIL_MS(i)_53-70-3
PAH	Dibenzo(a,h)anthracene	53-70-3	Mountain cottontail (Mammalian herbivore)	84	840		SOIL_DC(p)_53-70-3
PAH	Fluoranthene	206-44-0	Deer mouse (Mammalian omnivore)	38	380		SOIL_DM(ip)_206-44-0
PAH	Fluoranthene	206-44-0	Earthworm (Soil-dwelling invertebrate)	10	23		SOIL_EW_206-44-0
PAH	Fluoranthene	206-44-0	Gray fox (Mammalian top carnivore)	3900	39000		SOIL_RF(f)_206-44-0
PAH	Fluoranthene	206-44-0	Montane shrew (Mammalian insectivore)	22	220		SOIL_MS(i)_206-44-0
PAH	Fluoranthene	206-44-0	Mountain cottontail (Mammalian herbivore)	270	2700		SOIL_DC(p)_206-44-0
PAH	Fluorene	86-73-7	Deer mouse (Mammalian omnivore)	340	680		SOIL_DM(ip)_86-73-7
PAH	Fluorene	86-73-7	Earthworm (Soil-dwelling invertebrate)	3.7	19		SOIL_EW_86-73-7
PAH	Fluorene	86-73-7	Gray fox (Mammalian top carnivore)	50000	100000		SOIL_RF(f)_86-73-7
PAH	Fluorene	86-73-7	Montane shrew (Mammalian insectivore)	250	510		SOIL_MS(i)_86-73-7
PAH	Fluorene	86-73-7	Mountain cottontail (Mammalian herbivore)	1100	2300		SOIL_DC(p)_86-73-7
PAH	Indeno(1,2,3-cd)pyrene	193-39-5	Deer mouse (Mammalian omnivore)	110	1100		SOIL_DM(ip)_193-39-5
PAH	Indeno(1,2,3-cd)pyrene	193-39-5	Gray fox (Mammalian top carnivore)	4600	46000		SOIL_RF(f)_193-39-5
PAH	Indeno(1,2,3-cd)pyrene	193-39-5	Montane shrew (Mammalian insectivore)	71	710		SOIL_MS(i)_193-39-5
PAH	Indeno(1,2,3-cd)pyrene	193-39-5	Mountain cottontail (Mammalian herbivore)	510	5100		SOIL_DC(p)_193-39-5
PAH	Methylnaphthalene[2-]	91-57-6	Deer mouse (Mammalian omnivore)	24	240		SOIL_DM(ip)_91-57-6
PAH	Methylnaphthalene[2-]	91-57-6	Gray fox (Mammalian top carnivore)	4900	49000		SOIL_RF(f)_91-57-6
PAH	Methylnaphthalene[2-]	91-57-6	Montane shrew (Mammalian insectivore)	16	160		SOIL_MS(i)_91-57-6
PAH	Methylnaphthalene[2-]	91-57-6	Mountain cottontail (Mammalian herbivore)	110	1100		SOIL_DC(p)_91-57-6
PAH	Naphthalene	91-20-3	American kestrel (Avian top carnivore)	2100	21000		SOIL_AK(f)_91-20-3
PAH	Naphthalene	91-20-3	American kestrel (insectivore / carnivore)	78	780		SOIL_AK(fi)_91-20-3
PAH	Naphthalene	91-20-3	American robin (Avian herbivore)	3.4	34		SOIL_AR(p)_91-20-3
PAH	Naphthalene	91-20-3	American robin (Avian insectivore)	15	150		SOIL_AR(i)_91-20-3
PAH	Naphthalene	91-20-3	American robin (Avian omnivore)	5.7	57		SOIL_AR(ip)_91-20-3
PAH	Naphthalene	91-20-3	Deer mouse (Mammalian omnivore)	9.6	27		SOIL_DM(ip)_91-20-3
PAH	Naphthalene	91-20-3	Generic plant (Terrestrial autotroph - producer)	1	10		SOIL_GP_91-20-3
PAH	Naphthalene	91-20-3	Gray fox (Mammalian top carnivore)	5800	16000		SOIL_RF(f)_91-20-3
PAH	Naphthalene	91-20-3	Montane shrew (Mammalian insectivore)	28	79		SOIL_MS(i)_91-20-3
PAH	Naphthalene	91-20-3	Mountain cottontail (Mammalian herbivore)	14	40		SOIL_DC(p)_91-20-3
PAH	Phenanthrene	85-01-8	Deer mouse (Mammalian omnivore)	15	150		SOIL_DM(ip)_85-01-8
PAH	Phenanthrene	85-01-8	Earthworm (Soil-dwelling invertebrate)	5.5	12		SOIL_EW_85-01-8
PAH	Phenanthrene	85-01-8	Gray fox (Mammalian top carnivore)	1900	19000		SOIL_RF(f)_85-01-8
PAH	Phenanthrene	85-01-8	Montane shrew (Mammalian insectivore)	11	110		SOIL_MS(i)_85-01-8
PAH	Phenanthrene	85-01-8	Mountain cottontail (Mammalian herbivore)	62	620		SOIL_DC(p)_85-01-8
PAH	Pyrene	129-00-0	American kestrel (Avian top carnivore)	3000	30000		SOIL_AK(f)_129-00-0
PAH	Pyrene	129-00-0	American kestrel (insectivore / carnivore)	160	1600		SOIL_AK(fi)_129-00-0
PAH	Pyrene	129-00-0	American robin (Avian herbivore)	68	680		SOIL_AR(p)_129-00-0
PAH	Pyrene	129-00-0	American robin (Avian insectivore)	33	330		SOIL_AR(i)_129-00-0

Analyte Group	Analyte Name	Analyte Code	ESL Receptor	No Effect ESL	Low Effect ESL	Note	ESL ID
PAH	Pyrene	129-00-0	American robin (Avian omnivore)	44	440		SOIL_AR(ip)_129-00-0
PAH	Pyrene	129-00-0	Deer mouse (Mammalian omnivore)	31	310		SOIL_DM(ip)_129-00-0
PAH	Pyrene	129-00-0	Earthworm (Soil-dwelling invertebrate)	10	20		SOIL_EW_129-00-0
PAH	Pyrene	129-00-0	Gray fox (Mammalian top carnivore)	3100	31000		SOIL_RF(f)_129-00-0
PAH	Pyrene	129-00-0	Montane shrew (Mammalian insectivore)	23	230		SOIL_MS(i)_129-00-0
PAH	Pyrene	129-00-0	Mountain cottontail (Mammalian herbivore)	110	1100		SOIL_DC(p)_129-00-0
SVOC	Benzoic Acid	65-85-0	Deer mouse (Mammalian omnivore)	1.3	13		SOIL_DM(ip)_65-85-0
SVOC	Benzoic Acid	65-85-0	Gray fox (Mammalian top carnivore)	2000	20000		SOIL_RF(f)_65-85-0
SVOC	Benzoic Acid	65-85-0	Montane shrew (Mammalian insectivore)	1	10		SOIL_MS(i)_65-85-0
SVOC	Benzoic Acid	65-85-0	Mountain cottontail (Mammalian herbivore)	4.6	46		SOIL_DC(p)_65-85-0
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	American kestrel (Avian top carnivore)	9.3	93		SOIL_AK(f)_117-81-7
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	American kestrel (insectivore / carnivore)	0.096	0.96		SOIL_AK(fi)_117-81-7
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	American robin (Avian herbivore)	16	160		SOIL_AR(p)_117-81-7
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	American robin (Avian insectivore)	0.02	0.2		SOIL_AR(i)_117-81-7
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	American robin (Avian omnivore)	0.04	0.4		SOIL_AR(ip)_117-81-7
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	Deer mouse (Mammalian omnivore)	1.1	11		SOIL_DM(ip)_117-81-7
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	Gray fox (Mammalian top carnivore)	500	5000		SOIL_RF(f)_117-81-7
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	Montane shrew (Mammalian insectivore)	0.6	6		SOIL_MS(i)_117-81-7
SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	Mountain cottontail (Mammalian herbivore)	1900	19000		SOIL_DC(p)_117-81-7
SVOC	Butyl Benzyl Phthalate	85-68-7	Deer mouse (Mammalian omnivore)	160	1600		SOIL_DM(ip)_85-68-7
SVOC	Butyl Benzyl Phthalate	85-68-7	Gray fox (Mammalian top carnivore)	23000	230000		SOIL_RF(f)_85-68-7
SVOC	Butyl Benzyl Phthalate	85-68-7	Montane shrew (Mammalian insectivore)	90	900		SOIL_MS(i)_85-68-7
SVOC	Butyl Benzyl Phthalate	85-68-7	Mountain cottontail (Mammalian herbivore)	2400	24000		SOIL_DC(p)_85-68-7
SVOC	Carbazole	86-74-8	Deer mouse (Mammalian omnivore)	79	790		SOIL_DM(ip)_86-74-8
SVOC	Carbazole	86-74-8	Gray fox (Mammalian top carnivore)	13000	130000		SOIL_RF(f)_86-74-8
SVOC	Carbazole	86-74-8	Montane shrew (Mammalian insectivore)	110	1100		SOIL_MS(i)_86-74-8
SVOC	Carbazole	86-74-8	Mountain cottontail (Mammalian herbivore)	140	1400		SOIL_DC(p)_86-74-8
SVOC	Chlorobenzene	108-90-7	Deer mouse (Mammalian omnivore)	53	530		SOIL_DM(ip)_108-90-7
SVOC	Chlorobenzene	108-90-7	Earthworm (Soil-dwelling invertebrate)	2.4	24		SOIL_EW_108-90-7
SVOC	Chlorobenzene	108-90-7	Gray fox (Mammalian top carnivore)	25000	250000		SOIL_RF(f)_108-90-7
SVOC	Chlorobenzene	108-90-7	Montane shrew (Mammalian insectivore)	43	430		SOIL_MS(i)_108-90-7
SVOC	Chlorobenzene	108-90-7	Mountain cottontail (Mammalian herbivore)	170	1700		SOIL_DC(p)_108-90-7
SVOC	Chlorophenol[2-]	95-57-8	American kestrel (Avian top carnivore)	310	3100		SOIL_AK(f)_95-57-8
SVOC	Chlorophenol[2-]	95-57-8	American kestrel (insectivore / carnivore)	14	140		SOIL_AK(fi)_95-57-8
SVOC	Chlorophenol[2-]	95-57-8	American robin (Avian herbivore)	0.39	3.9		SOIL_AR(p)_95-57-8
SVOC	Chlorophenol[2-]	95-57-8	American robin (Avian insectivore)	2.6	26		SOIL_AR(i)_95-57-8
SVOC	Chlorophenol[2-]	95-57-8	American robin (Avian omnivore)	0.68	6.8		SOIL_AR(ip)_95-57-8
SVOC	Chlorophenol[2-]	95-57-8	Deer mouse (Mammalian omnivore)	0.54	5.4		SOIL_DM(ip)_95-57-8
SVOC	Chlorophenol[2-]	95-57-8	Gray fox (Mammalian top carnivore)	340	3400		SOIL_RF(f)_95-57-8
SVOC	Chlorophenol[2-]	95-57-8	Montane shrew (Mammalian insectivore)	2.3	23		SOIL_MS(i)_95-57-8
SVOC	Chlorophenol[2-]	95-57-8	Mountain cottontail (Mammalian herbivore)	0.74	7.4		SOIL_DC(p)_95-57-8
SVOC	Dibenzofuran	132-64-9	Generic plant (Terrestrial autotroph - producer)	6.1	61		SOIL_GP_132-64-9
SVOC	Diethyl Phthalate	84-66-2	Deer mouse (Mammalian omnivore)	3600	36000		SOIL_DM(ip)_84-66-2
SVOC	Diethyl Phthalate	84-66-2	Generic plant (Terrestrial autotroph - producer)	100	1000		SOIL_GP_84-66-2
SVOC	Diethyl Phthalate	84-66-2	Gray fox (Mammalian top carnivore)	2500000	25000000		SOIL_RF(f)_84-66-2
SVOC	Diethyl Phthalate	84-66-2	Montane shrew (Mammalian insectivore)	3600	36000		SOIL_MS(i)_84-66-2
SVOC	Diethyl Phthalate	84-66-2	Mountain cottontail (Mammalian herbivore)	8800	88000		SOIL_DC(p)_84-66-2
SVOC	Dimethyl Phthalate	131-11-3	Deer mouse (Mammalian omnivore)	38	460		SOIL_DM(ip)_131-11-3

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SVOC	Dimethyl Phthalate	131-11-3	Earthworm (Soil-dwelling invertebrate)	10	100		SOIL_EW_131-11-3
SVOC	Dimethyl Phthalate	131-11-3	Gray fox (Mammalian top carnivore)	48000	590000		SOIL_RF(f)_131-11-3
SVOC	Dimethyl Phthalate	131-11-3	Montane shrew (Mammalian insectivore)	80	980		SOIL_MS(i)_131-11-3
SVOC	Dimethyl Phthalate	131-11-3	Mountain cottontail (Mammalian herbivore)	60	740		SOIL_DC(p)_131-11-3
SVOC	Di-n-Butyl Phthalate	84-74-2	American kestrel (Avian top carnivore)	2	20		SOIL_AK(f)_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	American kestrel (insectivore / carnivore)	0.052	0.52		SOIL_AK(fi)_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	American robin (Avian herbivore)	0.38	3.8		SOIL_AR(p)_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	American robin (Avian insectivore)	0.011	0.11		SOIL_AR(i)_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	American robin (Avian omnivore)	0.021	0.21		SOIL_AR(ip)_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	Deer mouse (Mammalian omnivore)	360	860		SOIL_DM(ip)_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	Generic plant (Terrestrial autotroph - producer)	160	600		SOIL_GP_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	Gray fox (Mammalian top carnivore)	62000	140000		SOIL_RF(f)_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	Montane shrew (Mammalian insectivore)	180	450		SOIL_MS(i)_84-74-2
SVOC	Di-n-Butyl Phthalate	84-74-2	Mountain cottontail (Mammalian herbivore)	17000	40000		SOIL_DC(p)_84-74-2
SVOC	Di-n-octylphthalate	117-84-0	Deer mouse (Mammalian omnivore)	1.8	18		SOIL_DM(ip)_117-84-0
SVOC	Di-n-octylphthalate	117-84-0	Gray fox (Mammalian top carnivore)	1300	13000		SOIL_RF(f)_117-84-0
SVOC	Di-n-octylphthalate	117-84-0	Montane shrew (Mammalian insectivore)	0.91	9.1		SOIL_MS(i)_117-84-0
SVOC	Di-n-octylphthalate	117-84-0	Mountain cottontail (Mammalian herbivore)	8400	84000		SOIL_DC(p)_117-84-0
SVOC	Methylphenol[2-]	95-48-7	Deer mouse (Mammalian omnivore)	580	5800		SOIL_DM(ip)_95-48-7
SVOC	Methylphenol[2-]	95-48-7	Generic plant (Terrestrial autotroph - producer)	0.67	7		SOIL_GP_95-48-7
SVOC	Methylphenol[2-]	95-48-7	Gray fox (Mammalian top carnivore)	160000	1600000		SOIL_RF(f)_95-48-7
SVOC	Methylphenol[2-]	95-48-7	Montane shrew (Mammalian insectivore)	1500	15000		SOIL_MS(i)_95-48-7
SVOC	Methylphenol[2-]	95-48-7	Mountain cottontail (Mammalian herbivore)	880	8800		SOIL_DC(p)_95-48-7
SVOC	Methylphenol[3-]	108-39-4	Generic plant (Terrestrial autotroph - producer)	0.69	7		SOIL_GP_108-39-4
SVOC	Nitroaniline[2-]	88-74-4	Deer mouse (Mammalian omnivore)	5.3	10		SOIL_DM(ip)_88-74-4
SVOC	Nitroaniline[2-]	88-74-4	Gray fox (Mammalian top carnivore)	2200	4400		SOIL_RF(f)_88-74-4
SVOC	Nitroaniline[2-]	88-74-4	Montane shrew (Mammalian insectivore)	6.5	13		SOIL_MS(i)_88-74-4
SVOC	Nitroaniline[2-]	88-74-4	Mountain cottontail (Mammalian herbivore)	11	22		SOIL_DC(p)_88-74-4
SVOC	Nitrobenzene	98-95-3	Deer mouse (Mammalian omnivore)	4.8	48		SOIL_DM(ip)_98-95-3
SVOC	Nitrobenzene	98-95-3	Earthworm (Soil-dwelling invertebrate)	2.2	22		SOIL_EW_98-95-3
SVOC	Nitrobenzene	98-95-3	Gray fox (Mammalian top carnivore)	4100	41000		SOIL_RF(f)_98-95-3
SVOC	Nitrobenzene	98-95-3	Montane shrew (Mammalian insectivore)	21	210		SOIL_MS(i)_98-95-3
SVOC	Nitrobenzene	98-95-3	Mountain cottontail (Mammalian herbivore)	6.7	67		SOIL_DC(p)_98-95-3
SVOC	Pentachloronitrobenzene	82-68-8	American kestrel (Avian top carnivore)	110	1100		SOIL_AK(f)_82-68-8
SVOC	Pentachloronitrobenzene	82-68-8	American kestrel (insectivore / carnivore)	3.3	33		SOIL_AK(fi)_82-68-8
SVOC	Pentachloronitrobenzene	82-68-8	American robin (Avian herbivore)	21	210		SOIL_AR(p)_82-68-8
SVOC	Pentachloronitrobenzene	82-68-8	American robin (Avian insectivore)	0.7	7		SOIL_AR(i)_82-68-8
SVOC	Pentachloronitrobenzene	82-68-8	American robin (Avian omnivore)	1.3	13		SOIL_AR(ip)_82-68-8
SVOC	Pentachloronitrobenzene	82-68-8	Deer mouse (Mammalian omnivore)	22	220		SOIL_DM(ip)_82-68-8
SVOC	Pentachloronitrobenzene	82-68-8	Gray fox (Mammalian top carnivore)	3500	35000		SOIL_RF(f)_82-68-8
SVOC	Pentachloronitrobenzene	82-68-8	Montane shrew (Mammalian insectivore)	11	110		SOIL_MS(i)_82-68-8
SVOC	Pentachloronitrobenzene	82-68-8	Mountain cottontail (Mammalian herbivore)	930	9300		SOIL_DC(p)_82-68-8
SVOC	Pentachlorophenol	87-86-5	American kestrel (Avian top carnivore)	57	570		SOIL_AK(f)_87-86-5
SVOC	Pentachlorophenol	87-86-5	American kestrel (insectivore / carnivore)	1.7	17		SOIL_AK(fi)_87-86-5
SVOC	Pentachlorophenol	87-86-5	American robin (Avian herbivore)	29	290		SOIL_AR(p)_87-86-5
SVOC	Pentachlorophenol	87-86-5	American robin (Avian insectivore)	0.36	3.6		SOIL_AR(i)_87-86-5
SVOC	Pentachlorophenol	87-86-5	American robin (Avian omnivore)	0.72	7.2		SOIL_AR(ip)_87-86-5
SVOC	Pentachlorophenol	87-86-5	Deer mouse (Mammalian omnivore)	1.5	15		SOIL_DM(ip)_87-86-5
SVOC	Pentachlorophenol	87-86-5	Earthworm (Soil-dwelling invertebrate)	31	150		SOIL_EW_87-86-5
SVOC	Pentachlorophenol	87-86-5	Generic plant (Terrestrial autotroph - producer)	5	50		SOIL_GP_87-86-5
SVOC	Pentachlorophenol	87-86-5	Gray fox (Mammalian top carnivore)	230	2300		SOIL_RF(f)_87-86-5
SVOC	Pentachlorophenol	87-86-5	Montane shrew (Mammalian insectivore)	0.81	8.1		SOIL_MS(i)_87-86-5
SVOC	Pentachlorophenol	87-86-5	Mountain cottontail (Mammalian herbivore)	180	1800		SOIL_DC(p)_87-86-5

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SVOC	Phenol	108-95-2	Deer mouse (Mammalian omnivore)	37	370		SOIL_DM(ip)_108-95-2
SVOC	Phenol	108-95-2	Earthworm (Soil-dwelling invertebrate)	1.8	18		SOIL_EW_108-95-2
SVOC	Phenol	108-95-2	Generic plant (Terrestrial autotroph - producer)	0.79	8		SOIL_GP_108-95-2
SVOC	Phenol	108-95-2	Gray fox (Mammalian top carnivore)	43000	430000		SOIL_RF(f)_108-95-2
SVOC	Phenol	108-95-2	Montane shrew (Mammalian insectivore)	640	6400		SOIL_MS(i)_108-95-2
SVOC	Phenol	108-95-2	Mountain cottontail (Mammalian herbivore)	47	470		SOIL_DC(p)_108-95-2
VOC	Acetone	67-64-1	American kestrel (Avian top carnivore)	66000	660000		SOIL_AK(f)_67-64-1
VOC	Acetone	67-64-1	American kestrel (insectivore / carnivore)	840	8400		SOIL_AK(fi)_67-64-1
VOC	Acetone	67-64-1	American robin (Avian herbivore)	7.5	75		SOIL_AR(p)_67-64-1
VOC	Acetone	67-64-1	American robin (Avian insectivore)	170	1700		SOIL_AR(i)_67-64-1
VOC	Acetone	67-64-1	American robin (Avian omnivore)	14	140		SOIL_AR(ip)_67-64-1
VOC	Acetone	67-64-1	Deer mouse (Mammalian omnivore)	1.2	6.3		SOIL_DM(ip)_67-64-1
VOC	Acetone	67-64-1	Gray fox (Mammalian top carnivore)	7800	39000		SOIL_RF(f)_67-64-1
VOC	Acetone	67-64-1	Montane shrew (Mammalian insectivore)	15	79		SOIL_MS(i)_67-64-1
VOC	Acetone	67-64-1	Mountain cottontail (Mammalian herbivore)	1.6	8		SOIL_DC(p)_67-64-1
VOC	Benzene	71-43-2	Deer mouse (Mammalian omnivore)	24	240		SOIL_DM(ip)_71-43-2
VOC	Benzene	71-43-2	Gray fox (Mammalian top carnivore)	18000	180000		SOIL_RF(f)_71-43-2
VOC	Benzene	71-43-2	Montane shrew (Mammalian insectivore)	49	490		SOIL_MS(i)_71-43-2
VOC	Benzene	71-43-2	Mountain cottontail (Mammalian herbivore)	38	380		SOIL_DC(p)_71-43-2
VOC	Benzyl Alcohol	100-51-6	Deer mouse (Mammalian omnivore)	120	1200		SOIL_DM(ip)_100-51-6
VOC	Benzyl Alcohol	100-51-6	Gray fox (Mammalian top carnivore)	110000	1100000		SOIL_RF(f)_100-51-6
VOC	Benzyl Alcohol	100-51-6	Montane shrew (Mammalian insectivore)	270	2700		SOIL_MS(i)_100-51-6
VOC	Benzyl Alcohol	100-51-6	Mountain cottontail (Mammalian herbivore)	190	1900		SOIL_DC(p)_100-51-6
VOC	Butanone[2-]	78-93-3	Deer mouse (Mammalian omnivore)	350	920		SOIL_DM(ip)_78-93-3
VOC	Butanone[2-]	78-93-3	Gray fox (Mammalian top carnivore)	1300000	3500000		SOIL_RF(f)_78-93-3
VOC	Butanone[2-]	78-93-3	Montane shrew (Mammalian insectivore)	2700	6900		SOIL_MS(i)_78-93-3
VOC	Butanone[2-]	78-93-3	Mountain cottontail (Mammalian herbivore)	470	1200		SOIL_DC(p)_78-93-3
VOC	Carbon Disulfide	75-15-0	Deer mouse (Mammalian omnivore)	0.81	8.1		SOIL_DM(ip)_75-15-0
VOC	Carbon Disulfide	75-15-0	Gray fox (Mammalian top carnivore)	190	1900		SOIL_RF(f)_75-15-0
VOC	Carbon Disulfide	75-15-0	Montane shrew (Mammalian insectivore)	1.2	12		SOIL_MS(i)_75-15-0
VOC	Carbon Disulfide	75-15-0	Mountain cottontail (Mammalian herbivore)	1.4	14		SOIL_DC(p)_75-15-0
VOC	Chloroaniline[4-]	106-47-8	Earthworm (Soil-dwelling invertebrate)	1.8	18		SOIL_EW_106-47-8
VOC	Chloroaniline[4-]	106-47-8	Generic plant (Terrestrial autotroph - producer)	1	10		SOIL_GP_106-47-8
VOC	Chloroform	67-66-3	Deer mouse (Mammalian omnivore)	8	21		SOIL_DM(ip)_67-66-3
VOC	Chloroform	67-66-3	Gray fox (Mammalian top carnivore)	8900	24000		SOIL_RF(f)_67-66-3
VOC	Chloroform	67-66-3	Montane shrew (Mammalian insectivore)	8.2	22		SOIL_MS(i)_67-66-3
VOC	Chloroform	67-66-3	Mountain cottontail (Mammalian herbivore)	19	52		SOIL_DC(p)_67-66-3
VOC	Dichlorobenzene[1,2-]	95-50-1	Deer mouse (Mammalian omnivore)	1.5	15		SOIL_DM(ip)_95-50-1
VOC	Dichlorobenzene[1,2-]	95-50-1	Gray fox (Mammalian top carnivore)	480	4800		SOIL_RF(f)_95-50-1
VOC	Dichlorobenzene[1,2-]	95-50-1	Montane shrew (Mammalian insectivore)	0.92	9.2		SOIL_MS(i)_95-50-1
VOC	Dichlorobenzene[1,2-]	95-50-1	Mountain cottontail (Mammalian herbivore)	12	120		SOIL_DC(p)_95-50-1
VOC	Dichlorobenzene[1,3-]	541-73-1	Deer mouse (Mammalian omnivore)	1.2	12		SOIL_DM(ip)_541-73-1
VOC	Dichlorobenzene[1,3-]	541-73-1	Gray fox (Mammalian top carnivore)	380	3800		SOIL_RF(f)_541-73-1
VOC	Dichlorobenzene[1,3-]	541-73-1	Montane shrew (Mammalian insectivore)	0.74	7.4		SOIL_MS(i)_541-73-1
VOC	Dichlorobenzene[1,3-]	541-73-1	Mountain cottontail (Mammalian herbivore)	13	130		SOIL_DC(p)_541-73-1
VOC	Dichlorobenzene[1,4-]	106-46-7	Deer mouse (Mammalian omnivore)	1.5	6		SOIL_DM(ip)_106-46-7
VOC	Dichlorobenzene[1,4-]	106-46-7	Earthworm (Soil-dwelling invertebrate)	1.2	12		SOIL_EW_106-46-7
VOC	Dichlorobenzene[1,4-]	106-46-7	Gray fox (Mammalian top carnivore)	470	1800		SOIL_RF(f)_106-46-7
VOC	Dichlorobenzene[1,4-]	106-46-7	Montane shrew (Mammalian insectivore)	0.89	3.5		SOIL_MS(i)_106-46-7
VOC	Dichlorobenzene[1,4-]	106-46-7	Mountain cottontail (Mammalian herbivore)	12	49		SOIL_DC(p)_106-46-7
VOC	Dichloroethane[1,1-]	75-34-3	Deer mouse (Mammalian omnivore)	210	2100		SOIL_DM(ip)_75-34-3
VOC	Dichloroethane[1,1-]	75-34-3	Gray fox (Mammalian top carnivore)	250000	2500000		SOIL_RF(f)_75-34-3

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VOC	Dichloroethane[1,1-]	75-34-3	Montane shrew (Mammalian insectivore)	290	2900		SOIL_MS(i)_75-34-3
VOC	Dichloroethane[1,1-]	75-34-3	Mountain cottontail (Mammalian herbivore)	410	4100		SOIL_DC(p)_75-34-3
VOC	Dichloroethane[1,2-]	107-06-2	American kestrel (Avian top carnivore)	1300	2700		SOIL_AK(f)_107-06-2
VOC	Dichloroethane[1,2-]	107-06-2	American kestrel (insectivore / carnivore)	22	44		SOIL_AK(fi)_107-06-2
VOC	Dichloroethane[1,2-]	107-06-2	American robin (Avian herbivore)	0.85	1.6		SOIL_AR(p)_107-06-2
VOC	Dichloroethane[1,2-]	107-06-2	American robin (Avian insectivore)	4.5	9		SOIL_AR(i)_107-06-2
VOC	Dichloroethane[1,2-]	107-06-2	American robin (Avian omnivore)	1.4	2.8		SOIL_AR(ip)_107-06-2
VOC	Dichloroethane[1,2-]	107-06-2	Deer mouse (Mammalian omnivore)	27	270		SOIL_DM(ip)_107-06-2
VOC	Dichloroethane[1,2-]	107-06-2	Gray fox (Mammalian top carnivore)	36000	360000		SOIL_RF(f)_107-06-2
VOC	Dichloroethane[1,2-]	107-06-2	Montane shrew (Mammalian insectivore)	91	910		SOIL_MS(i)_107-06-2
VOC	Dichloroethane[1,2-]	107-06-2	Mountain cottontail (Mammalian herbivore)	39	390		SOIL_DC(p)_107-06-2
VOC	Dichloroethene[1,1-]	75-35-4	Deer mouse (Mammalian omnivore)	14	140		SOIL_DM(ip)_75-35-4
VOC	Dichloroethene[1,1-]	75-35-4	Gray fox (Mammalian top carnivore)	14000	140000		SOIL_RF(f)_75-35-4
VOC	Dichloroethene[1,1-]	75-35-4	Montane shrew (Mammalian insectivore)	11	110		SOIL_MS(i)_75-35-4
VOC	Dichloroethene[1,1-]	75-35-4	Mountain cottontail (Mammalian herbivore)	44	440		SOIL_DC(p)_75-35-4
VOC	Dichloroethene[cis/trans-1,2-]	540-59-0	Deer mouse (Mammalian omnivore)	25	250		SOIL_DM(ip)_540-59-0
VOC	Dichloroethene[cis/trans-1,2-]	540-59-0	Gray fox (Mammalian top carnivore)	25000	250000		SOIL_RF(f)_540-59-0
VOC	Dichloroethene[cis/trans-1,2-]	540-59-0	Montane shrew (Mammalian insectivore)	24	240		SOIL_MS(i)_540-59-0
VOC	Dichloroethene[cis/trans-1,2-]	540-59-0	Mountain cottontail (Mammalian herbivore)	64	640		SOIL_DC(p)_540-59-0
VOC	Diphenylamine	122-39-4	American kestrel (Avian top carnivore)	3900	6500		SOIL_AK(f)_122-39-4
VOC	Diphenylamine	122-39-4	American kestrel (insectivore / carnivore)	49	81		SOIL_AK(fi)_122-39-4
VOC	Diphenylamine	122-39-4	American robin (Avian herbivore)	78	130		SOIL_AR(p)_122-39-4
VOC	Diphenylamine	122-39-4	American robin (Avian insectivore)	10	16		SOIL_AR(i)_122-39-4
VOC	Diphenylamine	122-39-4	American robin (Avian omnivore)	17	29		SOIL_AR(ip)_122-39-4
VOC	Hexachlorobenzene	118-74-1	American kestrel (Avian top carnivore)	12	120		SOIL_AK(f)_118-74-1
VOC	Hexachlorobenzene	118-74-1	American kestrel (insectivore / carnivore)	0.37	3.7		SOIL_AK(fi)_118-74-1
VOC	Hexachlorobenzene	118-74-1	American robin (Avian herbivore)	83	830		SOIL_AR(p)_118-74-1
VOC	Hexachlorobenzene	118-74-1	American robin (Avian insectivore)	0.079	0.79		SOIL_AR(i)_118-74-1
VOC	Hexachlorobenzene	118-74-1	American robin (Avian omnivore)	0.15	1.5		SOIL_AR(ip)_118-74-1
VOC	Hexachlorobenzene	118-74-1	Deer mouse (Mammalian omnivore)	0.39	3.9		SOIL_DM(ip)_118-74-1
VOC	Hexachlorobenzene	118-74-1	Earthworm (Soil-dwelling invertebrate)	10	100		SOIL_EW_118-74-1
VOC	Hexachlorobenzene	118-74-1	Generic plant (Terrestrial autotroph - producer)	10	100		SOIL_GP_118-74-1
VOC	Hexachlorobenzene	118-74-1	Gray fox (Mammalian top carnivore)	59	590		SOIL_RF(f)_118-74-1
VOC	Hexachlorobenzene	118-74-1	Montane shrew (Mammalian insectivore)	0.2	2		SOIL_MS(i)_118-74-1
VOC	Hexachlorobenzene	118-74-1	Mountain cottontail (Mammalian herbivore)	910	9100		SOIL_DC(p)_118-74-1
VOC	Hexanone[2-]	591-78-6	American kestrel (Avian top carnivore)	290	2900		SOIL_AK(f)_591-78-6
VOC	Hexanone[2-]	591-78-6	American kestrel (insectivore / carnivore)	1.7	17		SOIL_AK(fi)_591-78-6
VOC	Hexanone[2-]	591-78-6	American robin (Avian herbivore)	0.47	4.7		SOIL_AR(p)_591-78-6
VOC	Hexanone[2-]	591-78-6	American robin (Avian insectivore)	0.36	3.6		SOIL_AR(i)_591-78-6
VOC	Hexanone[2-]	591-78-6	American robin (Avian omnivore)	0.41	4.1		SOIL_AR(ip)_591-78-6
VOC	Hexanone[2-]	591-78-6	Deer mouse (Mammalian omnivore)	6.1	23		SOIL_DM(ip)_591-78-6
VOC	Hexanone[2-]	591-78-6	Gray fox (Mammalian top carnivore)	5900	22000		SOIL_RF(f)_591-78-6
VOC	Hexanone[2-]	591-78-6	Montane shrew (Mammalian insectivore)	5.4	20		SOIL_MS(i)_591-78-6
VOC	Hexanone[2-]	591-78-6	Mountain cottontail (Mammalian herbivore)	17	65		SOIL_DC(p)_591-78-6
VOC	Iodomethane	74-88-4	American kestrel (Avian top carnivore)	46	92		SOIL_AK(f)_74-88-4
VOC	Iodomethane	74-88-4	American kestrel (insectivore / carnivore)	0.29	0.59		SOIL_AK(fi)_74-88-4
VOC	Iodomethane	74-88-4	American robin (Avian herbivore)	0.038	0.076		SOIL_AR(p)_74-88-4
VOC	Iodomethane	74-88-4	American robin (Avian insectivore)	0.062	0.12		SOIL_AR(i)_74-88-4
VOC	Iodomethane	74-88-4	American robin (Avian omnivore)	0.047	0.095		SOIL_AR(ip)_74-88-4
VOC	Methyl-2-pentanone[4-]	108-10-1	Deer mouse (Mammalian omnivore)	9.7	97		SOIL_DM(ip)_108-10-1
VOC	Methyl-2-pentanone[4-]	108-10-1	Gray fox (Mammalian top carnivore)	18000	180000		SOIL_RF(f)_108-10-1
VOC	Methyl-2-pentanone[4-]	108-10-1	Montane shrew (Mammalian insectivore)	15	150		SOIL_MS(i)_108-10-1
VOC	Methyl-2-pentanone[4-]	108-10-1	Mountain cottontail (Mammalian herbivore)	17	170		SOIL_DC(p)_108-10-1
VOC	Methylene Chloride	75-09-2	Deer mouse (Mammalian omnivore)	2.6	22		SOIL_DM(ip)_75-09-2

Analyte Group	Analyte Name	Analyte Code	ESL Receptor	No Effect ESL	Low Effect ESL	Note	ESL ID
VOC	Methylene Chloride	75-09-2	Generic plant (Terrestrial autotroph - producer)	1600	16000		SOIL_GP_75-09-2
VOC	Methylene Chloride	75-09-2	Gray fox (Mammalian top carnivore)	4300	36000		SOIL_RF(f)_75-09-2
VOC	Methylene Chloride	75-09-2	Montane shrew (Mammalian insectivore)	9.2	79		SOIL_MS(i)_75-09-2
VOC	Methylene Chloride	75-09-2	Mountain cottontail (Mammalian herbivore)	3.8	32		SOIL_DC(p)_75-09-2
VOC	Styrene	100-42-5	Earthworm (Soil-dwelling invertebrate)	1.2	12		SOIL_EW_100-42-5
VOC	Styrene	100-42-5	Generic plant (Terrestrial autotroph - producer)	3.2	32		SOIL_GP_100-42-5
VOC	Tetrachloroethene	127-18-4	Deer mouse (Mammalian omnivore)	0.35	1.7		SOIL_DM(ip)_127-18-4
VOC	Tetrachloroethene	127-18-4	Generic plant (Terrestrial autotroph - producer)	10	100		SOIL_GP_127-18-4
VOC	Tetrachloroethene	127-18-4	Gray fox (Mammalian top carnivore)	120	630		SOIL_RF(f)_127-18-4
VOC	Tetrachloroethene	127-18-4	Montane shrew (Mammalian insectivore)	0.18	0.94		SOIL_MS(i)_127-18-4
VOC	Tetrachloroethene	127-18-4	Mountain cottontail (Mammalian herbivore)	9.5	47		SOIL_DC(p)_127-18-4
VOC	Isopropyltoluene[4-]	99-87-6	Deer mouse (Mammalian omnivore)	25	250	Use toluene	SOIL_DM(ip)_108-88-3
VOC	Isopropyltoluene[4-]	99-87-6	Generic plant (Terrestrial autotroph - producer)	200	2000	Use toluene	SOIL_GP_108-88-3
VOC	Isopropyltoluene[4-]	99-87-6	Gray fox (Mammalian top carnivore)	12000	120000	Use toluene	SOIL_RF(f)_108-88-3
VOC	Isopropyltoluene[4-]	99-87-6	Montane shrew (Mammalian insectivore)	23	230	Use toluene	SOIL_MS(i)_108-88-3
VOC	Isopropyltoluene[4-]	99-87-6	Mountain cottontail (Mammalian herbivore)	66	660	Use toluene	SOIL_DC(p)_108-88-3
VOC	Toluene	108-88-3	Deer mouse (Mammalian omnivore)	25	250		SOIL_DM(ip)_108-88-3
VOC	Toluene	108-88-3	Generic plant (Terrestrial autotroph - producer)	200	2000		SOIL_GP_108-88-3
VOC	Toluene	108-88-3	Gray fox (Mammalian top carnivore)	12000	120000		SOIL_RF(f)_108-88-3
VOC	Toluene	108-88-3	Montane shrew (Mammalian insectivore)	23	230		SOIL_MS(i)_108-88-3
VOC	Toluene	108-88-3	Mountain cottontail (Mammalian herbivore)	66	660		SOIL_DC(p)_108-88-3
VOC	Trichlorobenzene[1,2,4-]	120-82-1	Deer mouse (Mammalian omnivore)	0.51	5.1		SOIL_DM(ip)_120-82-1
VOC	Trichlorobenzene[1,2,4-]	120-82-1	Earthworm (Soil-dwelling invertebrate)	1.2	12		SOIL_EW_120-82-1
VOC	Trichlorobenzene[1,2,4-]	120-82-1	Gray fox (Mammalian top carnivore)	110	1100		SOIL_RF(f)_120-82-1
VOC	Trichlorobenzene[1,2,4-]	120-82-1	Montane shrew (Mammalian insectivore)	0.27	2.7		SOIL_MS(i)_120-82-1
VOC	Trichlorobenzene[1,2,4-]	120-82-1	Mountain cottontail (Mammalian herbivore)	12	120		SOIL_DC(p)_120-82-1
VOC	Trichloroethane[1,1,1-]	71-55-6	Deer mouse (Mammalian omnivore)	400	4000		SOIL_DM(ip)_71-55-6
VOC	Trichloroethane[1,1,1-]	71-55-6	Gray fox (Mammalian top carnivore)	310000	3100000		SOIL_RF(f)_71-55-6
VOC	Trichloroethane[1,1,1-]	71-55-6	Montane shrew (Mammalian insectivore)	260	2600		SOIL_MS(i)_71-55-6
VOC	Trichloroethane[1,1,1-]	71-55-6	Mountain cottontail (Mammalian herbivore)	2000	20000		SOIL_DC(p)_71-55-6
VOC	Trichloroethene	79-01-6	Deer mouse (Mammalian omnivore)	54	540		SOIL_DM(ip)_79-01-6
VOC	Trichloroethene	79-01-6	Gray fox (Mammalian top carnivore)	42000	420000		SOIL_RF(f)_79-01-6
VOC	Trichloroethene	79-01-6	Montane shrew (Mammalian insectivore)	42	420		SOIL_MS(i)_79-01-6
VOC	Trichloroethene	79-01-6	Mountain cottontail (Mammalian herbivore)	190	1900		SOIL_DC(p)_79-01-6
VOC	Trichlorofluoromethane	75-69-4	Deer mouse (Mammalian omnivore)	97	650		SOIL_DM(ip)_75-69-4
VOC	Trichlorofluoromethane	75-69-4	Gray fox (Mammalian top carnivore)	62000	420000		SOIL_RF(f)_75-69-4
VOC	Trichlorofluoromethane	75-69-4	Montane shrew (Mammalian insectivore)	52	350		SOIL_MS(i)_75-69-4
VOC	Trichlorofluoromethane	75-69-4	Mountain cottontail (Mammalian herbivore)	1800	12000		SOIL_DC(p)_75-69-4
VOC	Vinyl Chloride	75-01-4	Deer mouse (Mammalian omnivore)	0.13	1.3		SOIL_DM(ip)_75-01-4
VOC	Vinyl Chloride	75-01-4	Gray fox (Mammalian top carnivore)	110	1100		SOIL_RF(f)_75-01-4
VOC	Vinyl Chloride	75-01-4	Montane shrew (Mammalian insectivore)	0.12	1.2		SOIL_MS(i)_75-01-4
VOC	Vinyl Chloride	75-01-4	Mountain cottontail (Mammalian herbivore)	0.34	3.4		SOIL_DC(p)_75-01-4

Analyte Group	Analyte Name	Analyte Code	ESL Receptor	No Effect ESL	Low Effect ESL	Note	ESL ID
VOC	Xylene[1,3-]+Xylene[1,4-]	Xylene[m+p]	American kestrel (Avian top carnivore)	13000	130000	Use Xylene total	SOIL_AK(f)_1330-20-7
VOC	Xylene[1,3-]+Xylene[1,4-]	Xylene[m+p]	American kestrel (insectivore / carnivore)	190	1900	Use Xylene total	SOIL_AK(fi)_1330-20-7
VOC	Xylene[1,3-]+Xylene[1,4-]	Xylene[m+p]	American robin (Avian herbivore)	89	890	Use Xylene total	SOIL_AR(p)_1330-20-7
VOC	Xylene[1,3-]+Xylene[1,4-]	Xylene[m+p]	American robin (Avian insectivore)	41	410	Use Xylene total	SOIL_AR(i)_1330-20-7
VOC	Xylene[1,3-]+Xylene[1,4-]	Xylene[m+p]	American robin (Avian omnivore)	56	560	Use Xylene total	SOIL_AR(ip)_1330-20-7
VOC	Xylene[1,3-]+Xylene[1,4-]	Xylene[m+p]	Deer mouse (Mammalian omnivore)	1.9	2.4	Use Xylene total	SOIL_DM(ip)_1330-20-7
VOC	Xylene[1,3-]+Xylene[1,4-]	Xylene[m+p]	Generic plant (Terrestrial autotroph - producer)	100	1000	Use Xylene total	SOIL_GP_1330-20-7
VOC	Xylene[1,3-]+Xylene[1,4-]	Xylene[m+p]	Gray fox (Mammalian top carnivore)	750	930	Use Xylene total	SOIL_RF(f)_1330-20-7
VOC	Xylene[1,3-]+Xylene[1,4-]	Xylene[m+p]	Montane shrew (Mammalian insectivore)	1.4	1.8	Use Xylene total	SOIL_MS(i)_1330-20-7
VOC	Xylene[1,3-]+Xylene[1,4-]	Xylene[m+p]	Mountain cottontail (Mammalian herbivore)	7.6	9.5	Use Xylene total	SOIL_DC(p)_1330-20-7