

**DEPARTMENT OF ENERGY**  
Environmental Management Los Alamos Field Office (EM-LA)  
Los Alamos, New Mexico 87544

Mr. John E. Kieling  
Bureau Chief  
Hazardous Waste Bureau  
New Mexico Environment Department  
2905 Rodeo Park Drive East, Building 1  
Santa Fe, NM 87505-6303



SEP 27 2018

Dear Mr. Kieling:

**Subject:** Submittal of the Letter Report: Fieldwork Completion and Status for the Known Cleanup Sites Campaign at Solid Waste Management Units 50-006(d), 03-049(a), and 46-004(q)

Enclosed please find two hard copies with electronic files of the Letter Report: Fieldwork Completion and Status for the Known Cleanup Sites Campaign at Solid Waste Management Units 50-006(d), 03-049(a), and 46-004(q).

This letter report fulfills Fiscal Year (FY) 2018 Milestone #15 of the 2016 Compliance Order on Consent (Consent Order), Appendix B, under the Known Cleanup Sites Campaign. The specific milestone addressed by this deliverable is described as a letter report documenting field completion of cleanups for Solid Waste Management Units (SWMUs) 50-006(d) and 03-049(a). Fieldwork to cleanup SWMU 46-004(q), which is included in a Consent Order Target for September 30, 2019, was initiated in FY 2018. Its status is also included in this letter report.

Pursuant to Section XXIII.C of the Consent Order, a pre-submission review meeting was held with Newport News Nuclear BWXT – Los Alamos, LLC, and the New Mexico Environment Department on September 20, 2018, to discuss the information presented in this report.

If you have any questions, please contact Brenda Bowlby at (505) 551-2957 (brenda.bowlby@em-la.doe.gov) or Cheryl Rodriguez at (505) 665-5330 (cheryl.rodriguez@em.doe.gov).

Sincerely,

Arturo Q. Duran  
Designated Agency Manager  
Environmental Management  
Los Alamos Field Office

Enclosures:

1. Letter Report: Fieldwork Completion and Status for the Known Cleanup Sites Campaign at Solid Waste Management Units 50-006(d), 03-049(a), and 46-004(q) (EM2018-0044)

cc (letter with enclosure[s]):

B. Bowlby, N3B

C. Rodriguez, EM-LA

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N3B Records

Public Reading Room (EPRR)

PRS Database

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D. Rhodes, EM-LA

EM-LA-20AD-00314

September 2018  
EM2018-0044


**Letter Report: Fieldwork  
Completion and Status for the  
Known Cleanup Sites Campaign  
at Solid Waste Management  
Units 50-006(d), 03-049(a), and  
46-004(q)**

Newport News Nuclear BWXT – Los Alamos, LLC (N3B), under the U.S. Department of Energy Office of Environmental Management Contract No. 89303318CEM000007 (the Los Alamos Legacy Cleanup Contract), has prepared this document pursuant to the Compliance Order on Consent, signed June 24, 2016. The Compliance Order on Consent contains requirements for the investigation and cleanup, including corrective action, of contamination at Los Alamos National Laboratory. The U.S. government has rights to use, reproduce, and distribute this document. The public may copy and use this document without charge, provided that this notice and any statement of authorship are reproduced on all copies.


# Letter Report: Fieldwork Completion and Status for the Known Cleanup Sites Campaign at Solid Waste Management Units 50-006(d), 03-049(a), and 46-004(q)

September 2018

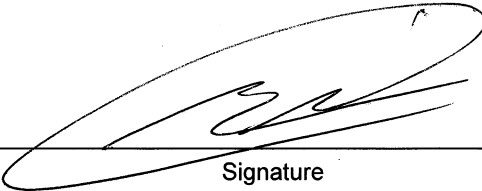
Responsible program director:

Erich Evered		Program Director	RCRA Remediation Program	9/21/18
Printed Name	Signature	Title	Organization	Date

Responsible N3B representative:

Joseph A. Legare		Program Manager	N3B Environmental Remediation Program	9/21/18
Printed Name	Signature	Title	Organization	Date

Responsible DOE-EM-LA representative:

Arturo Q. Duran		Designated Agency Manager	Office of Quality and Regulatory Compliance	9/25/18
Printed Name	Signature	Title	Organization	Date



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## **1.0 PURPOSE OF REPORT**

This letter report fulfills Fiscal Year (FY) 2018 Milestone #15 of the 2016 Compliance Order on Consent (Consent Order), Appendix B, under the Known Cleanup Sites Campaign. The specific milestone addressed by this deliverable is described as a letter report documenting field completion of cleanups for Solid Waste Management Units (SWMUs) 50-006(d) and 03-049(a). Fieldwork to clean up SWMU 46-004(q), which is included in a Consent Order Target for September 30, 2019, was initiated in FY 2018. Its status is also included in this letter report

The New Mexico Environment Department (NMED), pursuant to the New Mexico Hazardous Waste Act, regulates cleanup of hazardous wastes and hazardous constituents. The U.S. Department of Energy (DOE) regulates cleanup of radioactive contamination, pursuant to DOE Order 5400.5, "Radiation Protection of the Public and the Environment"; DOE Order 435.1, "Radioactive Waste Management"; and DOE Order 458.1, "Administrative Change 3, Radiation Protection of the Public and the Environment." Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents for SWMU 50-006(d), is voluntarily provided to NMED in accordance with DOE policy.

## **2.0 OVERVIEW**

The DOE Environmental Management Los Alamos Field Office (EM-LA) and Newport News Nuclear BWXT – Los Alamos, LLC (N3B) are in the process of remediating known cleanup sites that have been identified in supplemental investigation reports. These known cleanup sites are included in the 2016 Consent Order, under the Known Cleanup Sites (above soil screening levels [SSLs]) Campaign. The Known Cleanup Sites Campaign includes soil removal from sites where previous investigations have identified hazardous contaminants at concentrations that exceed the target risk level of  $10^{-5}$  for lifetime excess cancer risk for carcinogenic contaminants and a hazard index of 1 for noncarcinogenic contaminants.

## **3.0 SUMMARY OF FIELDWORK COMPLETED IN FY 2018**

The following sections provide site descriptions and background and summarize the status and fieldwork completed in FY 2018 for SWMUs 50-006(d), 03-049(a), and 46-004(q). The approximate site locations are depicted in Figure 3.0-1.

### **3.1 SWMU 50-006(d)**

#### **3.1.1 Site Description and Background**

SWMU 50-006(d) consists of a Technical Area 50 (TA-50) drainline (structure 50-64) and associated National Pollutant Discharge Elimination System- (NPDES-) permitted Outfall 051 in Mortandad Canyon for treated wastewater from the Radioactive Liquid Waste Treatment Facility (building 50-1). Structure 50-64 is a 6-in.-diameter iron discharge pipe that was rerouted in 1983 to accommodate construction of the TA-35 target fabrication facility (building 35-213). In 1985, the U.S. Environmental Protection Agency (EPA) Region 6 issued an administrative order to DOE requiring modification of the outfall to mitigate ongoing stream-bank erosion caused by the discharge pipe ending 25 ft short of the stream channel. DOE extended the pipe into the stream channel, and subsequently EPA Region 6 closed the order in 1986 (LANL 1992, 007672).

The “Supplemental Investigation Report for Upper Mortandad Canyon Aggregate Area” was submitted to NMED in December 2015 to evaluate the nature and extent of contamination and potential human health and ecological risks for the 29 SWMUs and areas of concern (AOCs) in the aggregate area (LANL 2015, 601063). SWMU 50-006(d) was recommended for remediation because concentrations of americium-241 and cesium-137 were above screening action levels (SALs) at SWMU 50-006(d) sample location MO-605088 and increased with depth. Therefore, the vertical extent of americium-241 and cesium-137 was not defined, and further characterization and remediation were warranted.

In 2017, revisions to Appendix B of the 2016 Consent Order included addition of SWMU 50-006(d) to the Known Cleanup Sites (above SSLs) Campaign and Milestone #15, which requires cleanup of SWMU 50-006(d) and submittal of a letter report by September 28, 2018.

### **3.1.2 Fieldwork Completed in FY 2018**

The field implementation plan for SWMU 50-006(d) proposed sampling and excavation around location MO-605088. Additional samples were collected at location MO-605088 from depths of 5–6 ft and 7–8 ft below ground surface and analyzed for americium-241 and by gamma spectroscopy for cesium-137 to define the extent of the elevated radionuclide concentrations.

Fieldwork began on September 10, 2018, with excavations and confirmation sample collection completed on September 21, 2018. Radionuclide-contaminated soil and tuff with concentrations exceeding the industrial and recreational SALs were removed. The analytical data were used to define the specific excavation areas and depths. Radionuclide-contaminated soil and tuff were removed from the area downslope of the former location of the TA-50 drainline outfall. The excavated material was packaged in waste containers for shipment to an approved, licensed waste disposal facility for final disposition. Each excavated area was backfilled to grade with clean fill.

### **3.1.3 Current Site Status**

The lateral and vertical extent of all chemicals of potential concern at SWMU 50-006(d) have been defined. The overall concentrations of americium-241 and cesium-137 in soil and tuff associated with this site are below industrial and recreational SALs; no further corrective actions are anticipated. Analytical results for all investigation and field quality control samples collected during this field event will be presented in a future report.

## **3.2 SWMU 03-049(a)**

### **3.2.1 Site Description and Background**

SWMU 03-049(a) is a currently NPDES-permitted outfall (03A022) located south of the Sigma Building (03-66). The outfall formerly discharged treated cooling water from a cooling tower (structure 03-127), which served the Sigma Building (03-66), and continues to discharge runoff from six roof drains on the Sigma Building. The cooling tower operated from 1960 to 1999. From 1984 to 1990, the outfall received discharge from rinse tanks associated with the electroplating operation in the Sigma Building. The tanks contained the final rinse from electroplating and surface-finishing experimental components. Although the rinse tanks were flushed continually with tap water to reduce contaminant buildup, trace amounts of metals, acids, cyanide, and depleted uranium were introduced into the rinse water. The NPDES permit allowed discharge of 4680 gal./d of treated cooling water and 24,000 gal./d of electroplating rinse water. Since 1990, the outfall has received only treated cooling water and roof-drain runoff. The outfall discharges to Upper Mortandad Canyon.

The supplemental investigation report for Upper Mortandad Canyon Aggregate Area recommended additional extent sampling and remediation at SWMU 03-049(a) for dioxin/furan contamination. This resulted in its inclusion in Appendix B of the 2016 Consent Order under the Known Cleanup Sites (above SSLs) Campaign, Milestone #15, which requires cleanup of SWMU 03-049(a) and submittal of a letter report by September 28, 2018.

### **3.2.2 Fieldwork Completed in FY 2018**

Although there were potential unacceptable cancer risks from dioxin/furans at this site, the risk calculations were reevaluated, and an error was identified that resulted in an excess cancer risk under the industrial scenario. With corrections to the calculations, the cancer risk is  $3 \times 10^{-6}$  for the industrial scenario; therefore, no site cleanup is necessary, and no fieldwork was performed in FY 2018. Tables from the supplemental investigation report for Upper Mortandad Canyon Aggregate Area are included as Appendix A with corrections noted in red.

### **3.2.3 Current Site Status**

Additional extent sampling for dioxin/furans will be conducted as recommended in the supplemental investigation report; however, remediation is not warranted at this time. The risk calculation corrections will be included in the revision to the supplemental investigation report for Upper Mortandad Canyon Aggregate Area.

## **3.3 SWMU 46-004(q)**

### **3.3.1 Site Description and Background**

SWMU 46-004(q) is an inactive outfall located approximately 40 ft north of building 46-58 at TA-46. The outfall consists of a 6-in.-diameter cast-iron pipe that discharged into Cañada del Buey. The source of the discharge to the outfall is not known (LANL 1993, 020952, pp. 5-124–5-125).

The supplemental investigation report for Upper Cañada del Buey Aggregate Area was submitted to NMED in August 2016 to evaluate the nature and extent of contamination and potential human health and ecological risks for the 49 SWMUs and AOCs in the aggregate area (LANL 2016, 601745).

SWMU 46-004(q) was recommended for remediation because of elevated mercury concentrations that exceeded SSLs for the construction worker scenario and the residential scenario.

Per section 7.19.4 of the supplemental investigation report for Upper Cañada del Buey Aggregate Area, the vertical extent of mercury was not defined because the concentration increased with depth at sample location 46-611501.

A field completion report for the cleanup of this site is included in Appendix B of the 2016 Consent Order as part of an FY 2019 Target due September 30, 2019. Site cleanup was expedited and initiated in FY 2018 and will continue through October 2018. The status of SWMU 46-004(q) is included in this letter report to document early progress.

### **3.3.2 Fieldwork Completed in FY 2018**

Fieldwork at SWMU 46-004(q) began on September 13, 2018, with site sample collection and excavation of mercury-contaminated soil and tuff scheduled to continue through October 2018. The analytical data will be used to define the specific excavation areas and depths. The excavated material will be packaged

in waste containers pending shipment to an approved, licensed waste disposal facility for final disposition. Excavated areas will be backfilled to grade with clean fill.

### 3.3.3 Current Site Status

The lateral and vertical extent of all chemicals of potential concern at SWMU 46-004(q) are not yet fully defined. Analytical results for all investigation and field quality control samples collected will be presented in a future report.

## 4.0 REFERENCES

*The following reference list includes documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ERID, ESHID, or EMID. This information is also included in text citations. ERIDs were assigned by the Laboratory's Associate Directorate for Environmental Management (IDs through 599999); ESHIDs were assigned by the Laboratory's Associate Directorate for Environment, Safety, and Health (IDs 600000 through 699999); and EMIDs are assigned by N3B (IDs 700000 and above). IDs are used to locate documents in N3B's Records Management System and in the Master Reference Set. The NMED Hazardous Waste Bureau and N3B maintain copies of the Master Reference Set. The set ensures that NMED has the references to review documents. The set is updated when new references are cited in documents.*

LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1147," Los Alamos National Laboratory document LA-UR-92-969, Los Alamos, New Mexico. (LANL 1992, 007672)

LANL (Los Alamos National Laboratory), August 1993. "RFI Work Plan for Operable Unit 1140," Los Alamos National Laboratory document LA-UR-93-1940, Los Alamos, New Mexico. (LANL 1993, 020952)

LANL (Los Alamos National Laboratory), December 2015. "Supplemental Investigation Report for Upper Mortandad Canyon Aggregate Area," Los Alamos National Laboratory document LA-UR-15-28015, Los Alamos, New Mexico. (LANL 2015, 601063)

LANL (Los Alamos National Laboratory), August 2016. "Supplemental Investigation Report for Upper Cañada del Buey Aggregate Area," Los Alamos National Laboratory document LA-UR-16-26150, Los Alamos, New Mexico. (LANL 2016, 601745)

NMED (New Mexico Environment Department), July 2015. "Risk Assessment Guidance for Site Investigations and Remediation," Hazardous Waste Bureau and Ground Water Quality Bureau, Santa Fe, New Mexico. (NMED 2015, 600915)

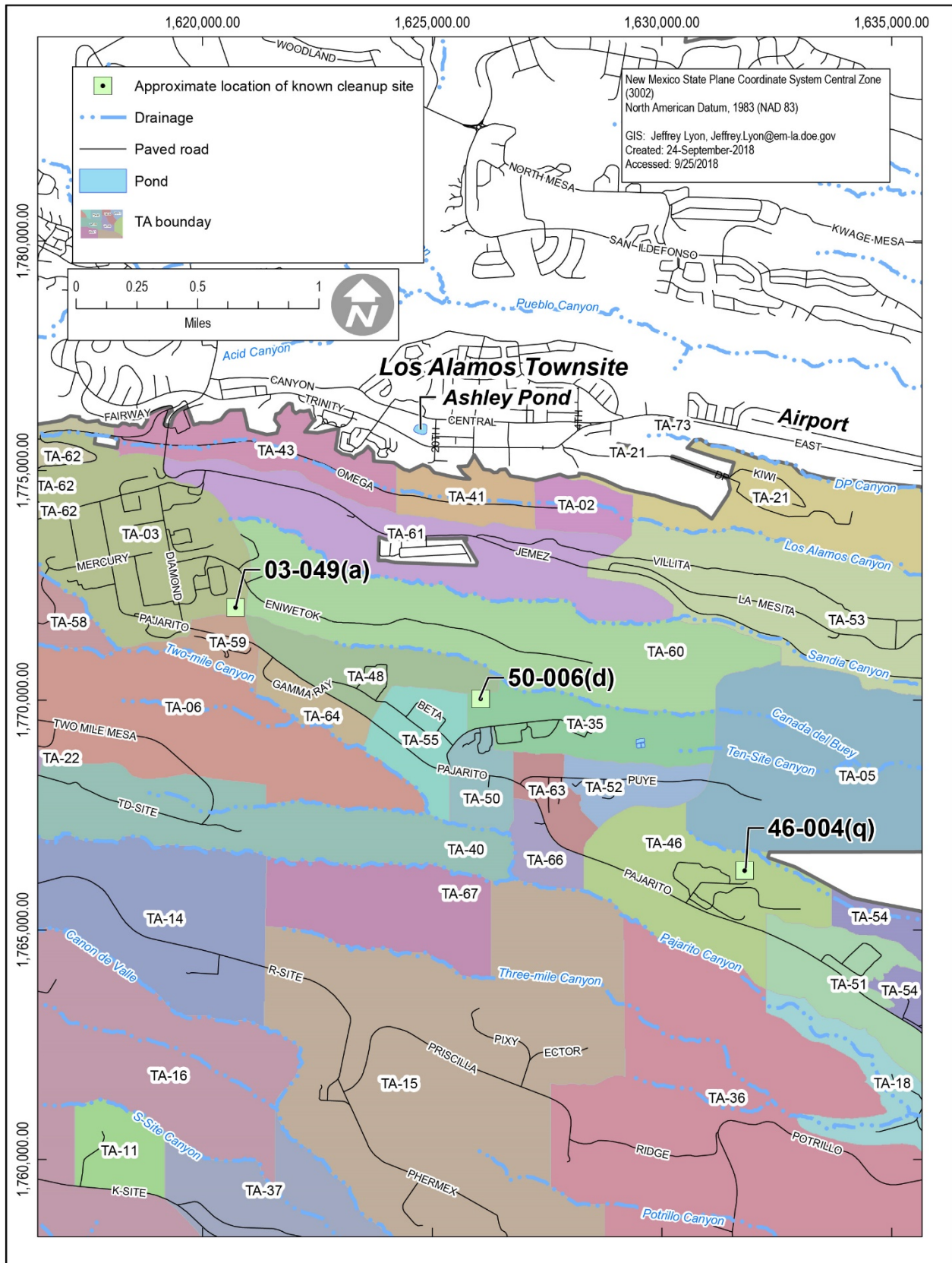


Figure 3.0-1 Approximate locations of known cleanup sites



# **Appendix A**

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*Corrected Risk Screening Tables for  
Solid Waste Management Unit 03-049(a)*





**Table H-2.3-13**  
**EPCs for SWMU 03-049(a) for the Industrial Scenario**

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
<b>Inorganic Chemicals (mg/kg)</b>							
Antimony	28	0	0.381(U)	4.18(U)	n/a <sup>a</sup>	4.18(U)	Maximum detection limit
Cadmium	28	11	0.11(U)	1.1	Approximate Normal	0.32	95% KM (t)
Chromium (Total)	28	20	4.2	465	Gamma	189.8	95% Adjusted Gamma
Chromium hexavalent	28	4	0.156	20(U)	n/a	2.8 <sup>b</sup>	Maximum detected concentration
Copper	28	20	2.36	663	Approximate Gamma	163.2	95% Adjusted Gamma
Iron	28	28	5980	19,200	Gamma	11,271	95% Adjusted Gamma
Lead	28	28	4.13	156	Gamma	41.4	95% Adjusted Gamma
Nickel	28	28	1.79	58.4	Gamma	22.9	95% Adjusted Gamma
Perchlorate	20	4	0.000626	0.00267(U)	n/a	0.0016 <sup>b</sup>	Maximum detected concentration
Selenium	28	1	0.75(U)	2.6(U)	n/a	0.862 <sup>b</sup>	Maximum detected concentration
Zinc	28	28	20.6	564	Approximate Gamma	239.7	95% Adjusted Gamma
<b>Organic Chemicals (mg/kg)</b>							
Acetone	10	1	0.00444	0.03(U)	n/a	0.00444 <sup>b</sup>	Maximum detected concentration
Aroclor-1254	5	4	0.00409(U)	0.0432	n/a	0.0432	Maximum detected concentration
Aroclor-1260	5	5	0.0053	0.129	n/a	0.129	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	20	10	0.085	0.439(U)	Approximate Lognormal	0.17	95% KM (t)
Butanone[2-]	10	1	0.00521(UJ)	0.042(U)	n/a	0.013 <sup>b</sup>	Maximum detected concentration
Methylene chloride	10	2	0.00521(UJ)	0.012	n/a	0.012	Maximum detected concentration
TCDD[2,3,7,8-] equivalent	4	4	3.22E-07	7.95E-04	n/a	<del>7.95E-04</del> <del>6.20E-05</del>	Maximum detected concentration

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Letter Report: Fieldwork Completion and Status of SWMUs 50-006(d), 03-049(a), and 46-004(g)

**Table H-2.3-13 (continued)**

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
<b>Radionuclides (pCi/g)</b>							
Cesium-137	18	14	-0.0425(U)	3.09	Approximate Gamma	1.19	95% KM (Chebyshev)
Tritium	20	6	-0.0133(U)	0.121	Normal	0.028	95% KM (t)
Uranium-234	28	28	0.53	3.84	Approximate Lognormal	2.15	95% Chebyshev (Mean, Sd)
Uranium-235/236	28	8	0.0133(U)	0.233	Normal	0.073	95% KM (t)
Uranium-238	28	28	0.561	5.69	Approximate Gamma	2.24	95% Adjusted Gamma

Note: Data qualifiers are defined in Appendix A.

<sup>a</sup> n/a = Not applicable.

<sup>b</sup> The maximum concentration of the data set is a nondetect (U or UJ); thus, the maximum detected concentration is less than the maximum concentration.

**Table H-2.3-14**  
**EPCs for SWMU 03-049(a) for Ecological Risk and Construction Worker and Residential Scenarios**

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
<b>Inorganic Chemicals (mg/kg)</b>							
Antimony	32	0	0.381(U)	4.18(U)	n/a <sup>a</sup>	4.18(U)	Maximum detection limit
Cadmium	32	13	0.11(U)	1.1	Approximate Normal	0.32	95% KM (t)
Chromium (Total)	32	32	4.2	465	Approximate Lognormal	208.6	95% Chebyshev (Mean, Sd)
Chromium hexavalent	32	6	0.156	20(U)	Normal	0.73 <sup>b</sup>	95% KM (t)
Copper	32	32	2.36	663	Lognormal	201.3	95% Chebyshev (Mean, Sd)
Iron	32	32	5980	19,200	Gamma	11,046	95% Adjusted Gamma
Lead	32	32	4.13	156	Gamma	36.9	95% Adjusted Gamma
Nickel	32	32	1.79	58.4	Nonparametric	26.4	95% Chebyshev (Mean, Sd)
Perchlorate	24	4	0.000626	0.00267(U)	n/a	0.0016 <sup>b</sup>	Maximum detected concentration
Selenium	32	1	0.75(U)	2.6(U)	n/a	0.862 <sup>b</sup>	Maximum detected concentration
Zinc	32	32	20.6	564	Approximate Lognormal	274.8	95% Chebyshev (MVUE)
<b>Organic Chemicals (mg/kg)</b>							
Acetone	14	1	0.00444	0.03(U)	n/a	0.00444 <sup>b</sup>	Maximum detected concentration
Aroclor-1254	7	4	0.00348(U)	0.0432	n/a	0.0432	Maximum detected concentration
Aroclor-1260	7	6	0.00348(U)	0.129	n/a	0.129	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	24	10	0.085	0.439(U)	Approximate Lognormal	0.17	95% KM (t)
Butanone[2-]	14	1	0.00521(UJ)	0.042(U)	n/a	0.013 <sup>b</sup>	Maximum detected concentration
Methylene chloride	14	2	0.00521(UJ)	0.012	n/a	0.012	Maximum detected concentration
TCDD[2,3,7,8-] equivalent	6	6	6.33E-09	7.95E-04	n/a	7.95E-04 6.20E-05	Maximum detected concentration
Toluene	14	3	0.00347	0.018(U)	n/a	0.000586	Maximum detected concentration

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Letter Report: Fieldwork Completion and Status of SWMUs 50-006(d), 03-049(a), and 46-004(g)

**Table H-2.3-14 (continued)**

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
<b>Radionuclides (pCi/g)</b>							
Cesium-137	22	14	-0.0425(U)	3.09	Approximate Gamma	0.62	95% KM (BCA)
Tritium	24	7	-0.0197(U)	0.121	Normal	0.019	95% KM (t)
Uranium-234	32	32	0.338	3.84	Lognormal	1.91	95% Chebyshev (MVUE)
Uranium-235/236	32	8	-0.00597(U)	0.233	Normal	0.054	95% KM (t)
Uranium-238	32	32	0.343	5.69	Lognormal	2.51	95% Chebyshev (MVUE)

Note: Data qualifiers are defined in Appendix A.

<sup>a</sup> n/a = Not applicable.

<sup>b</sup> The maximum concentration of the data set is a nondetect (U or UJ); thus, the maximum detected concentration is less than the maximum concentration.

**Table H-4.2-39  
Industrial Carcinogenic Screening Evaluation for SWMU 03-049(a)**

COPC	EPC (mg/kg)	Industrial SSL* (mg/kg)	Cancer Risk
Aroclor-1254	0.0432	11.5	3.76E-08
Aroclor-1260	0.129	11.5	1.12E-07
Bis(2-ethylhexyl)phthalate	0.17	1830	9.29E-10
Hexavalent chromium	2.8	72.1	3.88E-07
TCDD[2,3,7,8-] equivalent	<del>0.000795</del> <u>0.000062</u>	0.000248	<del>3.21E-05</del> <u>2.5E-06</u>
<b>Total Excess Cancer Risk</b>			<del>3E-05</del> <u>3E-06</u>

\*SSLs from NMED (2015, 600915).

**Table H-4.2-43  
Construction Worker Noncarcinogenic Screening Evaluation for SWMU 03-049(a)**

COPC	EPC (mg/kg)	Construction Worker SSL <sup>a</sup> (mg/kg)	HQ
Antimony	4.18(U)	142	2.94E-02
Cadmium	0.32	72.1	4.44E-03
Chromium (Total)	208.6	531,000 <sup>b</sup>	3.93E-04
Copper	201.3	14,200	1.42E-02
Iron	11,046	248,000	4.45E-02
Lead	36.9	800	4.61E-02
Nickel	26.4	753	3.51E-02
Perchlorate	0.0016	248	6.45E-06
Selenium	0.862	1750	4.93E-04
Zinc	274.8	106,000	2.59E-03
Acetone	0.00444	242,000	1.83E-08
Aroclor-1254	0.0432	4.91	8.80E-03
Bis(2-ethylhexyl)phthalate	0.17	5380	3.16E-05
Butanone[2-]	0.013	91,700	1.42E-07
Methylene chloride	0.012	1210	9.92E-06
TCDD[2,3,7,8-] equivalent	<del>0.000795</del> <u>0.000062</u>	0.000226	<del>3.52E+00</del> <u>2.74E-01</u>
Toluene	0.000586	14,000	4.19E-08
<b>HI</b>			<del>4</del> <u>0.5</u>

<sup>a</sup> SSLs from NMED (2015, 600915).

<sup>b</sup> SSL for chromium(III) (NMED 2015, 600915).

**Table H-4.2-45  
Residential Carcinogenic Screening Evaluation for SWMU 03-049(a)**

COPC	EPC (mg/kg)	Residential SSL* (mg/kg)	Cancer Risk
Aroclor-1260	0.129	2.43	5.32E-07
Bis(2-ethylhexyl)phthalate	0.17	380	4.47E-09
Hexavalent chromium	0.73	3.05	2.39E-06
TCDD[2,3,7,8-] equivalent	<del>0.000795</del> <u>0.000062</u>	0.000049	<del>1.62E-04</del> <u>1.27E-05</u>
<b>Total Excess Cancer Risk</b>			<del>2E-04</del> <u>2E-05</u>

\*SSLs from NMED (2015, 600915).

**Table H-5.3-10  
Minimum ESL Comparison for SWMU 03-049(a)**

COPC	EPC	ESL	Receptor	HQ
<b>Inorganic Chemicals (mg/kg)</b>				
Antimony	4.18(U)	2.4	Deer mouse	<b>1.74</b>
Cadmium	0.32	0.27	Montane shrew	<b>1.19</b>
Chromium (Total)	208.6	28	American robin (insectivore)	<b>7.45</b>
Copper	201.3	15	American robin (insectivore)	<b>13.4</b>
Hexavalent chromium	0.73	0.34	Earthworm	<b>2.15</b>
Lead	36.9	14	American robin (insectivore)	<b>2.64</b>
Nickel	26.4	9.7	Montane shrew	<b>2.72</b>
Selenium	0.862	0.52	Plant	<b>1.66</b>
Zinc	274.8	48	American robin (insectivore)	<b>5.73</b>
<b>Organic Chemicals (mg/kg)</b>				
Acetone	0.00444	1.2	Deer mouse	0.0037
Aroclor-1254	0.0432	0.041	American robin (insectivore)	<b>1.05</b>
Aroclor-1260	0.129	0.88	American robin (insectivore)	0.15
Bis(2-ethylhexyl)phthalate	0.17	0.02	American robin (insectivore)	<b>8.5</b>
Butanone[2-]	0.013	360	Deer mouse	0.000036
Methylene chloride	0.012	2.6	Deer mouse	0.0046
TCDD[2,3,7,8-] equivalent	<del>7.95E-04</del> <u>0.000062</u>	0.00000029	Montane shrew	<del>2741</del> <u>214</u>
Toluene	0.00586	23	Montane shrew	0.000025
<b>Radionuclides (pCi/g)</b>				
Cesium-137	0.68	1200	Cottontail	0.000567
Tritium	0.019	36,000	Plant	0.000000528
Uranium-234	1.91	440	Plant	0.0043
Uranium-235	0.054	440	Plant	0.00012
Uranium-238	2.51	400	Plant	0.0053

Note: Bolded values indicate HQ greater than 0.3.

**Table H-5.3-11  
HI Analysis for SWMU 03-049(a)**

COPEC	EPC (mg/kg)	Red Fox (mammalian top carnivore)	American Kestrel (avian top carnivore)	American Kestrel (avian intermediate carnivore)	American Robin (avian herbivore)	American Robin (avian omnivore)	American Robin (avian insectivore)	Desert Cottontail (mammalian herbivore)	Montane Shrew (mammalian)	Deer Mouse (mammalian omnivore)	Earthworm (soil dwelling invertebrate insectivore)	Plant (terrestrial autotroph-producer)
Antimony	4.18(U)	0.091	na*	na	na	na	na	<b>1.61</b>	<b>1.61</b>	<b>1.74</b>	0.054	<b>0.38</b>
Cadmium	0.32	0.0006	0.00068	0.21	0.073	<b>0.59</b>	<b>1.1</b>	0.036	<b>1.19</b>	<b>0.63</b>	0.0023	0.01
Chromium (Total)	208.6	0.12	0.21	<b>1.04</b>	<b>3.07</b>	<b>5.22</b>	<b>7.45</b>	0.28	<b>4.64</b>	<b>1.9</b>	na	na
Copper	201.3	0.05	0.15	<b>2.19</b>	<b>5.3</b>	<b>9.15</b>	<b>13.4</b>	<b>0.84</b>	<b>5.3</b>	<b>3.15</b>	<b>2.52</b>	<b>2.88</b>
Hexavalent chromium	0.73	0.0001	0.00017	0.00043	0.0026	0.0033	0.0038	0.00025	0.003	0.00085	<b>2.15</b>	<b>2.09</b>
Lead	36.9	0.01	0.059	<b>0.39</b>	<b>1.76</b>	<b>2.31</b>	<b>2.64</b>	0.11	<b>0.51</b>	<b>0.31</b>	0.022	<b>0.31</b>
Nickel	26.4	0.022	0.011	0.22	0.17	<b>0.69</b>	<b>1.26</b>	0.06	<b>2.72</b>	<b>1.32</b>	0.094	<b>0.69</b>
Selenium	0.862	0.01	0.011	0.2	<b>0.86</b>	<b>0.99</b>	<b>1.15</b>	<b>0.45</b>	<b>1.31</b>	<b>1.04</b>	0.21	<b>1.66</b>
Zinc	274.8	0.035	0.11	<b>1.1</b>	<b>0.79</b>	<b>3.23</b>	<b>5.73</b>	0.17	<b>2.8</b>	<b>1.62</b>	<b>2.29</b>	<b>1.72</b>
Aroclor-1254	0.0432	0.0073	0.0061	0.2	0.033	<b>0.54</b>	<b>1.05</b>	0.00094	0.1	0.049	na	0.00027
Bis(2-ethylhexyl)phthalate	0.17	0.00061	0.021	<b>1.7</b>	0.0085	<b>4.25</b>	<b>8.5</b>	0.000071	0.29	0.15	na	na
TCDD[2,3,7,8-] equivalent	<del>0.000795</del> <u>0.000062</u>	<del>9.58</del> <u>0.75</u>	na	na	na	na	na	<del>18.5</del> <u>1.44</u>	<del>2741</del> <u>214</u>	<del>1371</del> <u>107</u>	<del>0.00016</del> <u>0.000012</u>	na
	<b>HI</b>	<b>40</b> <u>1</u>	0.6	<b>7</b>	<b>12</b>	<b>27</b>	<b>42</b>	<del>22</del> <u>5</u>	<del>2761</del> <u>234</u>	<del>1383</del> <u>119</u>	<b>7</b>	<b>10</b>

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.

\*na = Not available.

**Table H-5.4-11  
Adjusted HIs at SWMU 03-049(a)**

COPECs	EPC (mg/kg)	Red Fox (mammalian top carnivore)	American Kestrel (avian top carnivore)	American Kestrel (avian intermediate carnivore)	American Robin (avian herbivore)	American Robin (avian omnivore)	American Robin (avian insectivore)	Desert Cottontail (mammalian herbivore)	Montane Shrew (mammalian)	Deer Mouse (mammalian omnivore)	Earthworm (soil dwelling invertebrate insectivore)	Plant (terrestrial autotroph-producer)
Antimony	4.18(U)	1.05E-06	na*	na	na	na	na	6.22E-03	0.049	0.27	0.054	<b>0.38</b>
Cadmium	0.32	6.98E-09	7.71E-08	2.42E-05	2.08E-03	0.017	0.032	1.41E-04	0.036	0.098	0.0023	0.01
Chromium (Total)	208.6	1.34E-06	2.36E-05	1.18E-04	0.088	0.15	0.21	1.08E-03	0.14	0.3	na	na
Copper	201.3	5.82E-07	1.75E-05	2.48E-04	0.15	0.26	<b>0.38</b>	3.25E-03	0.16	<b>0.49</b>	<b>2.52</b>	<b>2.88</b>
Hexavalent chromium	0.73	1.16E-09	1.97E-08	4.86E-08	7.45E-05	9.48E-05	1.10E-04	9.74E-07	8.02E-05	1.32E-04	<b>2.15</b>	<b>2.09</b>
Lead	36.9	1.15E-07	6.63E-06	4.40E-05	0.05	0.066	0.075	4.33E-04	0.016	0.048	0.022	<b>0.31</b>
Nickel	26.4	2.54E-07	1.30E-06	2.49E-05	4.71E-03	0.02	0.036	2.32E-04	0.084	0.21	0.094	<b>0.69</b>
Selenium	0.862	1.11E-07	1.20E-06	2.27E-05	0.025	0.028	0.033	1.76E-03	0.04	0.16	0.21	<b>1.66</b>
Zinc	274.8	4.07E-07	1.30E-05	1.24E-04	0.022	0.092	0.16	6.65E-04	0.086	0.25	<b>2.29</b>	<b>1.72</b>
Aroclor-1254	0.0432	8.46E-08	6.89E-07	2.22E-05	9.49E-04	0.015	0.03	3.64E-06	3.02E-03	7.65E-03	na	0.00027
Bis(2-ethylhexyl)phthalate	0.17	7.02E-09	2.38E-06	1.92E-04	2.43E-04	0.12	0.24	2.74E-07	8.87E-03	0.024	na	na
TCDD[2,3,7,8-] equivalent	<del>0.000795</del> <del>0.000062</del>	<del>1.11E-04</del> <del>9E-05</del>	na	na	na	na	na	<del>0.072</del> <del>0.006</del>	<del>84</del> <del>7</del>	<del>244</del> <del>17</del>	<del>0.00016</del> <del>0.000012</del>	na
<b>Adjusted HI</b>		<del>0.0004</del> <del>0.00009</del>	0.00007	0.0008	0.3	0.8	1	<del>0.09</del> <del>0.02</del>	<del>85</del> <del>8</del>	<del>246</del> <del>19</del>	<b>7</b>	<b>10</b>

Notes: Bolded values indicate HQ greater than 0.3 or HI greater than 1. Data qualifiers are defined in Appendix A.  
\*na = Not available.

A-8



**Table H-5.4-49**  
**HI Analysis Using LOAEL-Based ESLs at SWMU 03-049(a)**

COPEC	EPC (mg/kg)	Robin (insectivore)	Montane Shrew	Deer Mouse	Earthworm	Plant
Antimony	4.18(U)	n/a*	n/a	n/a	n/a	0.072
Copper	201.3	<b>4.38</b>	n/a	<b>2.01</b>	<b>0.38</b>	<b>0.41</b>
Hexavalent chromium	0.73	n/a	n/a	n/a	0.21	0.18
Lead	36.9	n/a	n/a	n/a	n/a	0.065
Nickel	26.4	n/a	n/a	n/a	n/a	0.098
Selenium	0.862	n/a	n/a	n/a	n/a	0.29
Zinc	274.8	n/a	n/a	n/a	0.3	<b>0.34</b>
TCDD[2,3,7,8-] equivalent	<del>0.000795</del> <u>0.000062</u>	n/a	<del>418</del> <u>33</u>	<del>204</del> <u>16</u>	n/a	n/a
	<b>HI</b>	<b>4</b>	<del>418</del> <u>33</u>	<del>206</del> <u>18</u>	0.9	1

Notes: Bolded values indicate HQ greater than 0.3 or HI greater than 1. Data qualifiers are defined in Appendix A.

\*n/a = Not applicable.

**Table H-5.4-50**  
**Adjusted HI Analysis Using LOAEL-Based ESLs at SWMU 03-049(a)**

COPEC	EPC (mg/kg)	Robin (insectivore)	Montane Shrew	Deer Mouse
Antimony	4.18(U)	n/a*	n/a	n/a
Copper	201.3	0.13	n/a	<b>0.32</b>
Hexavalent chromium	0.73	n/a	n/a	n/a
Lead	36.9	n/a	n/a	n/a
Nickel	26.4	n/a	n/a	n/a
Selenium	0.862	n/a	n/a	n/a
Zinc	274.8	n/a	n/a	n/a
TCDD[2,3,7,8-] equivalent	<del>0.000795</del> <u>0.000062</u>	n/a	<del>12.9</del> <u>1</u>	<del>32.6</del> <u>2.6</u>
	<b>Adjusted HI</b>	0.1	<del>13</del> <u>1</u>	<del>33</del> <u>3</u>

Notes: Bolded values indicate HQ greater than 0.3 or HI greater than 1. Data qualifiers are defined in Appendix A.

\*n/a = Not applicable.

