



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



EMLA-2022-BF140-02-001

September 21, 2022

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

Subject: Request for Certificates of Completion for Three Solid Waste Management Units and Two Areas of Concern at Technical Area 49 Inside the Nuclear Environmental Site Boundary

Dear Mr. Shean:

In accordance with Section XXI of the Compliance Order on Consent (Consent Order), the U.S. Department of Energy (DOE) is requesting certificates of completion without controls for the following two solid waste management units (SWMUs) and two areas of concern (AOCs) at Technical Area 49 (TA-49) inside the Nuclear Environmental Site (NES) boundary:

- SWMU 49-001(g), Soil Contamination (Material Disposal Area [MDA] B)
- SWMU 49-003, Leach Field (Area 11 Rad/Chem and Small Shot Area)
- AOC 49-008(c), Soil Contamination (Area 11)
- AOC 49-008(d), Firing Sites (Bottle House Area) Soil Contamination and Underground Chamber

SWMUs 49-001(g) and 49-003 and AOCs 49-008(c) and 49-008(d) were recommended for corrective action complete without controls in the "Supplemental Investigation Report for Sites at Technical Area 49 Inside the Nuclear Environmental Site Boundary, Revision 1" (hereafter the SIR) (EM2022-0110).

The SIR confirms the nature and extent of contamination are defined or no further sampling is warranted at SWMUs 49-001(g) and 49-003 and AOCs 49-008(c) and 49-008(d). In addition, the SIR demonstrates that the above-mentioned SWMUs and AOCs pose no potential unacceptable risks or doses to human health under the industrial and residential scenarios and pose no potential unacceptable risk to ecological receptors.

In addition, DOE is requesting a certificate of completion with controls for the following SWMU at TA-49 inside the NES boundary:

- SWMU 49-001(e), Shafts at Area 3 (MDA AB)

The SIR confirms the nature and extent of contamination are defined or no further sampling is warranted at SWMU 49-001(e). In addition, the SIR demonstrates that SWMU 49-001(e) poses no potential unacceptable risk or dose to human health under the industrial scenario and poses no potential

unacceptable risk to ecological receptors. SWMU 49-001(e) does pose potential unacceptable human health risk under the residential scenario. Therefore, site controls to prevent future residential land use are necessary.

The SIR was submitted to the New Mexico Environment Department (NMED) on August 9, 2016. NMED reviewed the SIR and provided draft comments to DOE on January 6, 2022; April 7, 2022; and May 10, 2022. Responses to NMED's January 6 comments were submitted on March 15, 2022, and a revised version in response to NMED's April 7 comments was submitted on April 21, 2022. Responses to NMED's May 10 comments were submitted on May 24, 2022. The revised SIR was approved in NMED's letter "Approval Supplemental Investigation Report for Sites at Technical Area 49 Inside the Nuclear Environmental Site Boundary, Revision 1" dated July 6, 2022.

NMED's approval noted that nature and extent are defined for SWMU 49-001(g), but that risk for SWMU 49-001(g) must be reevaluated because the SIR evaluated risk for SWMU 49-001(g) collectively with SWMUs 49-001(b), 49-001(c), and 49-001(d), and the latter three sites require additional corrective measures. Enclosure 1 presents an evaluation of human health and ecological risk for SWMU 49-001(g).

NMED's approval also notes that the hazard index (HI) for SWMU 49-001(e) was calculated at 2.0 and the total excess cancer risk was calculated at  $2.0 \times 10^{-5}$ , both of which are above NMED's respective targets of 1 and  $1 \times 10^{-5}$ , and the approval indicated that DOE must address this risk. The HI and risk referenced by NMED correspond to the residential scenario. As noted above, DOE will address this risk through use of controls to prevent future residential land use.

Based on the conclusions presented in the revised SIR and the results presented in Enclosure 1, neither site controls nor additional future actions under the Consent Order are necessary at SWMUs 49-001(g) and 49-003 and AOCs 49-008(c) and 49-008(d).

If you have any questions, please contact Christian Maupin at (505) 695-4281 (christian.maupin@em-la.doe.gov) or Cheryl Rodriguez at (505) 414-0450 (cheryl.rodriguez@em.doe.gov).

Sincerely,

**ARTURO  
DURAN**

Arturo Q. Duran  
Compliance and Permitting Manager  
Environmental Management  
Los Alamos Field Office

Digitally signed by ARTURO  
DURAN  
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Enclosure(s):

1. Two hard copies with electronic files – Screening-Level Risk Evaluations for Solid Waste Management Unit 49-001(g) (EM2022-0587)

cc (letter and enclosure[s] emailed):

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## **Enclosure 1**

### **Screening-Level Risk Evaluations for Solid Waste Management Unit 49-001(g)**

The potential risk to human health and ecological receptors from contamination at Solid Waste Management Unit (SWMU) 49-001(g) was evaluated in the “Supplemental Investigation Report for Sites at Technical Area 49 Inside the Nuclear Environmental Site Boundary, Revision 1” (hereafter the SIR) (N3B 2022, 702072). Because of the proximity of SWMU 49-001(g) and SWMUs 49-001(b), 49-001(c), and 49-001(d), the four sites were investigated collectively in the SIR, and the risk evaluation was based on data collected for all four sites. The July 6, 2022, New Mexico Environment Department letter “Approval Supplemental Investigation Report for Sites at Technical Area 49 Inside the Nuclear Environmental Site Boundary, Revision 1” (NMED 2022, 702174) stated that risk for SWMU 49-001(g) must be reevaluated because the SIR evaluated risk for SWMUs 49-001(g), 49-001(b), 49-001(c), and 49-001(d) collectively and the latter three SWMUs require additional corrective measures.

The following information evaluates human health and ecological risk for SWMU 49-001(g) based on results of samples collected at the site, rather than combined data for SWMUs 49-001(b), 49-001(c), 49-001(d), and 49-001(g). Samples collected at SWMU 49-001(g) are identified in Table 6.3-1 of the SIR (N3B 2022, 702072, p. 156). A total of 16 samples were collected from 8 locations and submitted for laboratory analysis of target analyte list (TAL) metals, americium-241, isotopic plutonium, isotopic uranium, strontium-90, and gamma-emitting radionuclides. At each location, samples were collected from the depth intervals 0–0.5 ft below ground surface (bgs) and 0.5–1.5 ft bgs. Sample locations are presented in Plate 8 in the SIR (N3B 2022, 702072). Data from these samples were evaluated to identify chemicals of potential concern (COPCs), and evaluate potential human-health and ecological risk. Human health and ecological risk-screening evaluations were conducted for the COPCs and radionuclides detected in solid media at SWMU 49-001(g) in accordance with N3B-SOP-ER-2009, “Performing Human and Ecological Risk Screening Assessments.”

#### **Identification of COPCs**

COPCs at SWMU 49-001(g) were identified in accordance with N3B-SOP-ER-2004, “Background Comparisons for Inorganic Chemicals,” and N3B-SOP-ER-2005, “Background Comparisons for Radionuclides.”

#### ***Inorganic Chemicals***

A total of 16 soil samples were analyzed for TAL metals. No metals were detected above background values (BVs) (LANL 1998, 059730) in samples collected for SWMU 49-001(g) (N3B 2022, 702072, p. 157). Therefore, there are no inorganic chemical COPCs.

#### ***Organic Chemicals***

Samples from SWMU 49-001(g) were not analyzed for organic chemicals and there are no organic chemical COPCs.

#### ***Radionuclides***

A total of 16 soil samples were analyzed for americium-241, isotopic plutonium, isotopic uranium, strontium-90, and gamma-emitting radionuclides. Table 6.3-4 in the SIR (N3B 2022, 702072, pp. 160–161) presents the radionuclides detected or detected above BVs/fallout values (FVs) (LANL 1998, 059730).

Americium-241 was detected above the soil FV (0.013 pCi/g) in eight samples with a maximum activity of 0.471 pCi/g. Americium-241 is retained as a COPC.

Plutonium-238 was detected above the soil FV (0.023 pCi/g) in one sample at an activity of 0.071 pCi/g. Plutonium-238 is retained as a COPC.

Plutonium-239/240 was detected above the soil FV (0.054 pCi/g) in eight samples with a maximum activity of 2.8 pCi/g. Plutonium-239/240 is retained as a COPC.

## **Risk Screening Evaluations**

Table 1 presents exposure point concentrations (EPCs) for the industrial scenario and Table 2 presents EPCs for the residential scenario and ecological receptors. For COPCs having at least eight results with at least five detections, the EPCs are the 95% upper confidence limits (UCLs) of the mean concentrations. UCLs were calculated using the U.S. Environmental Protection Agency ProUCL 5.2 software (EPA 2022, 702275), and ProUCL input and output files are provided in Attachment 1. Otherwise, if there were fewer than eight results and/or fewer than five detections, the EPC is the maximum detected concentration. EPCs for the industrial scenario were calculated using results from samples collected from the depth interval 0–0.5 ft bgs, and EPCs for the residential scenario and ecological receptors were calculated using results from samples collected from the depth intervals 0–0.5 ft bgs and 0.5–1.5 ft bgs.

### ***Human Health Risk Screening Evaluation***

There were no inorganic or organic chemical COPCs for SWMU 49-001(g), so carcinogenic and noncarcinogenic chemical risk were not evaluated. Radionuclide COPCs for SWMU 49-001(g) include americium-241, plutonium-238, and plutonium-239/240, and the total estimated doses for the industrial and residential scenarios are presented in Tables 3 and 4, respectively.

The total estimated dose under the industrial scenario is 0.03 mrem/yr and activities of all radionuclide COPCs are less than industrial screening action levels (SALs) (LANL 2015, 600929). The total estimated dose under the residential scenario is 0.4 mrem/yr and activities of all radionuclide COPCs are less than residential SALs (LANL 2015, 600929).

### ***Ecological Risk Screening Evaluation***

The ecological screening evaluation identifies chemicals of potential ecological concern (COPECs) and is based on the comparison of EPCs with ecological screening levels (ESLs). The ESLs used in the assessment for SWMU 49-001(g) are presented in Table 5.

The ESLs used in the assessment for SWMU 49-001(g) were obtained from the ECORISK Database, Version 4.2 (N3B 2020, 701067). The ESLs are based on similar species; derived from experimentally determined no observed adverse effect levels, lowest observed adverse effect levels, or doses determined lethal to 50% of the test population; and converted to no-effect levels, which are presented in Table 5. 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, Version 4.2 (N3B 2020, 701067).

The screening analysis began with a comparison of the minimum ESL for a given COPC to the EPC. The hazard quotient (HQ) is defined as the ratio of the EPC to the concentration that has been determined to be acceptable to a given ecological receptor (i.e., the ESL). HQs greater than 0.3 are used to identify COPECs requiring additional evaluation (LANL 2018, 602965). The minimum ESL comparison for

SWMU 49-001(g) is presented in Table 6. All HQs are less than 0.3. Therefore, there are no COPECs for SWMU 49-001(g) and further analysis of ecological risk is not required.

### **Summary of Human-Health and Ecological Risk Screening Assessments**

SWMU 49-001(g) does not present an unacceptable risk or dose to human health under the industrial and residential scenarios and does not present an unacceptable risk to ecological receptors.

### **References**

- EPA (U.S. Environmental Protection Agency), June 2022. "ProUCL Version 5.2.0 User Guide," Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations, EPA/600/B-22/087, Office of Research and Development, Washington, D.C. (EPA 2022, 702275)
- LANL (Los Alamos National Laboratory), September 22, 1998. "Inorganic and Radionuclide Background Data for Soils, Canyon Sediments, and Bandelier Tuff at Los Alamos National Laboratory," Los Alamos National Laboratory document LA-UR-98-4847, Los Alamos, New Mexico. (LANL 1998, 059730)
- LANL (Los Alamos National Laboratory), September 2015. "Derivation and Use of Radionuclide Screening Action Levels, Revision 4," Los Alamos National Laboratory document LA-UR-15-24859, Los Alamos, New Mexico. (LANL 2015, 600929)
- LANL (Los Alamos National Laboratory), April 2018. "Screening-Level Ecological Risk Assessment Methods, Revision 5.1," Los Alamos National Laboratory document LA-UR-18-22418, Los Alamos, New Mexico. (LANL 2018, 602965)
- N3B (Newport News Nuclear BWXT-Los Alamos, LLC), November 2020. "ECORISK Database (Release 4.2)," on CD, Newport News Nuclear BWXT-Los Alamos, LLC, document EM2020-0575, Los Alamos, New Mexico. (N3B 2020, 701067)
- N3B (Newport News Nuclear BWXT-Los Alamos, LLC), May 2022. "Supplemental Investigation Report for Sites at Technical Area 49 Inside the Nuclear Environmental Site Boundary, Revision 1," Newport News Nuclear BWXT-Los Alamos, LLC, document EM2022-0110, Los Alamos, New Mexico. (N3B 2022, 702072)
- NMED (New Mexico Environment Department), July 6, 2022. "Approval, Submittal of the Supplemental Investigation Report for Sites at Technical Area 49 Inside the Nuclear Site Boundary, Revision 1," New Mexico Environment Department letter to A. Duran (EM-LA) from R. Shean (NMED-HWB), Santa Fe, New Mexico. (NMED 2022, 702174)

**Table 1**  
**EPCs at SWMU 49-001(g) for the Industrial Scenario**

COPC	Number of Analyses	Number of Detections	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
<b>Radionuclides (pCi/g)</b>							
Americium-241	8	6	0.0104 (U) <sup>a</sup>	0.435	Nonparametric	0.267	95% KM (t)
Plutonium-238	8	0	-0.0079 (U)	0.055 (U)	n/a <sup>b</sup>	0.055 (U)	Maximum detection limit
Plutonium-239/240	8	5	0.0075 (U)	2.16	Normal	1.14	95% KM (t)

<sup>a</sup>U = The analyte was analyzed for but not detected.

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

**Table 2**  
**EPCs at SWMU 49-001(g) for the Residential Scenario and Ecological Receptors**

COPC	Number of Analyses	Number of Detections	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
<b>Radionuclides (pCi/g)</b>							
Americium-241	16	8	-0.0056 (U) <sup>a</sup>	0.471	Nonparametric	0.182	95% KM (t)
Plutonium-238	16	1	-0.0004 (U)	0.071	n/a <sup>b</sup>	0.071	Maximum detected activity
Plutonium-239/240	16	9	-0.0011 (U)	2.8	Approximate normal	0.876	95% KM (t)

<sup>a</sup>U = The analyte was analyzed for but not detected.

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

**Table 3**  
**Industrial Radionuclide Screening Evaluation for SWMU 49-001(g)**

<b>COPC</b>	<b>EPC (pCi/g)</b>	<b>Industrial SAL (pCi/g)*</b>	<b>Dose (mrem/yr)</b>
Americium-241	0.267	1000	6.68E-03
Plutonium-238	0.055 (U)	1300	1.06E-03
Plutonium-239/240	1.14	1200	2.38E-02
<b>Total Dose</b>			<b>0.03</b>

\* Screening action levels (SALs) from LANL (2015, 600929).

**Table 4**  
**Residential Radionuclide Screening Evaluation for SWMU 49-001(g)**

<b>COPC</b>	<b>EPC (pCi/g)</b>	<b>Residential SAL (pCi/g)*</b>	<b>Dose (mrem/yr)</b>
Americium-241	0.182	83	5.48E-02
Plutonium-238	0.071	84	2.11E-02
Plutonium-239/240	0.876	79	2.77E-01
<b>Total Dose</b>			<b>0.4</b>

\* Screening action levels (SALs) from LANL (2015, 600929).



**Table 5**  
**Ecological Screening Levels for Terrestrial Receptors**

COPEC	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)	Cottontail (mammalian herbivore)	Montane Shrew (mammalian insectivore)	Deer Mouse (mammalian omnivore)	Earthworm (soil-dwelling invertebrate)	Generic Plant (terrestrial autotroph-producer)
<b>Radionuclides (pCi/g)</b>											
Americium-241	26,000*	57,000	43,000	4600	6100	10,000	26,000	34,000	33,000	190	500
Plutonium-238	45,000	110,000	100,000	4300	5900	10,000	75,000	190,000	170,000	820	1800
Plutonium-239/240	51,000	130,000	120,000	4400	6100	10,000	94,000	320,000	280,000	870	1900

\* ESLS are based on no observed adverse effect levels and were obtained from the ECORISK Database, Version 4.2 (N3B 2020, 701067).

**Table 6**  
**Minimum ESL Comparison for SWMU 49-001(g)**

COPC	EPC (mg/kg)	ESL (mg/kg)	Receptor	HQ
<b>Radionuclides (pCi/g)</b>				
Americium-241	0.182	190	Earthworm	9.58E-04
Plutonium-238	0.071	820	Earthworm	8.66E-05
Plutonium-239/240	0.876	870	Earthworm	1.00E-03

# **Attachment 1**

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*ProUCL Files*  
*(on CD included with this document)*