ENVIRONMENTAL RESTORATION PROJECT

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TA-51: TA-54

Date: August 7, 2002
Refer to: ER2002-0535

AUG 2002

Mr. Everett Trollinger
Department of Energy, MS A316
Office of Los Alamos Site Operations
Los Alamos, NM 87545

SUBJECT: RESPONSES TO THE DEPARTMENT OF ENERGY (DOE) COMMENTS ON THE VOLUNTARY CORRECTIVE ACTION (VCA) COMPLETION REPORT FOR POTENTIAL RELEASE SITES (PRSs) 51-001 AND 54-007(d)

Dear Everett:

Woody Woodworth provided DOE comments on the VCA Completion Report for PRSs 51-001 and 54-007(d) that was submitted to DOE on September 28, 2001. Attached are Los Alamos National Laboratory's (LANL's) responses to the DOE comments and revised pages for the VCA Completion Report. LANL has also submitted Radiological Release Reports to Mr. Woodworth for these two PRSs under separate cover.

Please call John Hopkins at (505)-667-9551 if you have any questions.

Sincerely,

David McInroy, Acting Program Manager
Environmental Restoration Project

DM/JH/vn

Attachments: Response to Request for Supplemental Information Request for the VCA Completion Report for PRSs 51-001 and 54-007(d)

Cy (w/att.):
M. Kirsch, RRES-ER, MS M992
RRES-ER File, MS M992
IM-5, MS A150
RPF, MS M707

Cy (w/o att.):
D. McInroy, RRES-ER, MS M992

Response to Request for Supplemental Information Request for the VCA Completion Report for PRSs 51-001 and 54-007(d) Los Alamos National Laboratory

INTRODUCTION

To facilitate review of this response, the US Department of Energy (DOE) comments are included verbatim. Los Alamos National Laboratory's (LANL's) responses follow each DOE comment.

GENERAL COMMENTS

DOE Comment

1. *There do not appear to be any borehole logs for 54-007.*

LANL Response

1. There were no characterization boreholes drilled at PRS 54-007. Two boreholes were drilled at PRS 51-001 to characterize potential releases from the 50-ft-deep seepage pit. A statement to this effect will be added to Appendix J.

DOE Comment

2. *Why have a Statistical Analysis append when no statistical analysis was conducted? (Except to say so)*

LANL Response

2. The editor went strictly by the VCA Completion Report outline. Since issuance of this report, NMED has agreed that not all appendixes specified in the outline are required.

DOE Comment

3. *Do you think the cost comparison needs to be a little more detailed (i.e. broken down into several major units)?*

LANL Response

3. A cost breakdown could be provided based on the baseline cost estimate. The fieldwork was bid fixed price for removal of four septic tanks, two of which are this VCA. The subcontractor was not required to split out costs by each septic tank. This statement will be added to Appendix G.

DOE Comment

4. *When you get to Append "H" it gets confusing because Append "H" also has Appendices of its own.*

LANL Response

4. It is agreed that reading this Appendix may be confusing with page numbers. However, Appendix H contains the VCA Plan that is an approved regulatory document.

SPECIFIC COMMENTS

DOE Comment

Page 10, Paragraphs 2 and 3

These two paragraphs appear to contradict each other.

LANL Response

The second paragraph refers to the condition of the tank after the tank was uncovered and documents that the tank was in good condition and probably didn't leak. The third paragraph describes how the tank was removed during VCA activities. The tank had to be collapsed in order to remove it in sections. These paragraphs will be revised based on DOE's suggested language.

DOE Comment

Page 27, Table 3.3-2

This table appears confusing based on the information contained in some of the rows in columns 3, 4, 7 and 8.

LANL Response

The last column of Table 3.3-2 will be removed.

Page 29, para. 1

This description does not coincide with Figure 3.4-1.

LANL Response

The baffle shown in Figure 3.4-1 was meant to delineate the two compartments. A rectangular tank is described in the narrative. A standard tank depiction (cylindrical) is shown in the figure.

DOE Comment

Page 38, Sect. 3.4.3.1, Para 1, line 3

Didn't you mean to call out Figure 3.4-3 instead?

LANL Response

Agreed. Figure 3.4-2 will be changed to Figure 3.4-3.

DOE Comment

Page 43, Sect. 3.5.1.2(a), Paras. 1 and 2

Shouldn't ESCM really be ECSM?

LANL Response

ESCM is correct. Appendix A will be changed.

DOE Comment

Page 44, Table 3.5-4.

Should there be any explanation associated with the two blank columns associated with the carbon disulfide entry?

LANL Response

We'll add footnotes a and b to the table next to the dashes, similar to the ones for bromomethane.

DOE Comment

Page 45, Antimony.

This never fails to amaze me; we say this element was not detected in soil, or sludge yet we include it in the write-up. What is the driver that makes us do this?

LANL Response

The driver is that we need to explain why elevated detection levels greater than background are not a concern.

DOE Comment

Page B1, Sect B-1.0, para. 2, lines 2 thru 5.

It appears we make two different statements about TRU disposal.

LANL Response

We will delete "and transuranic (TRU) from lines two and three in all Appendix B's for TA-54.

DOE Comment

Page B1, Sect B-1.0, para. 2, line 12.

You may want to update the "j" information.

LANL Response

Construction of the MDA J cover was completed in 2002. Construction was originally scheduled to be completed in 2001. The text will be updated to reflect this.

The tank was in sound condition with no visible cracking. Both compartments of the tank contained liquid and sludge waste. The contents of the tank were pumped into liquid-rated 55-gal. drums through a 1/32-in. sieve screen. Captured solids were placed in a 55-gal. drum. The interior of the tank was pressure-washed and wash water was pumped into 55-gal. drums. The interior of the tank was then examined and photographed from the cleanout port. Septic tank wastewater, sludge, and decontamination wash water were removed from the tank using a submersible pump.

The tank was collapsed in place and removed using a track excavator. The tank and associated debris (e.g., concrete guard posts and rebar from temporary fencing used during the VCA) were placed into a roll-off bin. The tank inlet and outlet lines were plugged with an appropriately sized, permanent, gasket-type, expandable plug. The tank imprint was only partially visible after removal of the tank because parts of the walls of the excavation had collapsed. There was no staining or excessive moisture in the adjacent soils to indicate leakage from the tank. The PVC inlet and outlet lines were also in sound condition with no visible signs of leakage. The inlet line extended less than 5 ft from the tank.

Seven samples (three soil and four tuff) were collected from two depth intervals at three locations in the tank imprint to determine if there was a release of contaminants from the septic tank (Figure 2.4-2). Two additional soil samples were collected from beneath the inlet pipe to determine if there was a release of contaminants from the pipe (Figure 2.4-2). The samples were submitted to an off-site, fixed analytical laboratory. Table 2.4-2 lists sample and location IDs and the analytical suites. A 6-in. layer of gravel was placed in the bottom of the tank excavation; the excavation was then back filled with excavated soil.

The top of the seepage pit was excavated with a backhoe to verify the pit's location. Two boreholes (51-10000 and 51-10001) were drilled 7.5 ft (one to the northeast and one to the northwest) from the center of the seepage pit and two tuff samples were collected from each borehole at depths of 49 ft–50 ft and 59 ft–60 ft (Figures 2.4-2 and 2.4-3). The tuff samples were submitted to an off-site, fixed analytical laboratory. Table 2.4-2 lists sample identifications (IDs) and locations and presents the analytical suites for these samples. Tuff samples were collected at the 49-ft to 50-ft depth instead of the 40-ft depth, as stated in the VCA plan, because the bottom of the seepage pit was at 50 ft. In addition, a sample at this depth and at the 59-ft to 60 ft sample were more likely to detect a potential release.

2.4.2 Data Review for VCA Samples

The 2000 waste characterization sample results (Table 2.4-1) were used to define the analytical suite for the VCA samples; the analytical suites for the VCA included isotopic plutonium, isotopic uranium, gamma-emitting radionuclides, tritium, strontium-90, pH, VOCs, and SVOCs. VCA sample results are discussed in the following sections and are presented in Appendix D. In accordance with the approved VCA plan (LANL 2000, 70658), confirmation samples were not analyzed for inorganic chemicals because they were not detected above BVs in the 1995 RFI samples (Table 2.3-1).

2.4.2.1 Inorganic Chemical Comparison with Background

As stated in Section 2.4.2, inorganic chemicals were not analyzed for in the 2001 VCA confirmation samples.

Table 3.3-1
Frequency of Detected Organic Chemicals During 1995 Phase I RFI, PRS 54-007(d)

Analyte	Medium	Number of Analyses	Number of Detects	Concentration Range (mg/kg)[a]	Frequency of Detects
Aroclor-1254	Soil	3	1	0.25–[0.35]	1/3
DDE(4,4'-)	Soil	3	1	[0.0035]–0.0053	1/3
DDT(4,4'-)	Soil	3	1	[0.0035]–0.0046	1/3
Toluene	Soil	3	1	0.004–[0.005]	1/3

[a] Values in brackets indicate nondetected values.

Table 3.3-2
Frequency of Detected Inorganic Chemicals During 1995 Phase I RFI, PRS 54-007(d)

Analyte	Medium	Number of Analyses	Number of Detects	Concentration Range (mg/kg)[a]	BV (mg/kg)	Frequency of Detects above BV
Aluminum	Soil	3	3	7260–8900	29200	0/3
Antimony	Soil	3	0	[9–9.2]	0.83	0/3
Arsenic	Soil	3	0	[0.38–1.4]	8.17	0/3
Barium	Soil	3	3	82.8–155	295	0/3
Beryllium	Soil	3	0	[1.1]	1.83	0/3
Cadmium	Soil	3	0	[0.71–0.72]	0.4	0/3
Chromium, total	Soil	3	3	7.6–8	19.3	0/3
Cobalt	Soil	3	1	[3.5]–6.2	8.64	0/3
Copper	Soil	3	3	8–9.1	14.7	0/3
Cyanide,	Soil	3	0	[0.5]	0.5	0/3
Iron	Soil	3	3	9420–11500	21,500	0/3
Lead	Soil	3	3	10.2–14	22.3	0/3
Magnesium	Soil	3	3	1610–1940	4610	0/3
Manganese	Soil	3	3	64.7–342	671	0/3
Mercury	Soil	3	0	[0.5]	0.1	0/3
Nickel	Soil	3	3	3.3–7.5	15.4	0/3
Selenium	Soil	3	0	[0.33–0.34]	1.52	0/3
Silver	Soil	3	0	[0.92–0.94]	1	0/3
Thallium	Soil	3	1	[0.19–0.36]	0.73	0/3
Vanadium	Soil	3	3	16.8–21	39.6	0/3
Zinc	Soil	3	3	33.5–42.2	48.8	0/3

[a] Values in square brackets indicate nondetected results.
[b] Within range of background concentrations.

3.4.3 Revised Site Conceptual Model

The results of the VCA confirmed the preliminary conceptual model for PRS 54-007(d) so no revisions to the model are necessary. The preliminary conceptual model identified potential release mechanisms as seepage through (1) porous joints in drain lines and (2) slotted PVC lines used to construct the drain field and spread tank liquids to the subsurface. When the tank was excavated and the inlet and outlet lines were inspected, they were intact, and no soil staining was observed. Low levels of organic chemicals (J qualified) were detected in the liquid and sludge in the tank and in the drain field.

3.4.3.1 Nature and Extent of Contamination

Organic chemicals detected in drain field samples included acetone, benzene, bis(2-ethylhexyl) phthalate, bromomethane, 2-butanone, carbon disulfide, isopropylbenzene, isopropyltoluene, methyl-2-pentanone, toluene, trichlorofluoromethane, and trimethylbenzene[1,2,4-] (Table 3.4-4 and Figure 3.4-3). These organic chemicals were all detected at concentrations less than their respective EQLs in one or more samples. Acetone was the only organic chemical detected in the tank imprint that was also detected in a sample collected beneath the inlet line; all concentrations of acetone were less than the EQL. None of the organic COPCs were detected in the tank contents.

The results indicated low concentrations of COPCs, most of which were detected at concentrations less than EQLs. At most locations, the concentrations of organic chemicals decreased slightly with depth. Because the organic chemicals were detected at concentrations near or below the EQLs, were not detected in the tank contents, and generally decreased with depth, additional sampling for extent is not warranted at PRS 54-007(d).

3.4.3.2 Environmental Fate

The evaluation of environmental fate addresses the chemical processes that affect the persistence of a chemical in the environment. Table 3.4-5 presents data on the vapor pressure and solubility of the organic compounds. The evaluation of transport addresses the physical processes affecting mobility along the migration pathway. Physicochemical properties such as vapor pressure and solubility in water are important in evaluating chemical mobility.

The following information, summarized from Ney (1995, 58210), is presented to give the reader an indication of the potential fate and transport tendencies of organic chemicals.

Water Solubility. Water solubility is perhaps the most important chemical characteristic used to assess chemical mobility. The higher the water solubility of a chemical, the more likely it is to be mobile and the less likely it is to accumulate, bioaccumulate, volatilize, and persist in the environment. Chemicals with solubilities greater than 0.1 gram per 100 milliliters (g/100mL) are more prone to biodegradation and metabolism. Chemicals with water solubility less than 0.001g/100mL are more likely be immobilized by way of adsorption.

Vapor Pressure. Chemicals with vapor pressure greater than 0.01 millimeter mercury (mmHg) are more likely to volatilize and diffuse through the soil pore-gas with potential release to the atmosphere. Chemicals with vapor pressure less than 0.000001 mmHg are less likely to volatilize and, therefore, more likely to remain immobile.

Bis(2-ethylhexyl)phthalate, isopropylbenzene, isopropyltoluene, and trimethylbenzene[1,2,4] have low water solubilities, which indicate that these chemicals will not be highly mobile in percolating water. This group of contaminants will biodegrade in several days to weeks (Howard et al. 1991, 57902).

used for each COPC to ensure a conservative evaluation. ESLs were selected from all available data for terrestrial receptors in the Laboratory's ECORISK database (LANL 2000, 67822.1). Results of this comparison are shown in Table 3.5-4.

Table 3.5-4
Final ESL Comparisons for Terrestrial Receptors, PRS 54-007(d)

COPC	Maximum Soil Concentration 0–5 ft bgs (mg/kg)	Final ESL (mg/kg)	Receptor	HQ (unitless)
Acetone	0.069	1.8	Mouse	3.8E-02
Benzene	0.0016	65	Mouse	2.5E-05
Bromomethane	0.0023	No value	–[a]	–[b]
2-Butanone	0.0084	960	Mouse	8.8E-06
Carbon disulfide	0.002	No value	–[a]	–[b]
Antimony	9.2(U)	0.5	Plant	18.4

[a] No toxicity information is available for any receptor for this chemical.
[b] HQ not calculated because no ESLs are available for this chemical.

The detected COPCs did not exceed their final ESLs and the HQs were less than 0.3. Therefore, these COPCs are not evaluated further. Antimony was not detected but detection limits of 9 mg/kg were above the final ESL of 0.5 mg/kg and two chemicals do not have ESLs. Antimony, bromomethane, and carbon disulfide are identified as COPECs and are discussed further in the uncertainty analysis.

(c) Uncertainty Analysis

The COPC concentrations used in all exposure calculations of HQs were the maximum concentrations in soil, thereby overestimating the actual concentration of each COPC. The COPCs were also assumed to be 100% bioavailable at the maximum concentration, and the maximum concentration was assumed to be uniform throughout the site. Both these assumptions are likely to overestimate the actual exposure to the receptor species.

Aroclor-1254, DDE[4,4'-], DDT[4,4'-], and toluene were detected in a single sample in the1995 soil samples, but not in the sludge samples. Therefore, they are not considered COPCs related to the septic system (Table 3.5-5).

Table 3.5-5
Final ESL Comparisons for Non-Site Related Chemicals

Analyte	Maximum Soil Concentration 0–5 ft bgs (mg/kg)	Final ESL (mg/kg)	Receptor	HQ (unitless)
Aroclor-1254	0.25	0.12	Shrew	2.1E+00
DDE[4,4'-]	0.0053	0.0018	Kestrel (falcon)	2.9E+00
DDT[4,4'-]	0.0046	0.0028	Robin (invertebrate)	1.6E+00
Toluene	0.004	1.8	Mouse	2.0E-03

APPENDIX A ACRONYMS, GLOSSARY, AND CONVERSION TABLE

A-1.0 ACRONYMS AND ABBREVIATIONS

AOC	area of concern
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, xylene
BV	background value
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
CRDL	contract-required detection limit
CVAA	cold vapor atomic absorption
DOE	US Department of Energy
DRO	diesel range organics
EETF	Experimental Engineering Test Facility
EPA	US Environmental Protection Agency
EQL	estimated quantitation limit
ER	environmental restoration
ESCM	ecological site conceptual model
ESL	ecological screening levels
EQL	estimated quantitation limit
GMFZ	Guaje Mountain fault zone
GRO	gasoline range organics
HI	hazard index
HQ	hazard quotient
HRMB	Hazardous and Radioactive Materials Bureau
HSWA	Hazardous and Solid Waste Amendments of 1984
ICPES	inductively coupled plasma emission spectroscopy
IWP	installation work plan
JCNNM	Johnson Controls Northern New Mexico
LANL	Los Alamos National Laboratory
LCS	laboratory control samples
MDA	material disposal area
NFA	no further action
NFG	national functional guidelines
NMED	New Mexico Environment Department
NOAEL	no observed adverse effect level

APPENDIX B OPERATIONAL AND ENVIRONMENTAL SETTING

B-1.0 OPERATIONAL HISTORY AND LAND USE

Technical Areas (TAs) 51 and 54 are located in the east-central portion of the Los Alamos National Laboratory (Laboratory) (Figure 1.0-1, Section 1) on Mesita del Buey between Pajarito Canyon (on the south) and Cañada del Buey (on the north). During the late 1950s, the Laboratory, with approval of the US Atomic Energy Commission and upon recommendation of the US Geological Survey, selected TA-54 for disposal of Laboratory-derived waste. Since that time, the site has functioned as a major storage and disposal facility with some permitted treatment of Laboratory-derived wastes. There are four material disposal areas (MDAs) at TA-54, which have been used to store and/or dispose of solid, sensitive (classified), hazardous, radioactive, or mixed waste generated at the Laboratory.

MDA G, the first disposal area, accepted its first shipment of radioactive waste in 1957 and is still in operation. The Department of Energy (DOE) authorized MDA G for the disposal of low-level radioactive waste and certain radioactively contaminated infectious waste, asbestos-contaminated material, and polychlorinated biphenyls (PCBs) and for the temporary placement of TRU waste. The New Mexico Environment Department (NMED) issued a permit for the site for the storage of mixed waste. MDA L opened during the late 1950s for the disposal of liquid chemical waste; it is operating as a storage facility permitted by the Resource Conservation and Recovery Act (RCRA). MDA H opened in 1960 and was used for the disposal of classified, noncontainerized, solid wastes, some of which were residually contaminated with radioactive, hazardous, and high-explosive constituents. MDA H is no longer operational but has not undergone formal closure. Finally, MDA J has been used since 1961 for the disposal of administratively controlled solid wastes and for the storage and disposal of special wastes. MDA J will be closed in Fiscal Year 2002 as a solid waste and special waste facility in accordance with New Mexico Solid Waste Management Regulations, 20 NMAC 9.1, Subpart V. Chapter 2 of the RCRA facility investigation (RFI) work plan for Operable Unit 1148 (TA-54) (LANL 1992, 7669) describes the TA-54 area and documents the uses of the MDAs. The performance assessment and composite analysis report (Hollis et al. 1997, 63131) and the safety analysis report (LANL 1995, 63300) present additional information on MDA G.

TA-51 is the base of operations for the Experimental Engineering Test Facility (EETF), which supports research to develop effective isolation techniques for the burial of wastes in semiarid climates. The EETF was built in 1980, and support offices for staff were constructed in 1986.

B-2.0 CLIMATE

Mesita del Buey has a semiarid, temperate mountain climate (Bowen 1990, 6899). Average annual precipitation at a weather station at MDA G is approximately 14 in. (35.6 cm); about 40% of this occurs as brief, intense thunderstorms during July and August. Snowfall is greatest from December through March; heavy snowfall is infrequent during other months. Surface water runoff can occur during summer thunderstorms, frontal storms, and snowmelt periods, but the majority of runoff and resultant erosion probably occurs during the summer thunderstorm period. The canyon-mesa topography at TA-54 affects wind speed and direction in a dramatic way, as indicated by measurements taken at meteorological stations on Mesita del Buey and within Cañada del Buey and Pajarito Canyon. Mesa-top winds flow predominately south to southwest during the day. Canyon winds are strongly channeled; they flow predominately up canyon (north-northwest) during the day and down canyon (south-southeast) and across the mesa (east) at night. The strongest winds typically occur in the spring. Summer afternoon temperatures generally range between 70°F and 90°F, and typical winter temperatures range between 30°F and 50°F during the day and 15°F and 25°F at night.

APPENDIX G COMPARISON OF ANTICIPATED AND ACTUAL COSTS

The baseline cost estimate for the voluntary corrective action (VCA) plan, implementation of the VCA, and preparation of the VCA report for Potential Release Sites 51-001 and 54-007 (c, d, e) (4 septic tanks) was $582,342. The estimate at completion cost for this work is $540,000. The fieldwork was bid fixed price for removal of the four septic tanks, two of which are included in this VCA. The subcontractor was not required to split out costs by each septic tank.

APPENDIX J BOREHOLE LOGS

There were no characterization boreholes drilled at PRS 54-007(d). Two boreholes were drilled at PRS 51-001 to characterize potential releases from the 50 ft deep seepage pit.