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Voluntary Corrective Action Plan for Potential Release Sites 51-001 and 54-007(d)

Los Alamos
NATIONAL LABORATORY
Los Alamos, NM 87545

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EXECUTIVE SUMMARY

This voluntary corrective action (VCA) plan presents an approach for characterizing and remediating two potential release sites (PRSs), 51-001 located within Technical Area (TA) 51 and 54-007(d) located within TA-54 West, at Los Alamos National Laboratory (the Laboratory). The two PRSs addressed in this VCA are two inactive/abandoned septic tank systems that are not listed on the Laboratory's Hazardous Waste Facility Permit. They are grouped into this VCA plan on the basis of similarities in design, construction, use, location, and environmental setting.

The two PRSs addressed in this VCA plan were first investigated in 1995 as part of a Resource Conservation and Recovery Act facility investigation (RFI) of former Operable Unit 1148. However, the nature and extent of potential contamination were not determined, and the data were not assessed or presented in an RFI report. The septic systems are located on a mesa top near the canyon edge, and waste remains in the tanks. It is an Environmental Restoration (ER) Project best management practice (BMP) to properly and consistently manage inactive/abandoned septic systems in accordance with applicable regulatory requirements and thereby mitigate potential environmental issues that may remain if the systems are not addressed, regardless of RFI results. The proposed corrective actions meet the requirements of the accelerated corrective action checklist provided in Appendix B and will result in a final remedy and determination of no further action (NFA) for both PRSs.

The objectives of this VCA are to characterize, remove, and dispose of the waste remaining in each septic tank; collect confirmatory subsurface soil samples at each septic system, if necessary; determine the nature and extent of soil contamination (if present) using the existing and confirmatory data; assess the potential human health and ecological risks to the environment from each septic system; and remediate (by excavation), as necessary, the inactive/abandoned septic systems following Laboratory ER Project BMPs. Based on waste characterization results, the systems will either be closed in place in accordance with 20NMAC7.3, "Abandoned Sewers and On-Site Liquid Waste Management Systems," or if contaminated, the septic tanks will be removed and the drain lines plugged. The area around the drain field and seepage pit will be characterized and remediated, if necessary, to levels protective of humans and/or the ecosystem.

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. PRS 51-001 is the septic system that served the EETF. The septic system was installed in 1988 to provide sanitary sewer service to Buildings TA-51-11, -12, and -26 and was decommissioned in 1993. Building TA-51-11 housed the Environmental Science Laboratory. A greenhouse and laboratory occupied Building TA-51-12; the building was equipped with sinks and lavatories. Building TA-51-26 has housed offices since its construction in 1986.

PRS 54-007(d) is an inactive/abandoned septic system that served buildings TA-54-1001, -1002, -1003, and -1004. The Radiation Exposure Facility conducted research (from 1962 to the mid-1970s) on the exposure of animals to gamma radiation from cobalt-60 sources. The septic system was installed in 1962 and was decommissioned in 1993.

The purpose of this VCA is to characterize and remove the contents of the septic tanks, remove or close the septic tanks in place, collect sufficient soil characterization data to determine if drain lines are to be capped or removed, and determine if the seepage pit and drain field are to be left in place or removed, and implement removal, if necessary. The planned sequence of events is as follows:

- characterize the contents of the septic tank;
- remove the liquids and sludges in the septic tanks;

- perform confirmatory sampling of the drain field and seepage pit;
- remove and dispose of the septic tanks and drain lines or close them in place;
- perform confirmatory sampling of any excavated areas;
- perform a risk assessment to determine if any media exceed preliminary remediation goals (PRGs);
- remove any contaminated soil from the tank excavations, drain lines, drain field, and seepage pit if contamination results in an unacceptable level of risk; and
- restore the site.

VCA sampling data will be compared to the Environmental Protection Agency's Region VI industrial PRGs after extent has been defined; the results will be used to determine whether soil removal will be necessary. If remediation of the soils, drain lines, the seepage pit, or drain field is required, cleanup levels will be derived for the contaminants.

After VCA activities are complete, the site will be restored, and BMPs will be installed as needed. The waste will be disposed of in accordance with applicable regulatory requirements.

Sampling of the septic tanks occurred during July 2000, removal and disposal activities and confirmatory sampling will take place during September 2000, and the VCA report will be published during Fiscal Year 2001. A summary of the VCA is presented in Table ES-1.

Table ES-1
VCA Summary Table

PRS Number	PRS Description	HSWA[a,b]	Radionuclide Component[c]	Proposed Action	Rationale for Recommendation
51-001	Inactive/abandoned septic system	No	Unknown	Septic tank removal or closure in place	NFA
54-007(d)	Inactive/abandoned septic system	No	Unknown	Septic tank removal or closure in place	NFA

[a] HSWA = Hazardous and Solid Waste Amendments of 1984.

[b] Is this site listed in Module VIII of the Laboratory's Hazardous Waste Facility Permit?

[c] Are radionuclides associated with this PRS?

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1.0 INTRODUCTION

This voluntary corrective action (VCA) plan presents an approach for characterizing and remediating two potential release sites (PRSs) in Technical Areas (TAs) 51 and 54 West at Los Alamos National Laboratory (the Laboratory) (Figure 1.0-1). The PRSs addressed in this plan are 51-001 and 54-007(d), both inactive/abandoned septic systems. The similar environmental settings of the sites and use of the septic systems support grouping the PRSs in one VCA plan. These sites are not listed in the Laboratory's Hazardous Waste Facility Permit (EPA 1990, 1585).

It is an Environmental Restoration (ER) Project best management practice (BMP) to properly and consistently manage inactive/abandoned septic systems in accordance with applicable regulatory requirements and thereby to mitigate potential environmental issues that may remain if the systems are not addressed, regardless of Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) results. The ER Project will remove inactive/abandoned septic tank structures if removal is (1) feasible or (2) warranted to mitigate potential environmental issues. Waste does remain in the septic tanks of these PRSs.

The purpose and scope, regulatory history, and rationale for the proposed corrective action are presented in Section 1. Section 2 presents the site description and operational history, previous field investigations, and results of previous investigations for these PRSs. The basis for cleanup levels is presented in Section 3. Section 4 includes the conceptual model, the supplemental sampling, the cleanup activities, and the site restoration activities. Confirmatory sampling is discussed in Section 5. Section 6 presents the estimated types and volumes of waste and the method of management and disposal. Section 7 discusses the proposed schedule and uncertainties. References are listed in Section 8. Appendix A includes acronyms and abbreviations; Appendix B includes the VCA checklist; Appendix C includes the ER standard operating procedure 2.01, "Surface Water Site Assessments"; Appendix D includes the ecological checklists; and Appendix E includes the estimated costs.

1.1 Purpose and Scope

The objective of this VCA is to complete characterization and remedial actions with respect to the two septic tanks and their associated drain lines, seepage pit, and drain field. To meet this objective, the Laboratory's ER Project will conduct the following activities:

- characterize, remove, and dispose of the waste remaining in each septic tank.
- supplement previous RCRA investigatory data pertinent to each PRS with additional site characterization data, as needed. These data will be used to determine nature and extent of contamination associated with the septic tank, drain line, seepage pit, and drain field operations.
- assess human health and ecological risk, based on nature and extent of contamination from previous and supplemental data collected for each PRS.
- determine the remedial approach for each PRS, based on Environmental Protection Agency (EPA) Region VI industrial preliminary remediation goals (PRGs) and nature and extent of contamination.
- conduct removal activities, as necessary, using cost-effective, environmentally acceptable methods while minimizing waste generation and disruption to facility operations.

1.2 Regulatory History

The regulatory activities of the PRSs subject to this VCA are summarized in Table 1.2-1.

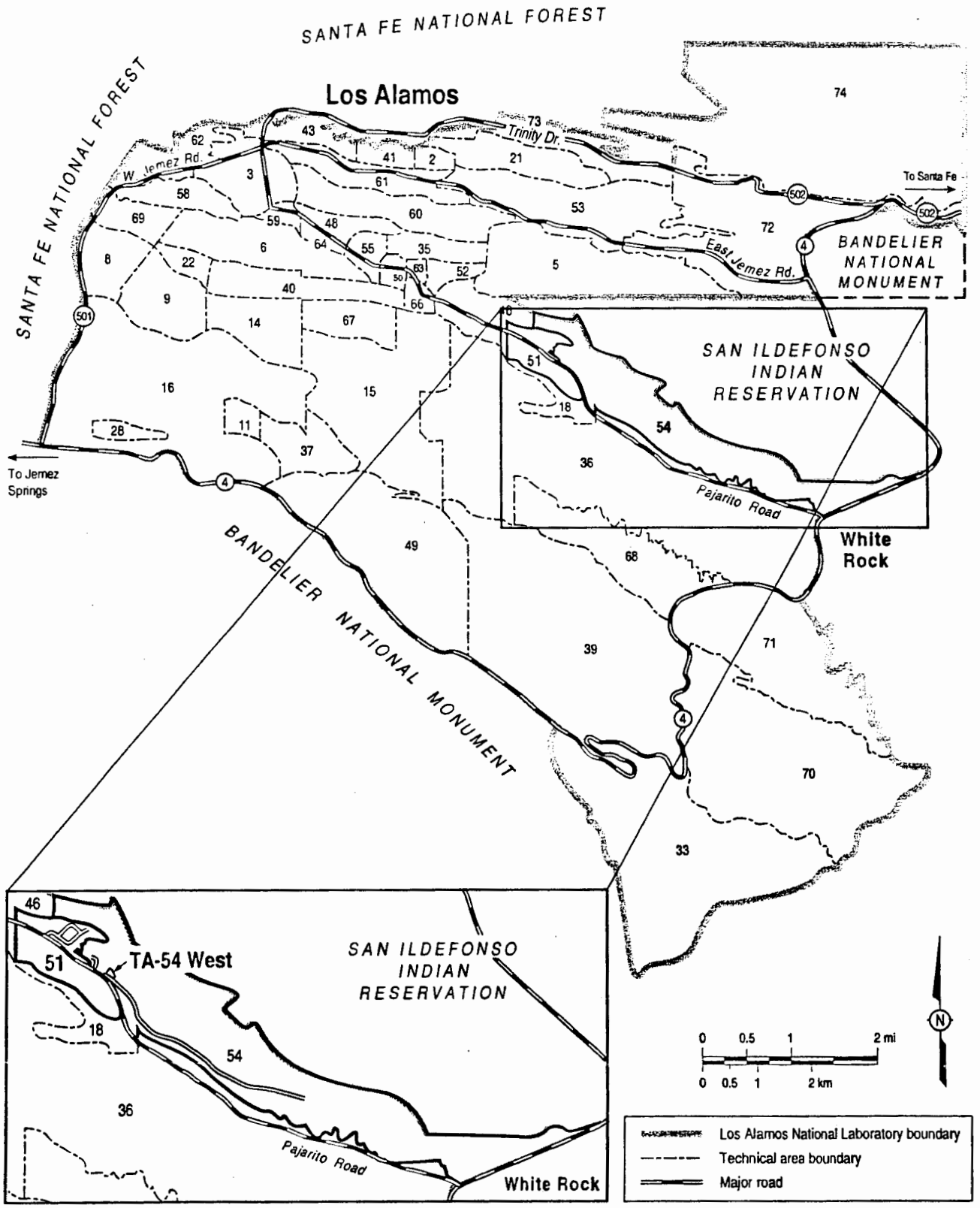

Figure 1.0-1. Locations of TA-51 and TA-54 West within the Laboratory

Table 1.2-1
Regulatory Activity at PRSs 51-001 and 54-007(d)

Date	Activity	Report
October 1987	Identification of PRSs 51-001 and 54-007(d) during the Comprehensive Environmental Assessment and Response Program investigation	"Phase I: Installation Assessment, Los Alamos National Laboratory" (DOE 1987, 8663 and 8664)
May 1992	Submittal of RFI work plan for OU* 1148	"RFI Work Plan for Operable Unit 1148" (LANL 1992, 7669)

* OU = operable unit.

1.3 Rationale for Proposed Corrective Action

The septic systems identified as PRSs 51-001 and 54-007(d) are located on Department of Energy (DOE) property that will remain under institutional control for the foreseeable future. It is an ER Project BMP to properly manage inactive/abandoned septic systems in accordance with applicable regulatory requirements and thereby mitigate potential environmental issues that may remain if the systems are not addressed, regardless of RFI results. The septic systems are located on a mesa top near the canyon edge, and waste remains in the tanks. Therefore, as a final and obvious remedy, the systems will either be closed in place in accordance with 20NMAC7.3, "Abandoned Sewers and On-Site Liquid Waste Management System," or if contaminated, the tanks will be removed and the drain lines plugged. The areas around the seepage pit and drain field will be characterized and remediated, if necessary, to levels protective of humans and the ecosystem.

The corrective actions proposed herein will meet the requirements of the accelerated corrective action checklist provided in Appendix B. The industrial land-use assumption is straightforward, and EPA Region VI industrial PRGs are appropriate. The nature and extent of chemicals of potential concern (COPCs) will be determined during the accelerated site characterization to supplement the 1995 RFI data and will be used to determine risk to human health and ecosystems. Treatment, storage, and disposal facilities are available for each potential waste type, and the cost and implementation time period are reasonable.

2.0 PREVIOUS SITE CHARACTERIZATION

2.1 PRS 51-001

2.1.1 Site Description and Operational History

PRS 51-001 is an inactive/abandoned septic system that served Buildings TA-51-11, -12, and -26 (Figure 2.1-1). Structures included in this PRS include a 1000-gal. concrete septic tank (TA-51-03), drain lines, and a seepage pit (TA-51-31). The seepage pit is 4 ft in diameter and 50 ft deep. The septic tank is connected to the seepage pit by a 4-in.-diameter vitrified clay pipe (VCP) buried in a trench that is 2-ft and 6-in.-deep. The VCP connects to a 4-in.-diameter perforated polyvinyl chloride (PVC) drop pipe that extends to within 2 ft of the bottom of the pit. The pit is backfilled with screened gravel to between 40 ft and 50 ft below ground surface (bgs). Construction details of the seepage pit are illustrated in Figure 2.1-2.

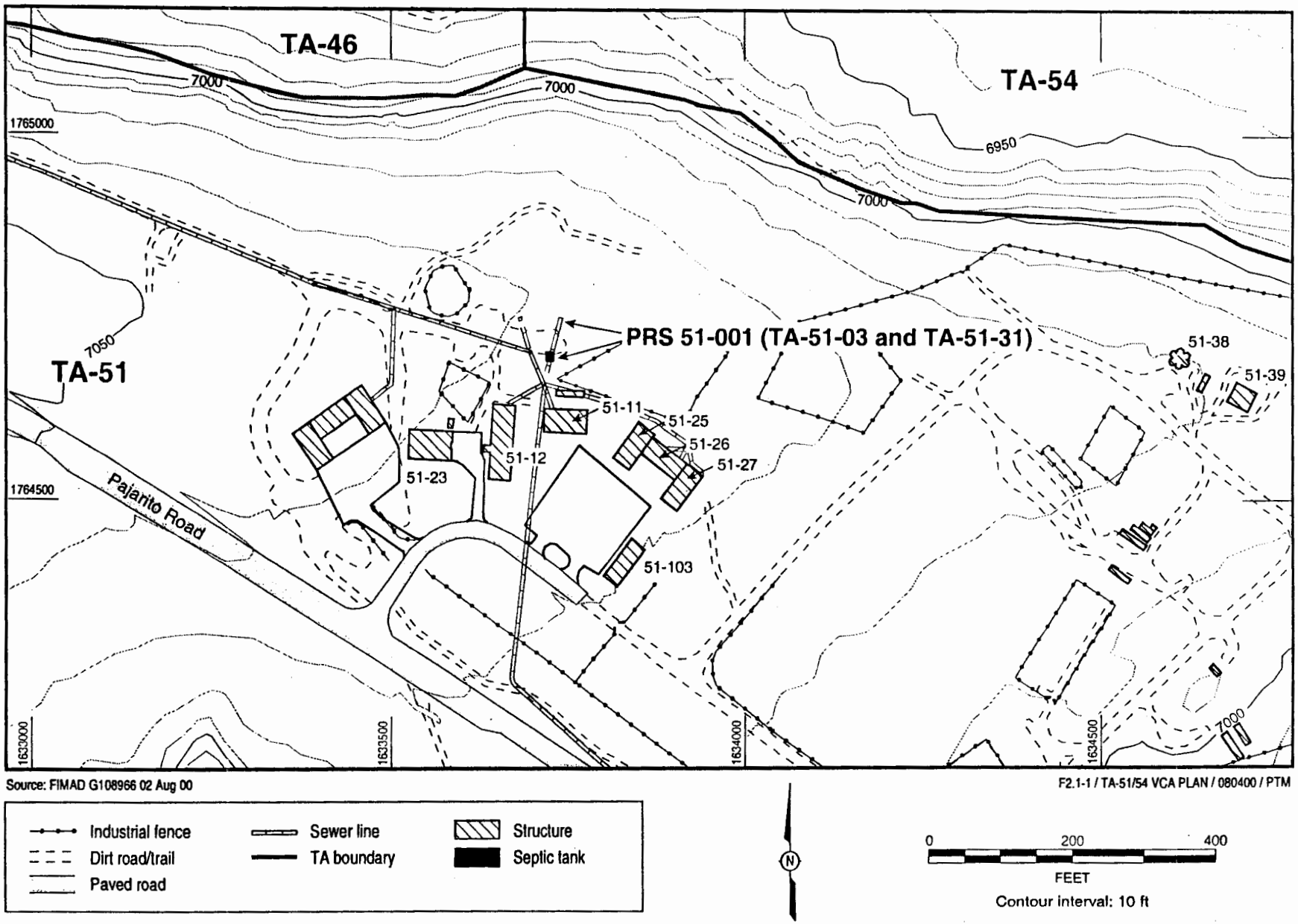

Figure 2.1-1. Location of PRS 51-001, septic system

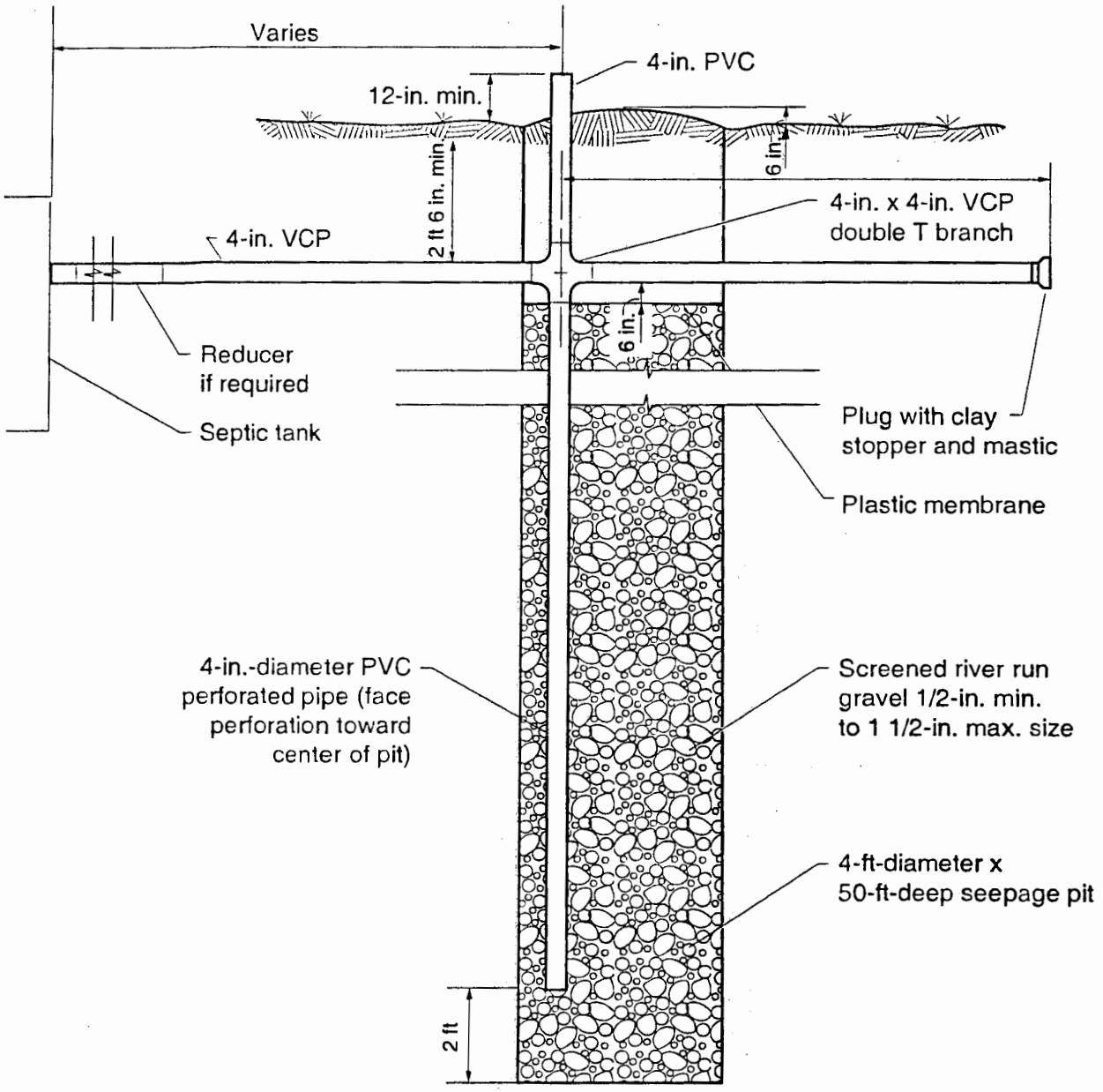

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Figure 2.1-2. Seepage pit construction detail for TA-51-31 (LANL 1983, 66410)

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 (LANL 1992, 7669). The EETF was built in 1980, and support offices for staff were constructed in 1986. PRS 51-001 served the EETF. The septic system was installed in 1988 to provide sanitary sewer service to Buildings TA-51-12, -11, and -26 and was decommissioned in 1993 when the sanitary sewer line was installed as part of the Laboratory's Sanitary Wastewater Systems Consolidation (SWSC) Program. The influent now flows to a new manhole west of the septic tank. A greenhouse and laboratory previously occupied Building TA-51-12; the building was equipped with sinks and lavatories. Building TA-51-26 has housed offices since its construction in 1986. Building TA-51-11 housed the Environmental Science Laboratory.

2.1.2 Previous Field Investigations

There are no documented operational spills or unintentional releases associated with PRS 51-001. The septic system was investigated during the 1995 RFI in accordance with the OU 1148 RFI work plan (LANL 1992, 7669). However, the nature and extent of potential contamination were not determined, and the data have not been assessed or presented in an RFI report. Previous sample locations are shown in Figure 2.1-3. As part of that RFI, the contents of the septic tank were sampled and analyzed. Additionally, a borehole was advanced through the center of the seepage pit to an approximate depth of 60 ft. However, the drill was unable to collect a sample in the gravel layer at the base of the seepage pit, so only a single tuff sample and a duplicate sample were collected from between 55 ft and 60 ft bgs. The analytical suite for the sludge sample and the tuff samples included gross alpha, beta, and gamma; pesticides/polychlorinated biphenyls (PCBs); cyanide; volatile organic compounds (VOCs); semivolatile organic compounds (SVOCs); and total metals.

2.1.3 Results from Previous Investigations

A review of the analytical results in Table 2.1-1 from the 1995 RFI sampling indicates that there are insufficient data to determine if radionuclides are above background levels. Therefore, the July 2000 samples will be analyzed for isotopic plutonium, isotopic uranium, gamma-emitting radionuclides (by gamma spectrometry), and tritium. The 1995 data do show low concentrations of the VOCs chloroethane and 1,2-dichloroethane in the septic tank sludge sample and the rinsate from the equipment used to collect that sample. The same VOCs were detected in the tuff sample, the duplicate sample, and the rinsate sample from equipment that was used to collect the seepage pit samples; concentrations in these samples were lower than those measured in the sludge. No inorganic chemicals were detected above Laboratory background values.

2.2 PRS 54-007(d)

2.2.1 Site Description and Operational History

PRS 54-007(d) is an inactive/abandoned septic system that served buildings TA-54-1001, -1002, -1003, and -1004, formerly buildings TA-51-1, -2, -3, and -7. The system was constructed in 1962 and consists of a 972-gal. reinforced concrete septic tank (TA-54-4) located north of building TA-54-1004, formerly building TA-51-7 (Figure 2.2-1). The 4-in. cast iron drain line from the septic tank connects to a reinforced concrete distribution box, which diverted the effluent to the east and west to a drain field of 4-in.-diameter drain tile running approximately 60 ft in both directions. The septic system was abandoned in 1993 when the sanitary sewer line was installed as part of the Laboratory's SWSC Program. The influent now flows to a new manhole, TA-54-151, constructed south of the septic tank.

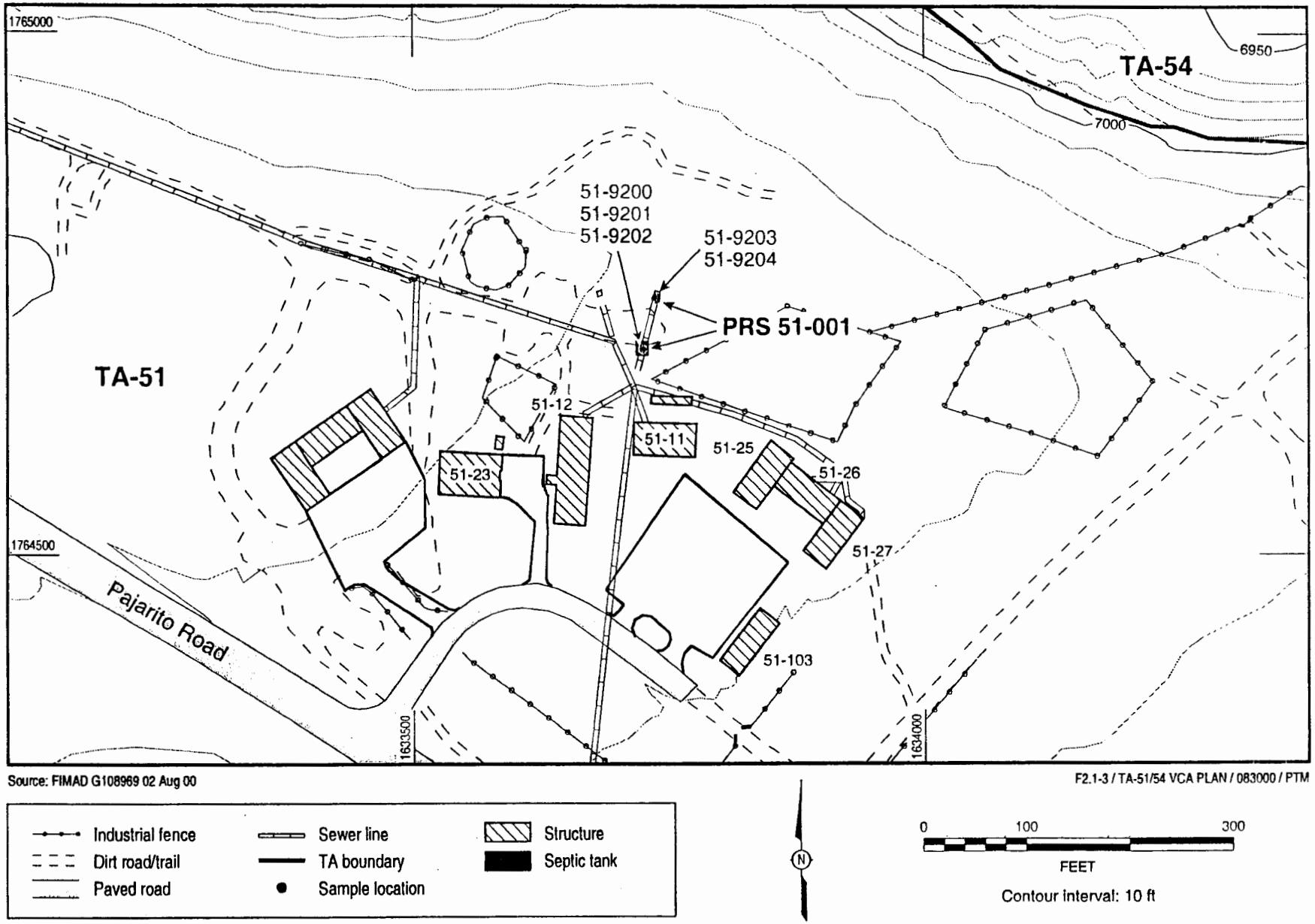

Figure 2.1-3. Sample locations for the 1995 RFI at PRS 51-001

Table 2.1-1
Organic Analytes and Radiation Detected at PRS 51-001

Location ID	Request No.	Matrix	Depth (ft)	Sample ID	Analyte	Result	Uncertainty	Units	Qualifier
51-9200	1618	Sludge	n/a[a]	0551-95-2000	Chloroethane	71	n/a	ug/L	None
51-9200	1618	Sludge	n/a	0551-95-2000	Dichloroethane[1,2-]	5	n/a	ug/L	None
51-9201	1618	Sludge	n/a	0551-95-2001	Chloroethane	64	n/a	ug/L	None
51-9201	1618	Sludge	n/a	0551-95-2001	Dichloroethane[1,2-]	4	n/a	ug/L	J[b]
51-9202	1631	Sludge	n/a	0551-95-2002	Gross beta radiation	54.30	4.35	pCi/L	None
51-9202	1631	Sludge	n/a	0551-95-2002	Gross gamma radiation	25.20	5.45	pCi/L	None
51-9204	1686	Soil	50–60	0551-95-2016	Gross alpha radiation	1.46	0.12	pCi/g	None
51-9204	1686	Soil	50–60	0551-95-2016	Gross beta radiation	0.98	0.13	pCi/g	None
51-9204	1686	Soil	50–60	0551-95-2017	Gross alpha radiation	0.71	0.08	pCi/g	None

[a] n/a = not applicable.

[b] J = result should be regarded as estimated.

The Radiation Exposure Facility, located in the western part of TA-54, was in operation from 1962 to the mid-1970s. The facility was used for biomedical research on the exposure of animals to gamma radiation from sealed cobalt-60 sources. The radiation sources were removed from the facility when research was terminated. In 1992, when the OU 1148 work plan was being written, the facility was used for research on the exposure of animals to the oxides of nitrogen.

2.2.2 Previous Field Investigations

There are no documented operational spills or unintentional releases associated with PRS 54-007(d). The septic system was investigated during the 1995 RFI in accordance with the OU 1148 RFI work plan (LANL 1992, 7669). However, the nature and extent of potential contamination were not determined, and the data have not been assessed or presented in an RFI report. As part of the RFI, the contents of the septic tank were sampled and analyzed. Subsurface soils adjacent to the discharge line and drain field were also sampled and analyzed. Previous sample locations are shown in Figure 2.2-2. The analytical suite for the sludge sample and the soils samples included gross alpha, beta, and gamma; pesticides/PCBs; VOCs; SVOCs; and total metals.

2.2.3 Results of Previous Field Investigations

A review of the analytical results in Table 2.2-1 from the 1995 RFI sampling indicates that there are insufficient data to determine if radionuclides are above background levels. Therefore, the July 2000 samples will be analyzed for isotopic plutonium, isotopic uranium, gamma-emitting radionuclides (by gamma spectrometry), and tritium. The 1995 data do show low concentrations of several VOCs in the septic tank sludge and soils in the vicinity of the drain field. Extremely low concentrations of toluene were detected in soil samples collected from the drain field while chloroethane, 1,2-dichloroethane, and acetone were detected in low concentrations in rinsate samples from equipment used to collect soil samples from the drain field. Low levels of chloroethane and 1,2-dichloroethane were also detected in the sludge remaining in the tank. No inorganic chemicals were detected above Laboratory background values.

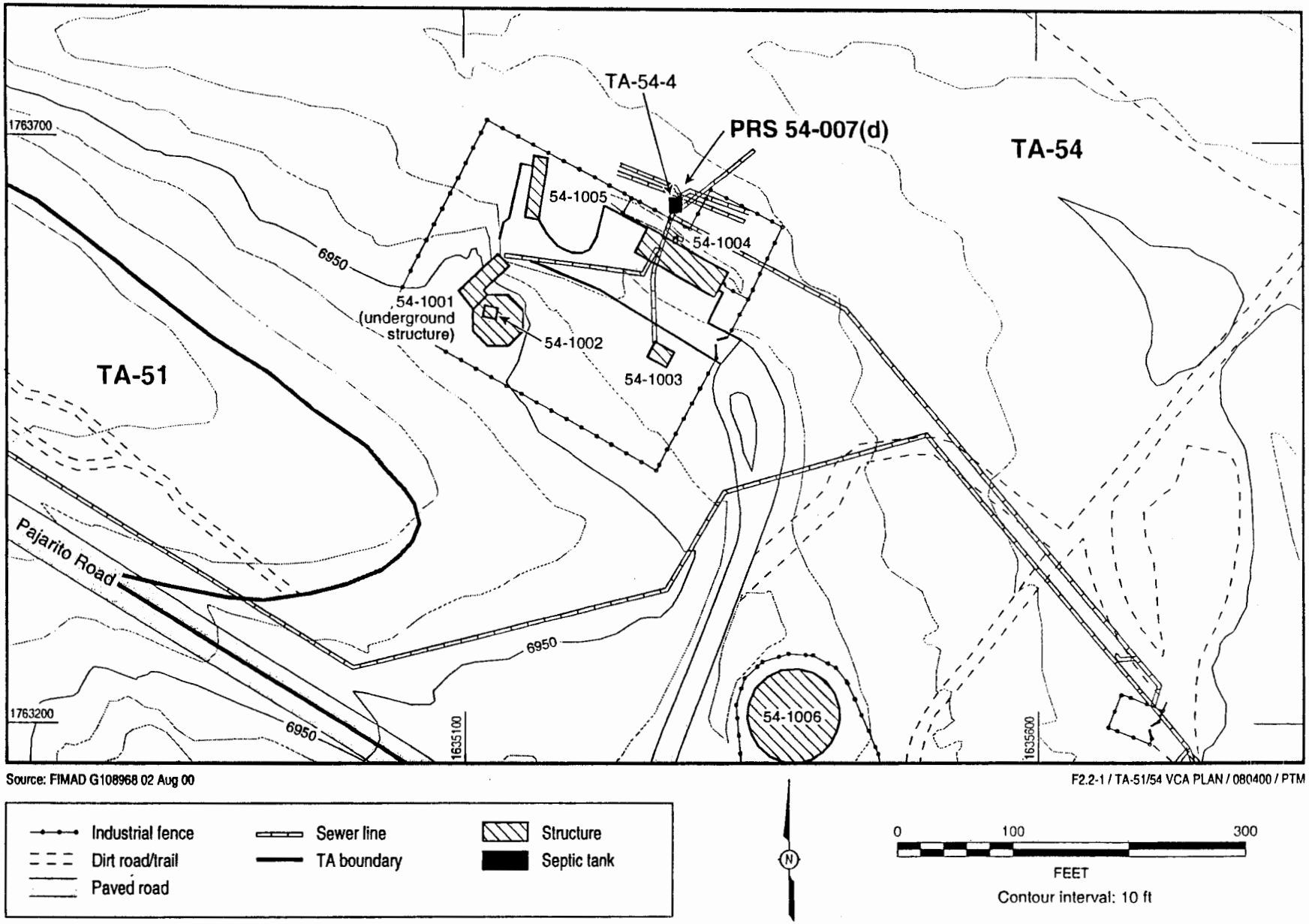

Figure 2.2-1. Location of PRS 54-007(d), septic system

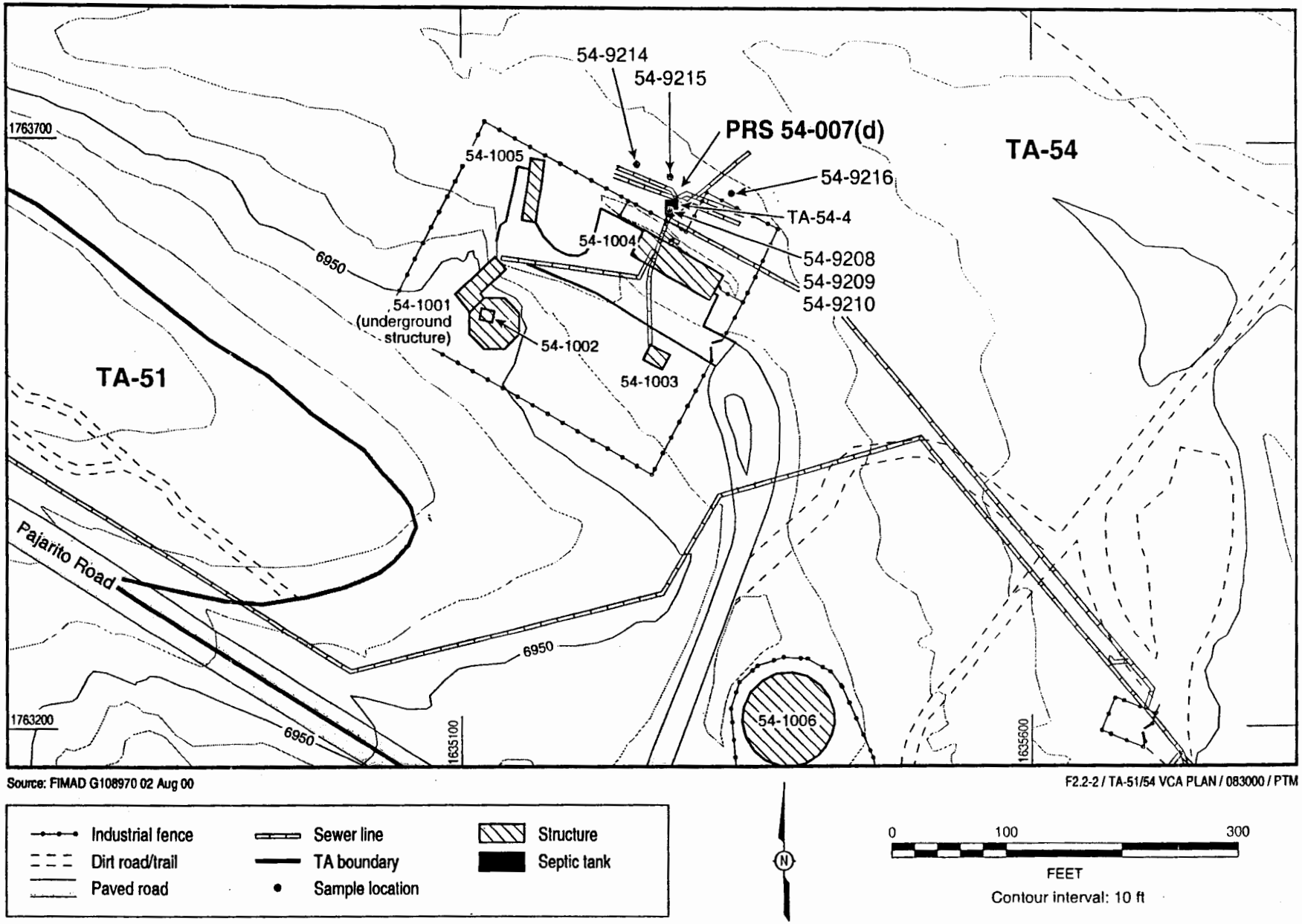

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Figure 2.2-2. Sample locations for the 1995 RFI at PRS 54-007(d)

Table 2.2-1
Organic Analytes and Radiation Detected at PRS 54-007(d)

Location ID	Request No.	Depth (in.)	Matrix	Sample ID	Analyte	Result	Uncertainty	Units	Qualifier
54-9208	1618	n/a[a]	Sludge	0554-95-2009	Chloroethane	79	n/a	ug/L	None
54-9208	1618	n/a	Sludge	0554-95-2009	Dichloroethane[1,2-]	6	n/a	ug/L	None
54-9209	1618	n/a	Sludge	0554-95-2010	Chloroethane	78	n/a	ug/L	None
54-9209	1618	n/a	Sludge	0554-95-2010	Dichloroethane[1,2-]	6	n/a	ug/L	None
54-9210	1618	n/a	Sludge	0554-95-2011	Bis(2-ethylhexyl)phthalate	2	n/a	ug/L	J[b]
54-9210	1618	n/a	Sludge	0554-95-2011	Di-n-butylphthalate	1	n/a	ug/L	J
54-9210	1631	n/a	Sludge	0554-95-2011	Gross alpha radiation	2.90	0.95	pCi/L	None
54-9210	1631	n/a	Sludge	0554-95-2011	Gross beta radiation	16.50	1.75	pCi/L	None
54-9210	1631	n/a	Sludge	0554-95-2011	Gross gamma radiation	33.40	5.90	pCi/L	None
54-9214	1634	30–40	Soil	0554-95-2021	Gross alpha radiation	3.86	0.25	pCi/g	None
54-9214	1634	30–40	Soil	0554-95-2021	Gross beta radiation	2.98	0.22	pCi/g	None
54-9214	1634	30–40	Soil	0554-95-2021	Gross gamma radiation	2.94	0.89	pCi/g	None
54-9215	1634	26–36	Soil	0554-95-2022	Gross alpha radiation	5.88	0.38	pCi/g	None
54-9215	1634	26–36	Soil	0554-95-2022	Gross beta radiation	3.64	0.26	pCi/g	None
54-9215	1634	26–36	Soil	0554-95-2023	Gross alpha radiation	5.01	0.32	pCi/g	None
54-9215	1634	26–36	Soil	0554-95-2023	Gross beta radiation	3.71	0.26	pCi/g	None
54-9215	1634	26–36	Soil	0554-95-2023	Gross gamma radiation	2.92	0.65	pCi/g	None
54-9216	1632	5–15	Soil	0554-95-2024	Toluene	0.0009	n/a	mg/kg	J
54-9216	1634	5–15	Soil	0554-95-2024	Gross alpha radiation	5.13	0.33	pCi/g	None
54-9216	1634	5–15	Soil	0554-95-2024	Gross beta radiation	2.99	0.25	pCi/g	None

[a] n/a = not applicable.

[b] J = result should be regarded as estimated.

3.0 BASIS FOR CLEANUP LEVELS

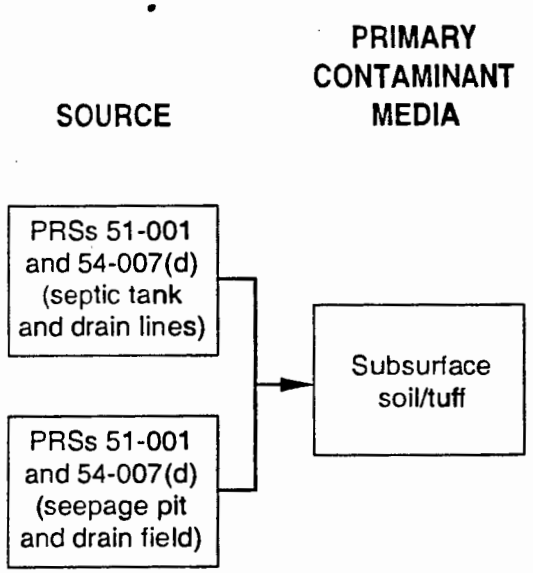
The basis for cleanup levels will be determined by the results of the human health risk screens, human health risk assessments, ecological risk assessments (ERAs), and/or, in some cases, by statute or regulatory mandate. Cleanup levels for each PRS that are protective of human health will be based on EPA Region VI industrial PRGs. The COPCs will be identified in the screening assessment for human health, and cleanup levels will be developed for each COPC. Cleanup levels protective of ecological receptors and the ecosystems they represent will be derived using information from the ecological scoping process, which identifies chemicals of potential ecological concern and potential complete exposure pathways, and an ERA, if warranted. The scoping process and the screening ERA will be prepared in accordance with ERA guidance developed specifically for the Laboratory (Kelly et al. 1998, 57916).

The ER Project is committed to working closely with DOE and New Mexico Environment Department (NMED) staff, if required, during preparation of the VCA plan and completion report to confirm future land-use scenarios and determine corresponding cleanup levels.

4.0 PROPOSED CORRECTIVE ACTION

4.1 Conceptual Model

The conceptual model (Figure 4.1-1) for PRSs 51-001 and 54-007(d) specifies subsurface soil as the primary potential contaminated media. These septic systems were gravity driven and not under pressure. Therefore, soil overlying the septic tanks and drain lines is not expected to be contaminated. The potential release mechanisms would be porous joints in drain lines, slotted PVC lines used to construct the drain field and spread tank liquids to the subsurface, and aggregate rock used to spread tank liquids at the bottom of the seepage pit. The analytical data from characterization of liquids and sludges remaining in the septic tanks would be representative of the subsurface soil beneath the septic tanks, drain lines, drain field, and seepage pit.



F4.1-1 / TA-51/54 VCA PLAN / 080800 / PTM

Figure 4.1-1. Conceptual model of contaminant transport at PRSs 51-001 and 54-007(d)

Samples were collected at PRS 54-007(d) in 1995 on the south side of the drain field at a 5-ft depth (1 ft below the depth of drain field). To determine nature and extent of contamination, samples will be collected during September 2000 on the north side of the drain field at a 5-ft depth. In 1995, samples were collected at PRS 51-001 directly beneath the seepage pit. To determine nature and extent of contamination, two downgradient boreholes will be advanced to a 60-ft depth (one the northeast side and one on the northwest side of the seepage pit) in September 2000. Core samples will be field screened and samples collected at approximately 40-ft and 60-ft depth.

Possible pathways from subsurface releases to potential human receptors would be complete only if contaminated soil or tuff was excavated and brought to the surface. The potential pathways would be

similar to those of a surface soil release, i.e., dermal contact, inhalation of fugitive dust, and incidental ingestion of soil. Downward migration of contaminants in the vadose zone would be limited by a lack of hydrostatic pressure, and the lack of saturated conditions in the area would restrict both horizontal and vertical migration. Therefore, a complete pathway to the regional aquifer, which is located approximately 1000 ft below the PRS structures, is unlikely. In addition, there are no seeps or springs nearby that would indicate the presence of perched alluvial aquifers.

For PRS 51-001, there is no complete exposure pathway. For 54-007(d), the only complete exposure pathway is root uptake from the drain field. The ecological conceptual site model for PRSs 51-001 and 54-007(d) and the associated rationale are presented in Part C of the ecological scoping checklists (Appendix D).

4.2 Sampling

There will be two sampling events. First, sampling was conducted in July 2000 to complete the characterization of waste remaining in the septic tanks. Second, sampling will be conducted to determine the nature and extent of contamination adjacent to the PRS 51-001 seepage pit and the PRS 54-007(d) drain field. Field screening will be performed to ensure worker health and safety, to comply with Laboratory waste minimization policies, and to guide selection of possible soil-sampling locations. An organic vapor monitor will be used to screen soil for volatile organic vapors, and an alpha probe and a beta/gamma probe will be used to screen soil and possible waste for ionizing radiation. A combustible gas indicator will be used to screen any excavation areas and septic tanks for flammable gases. The site safety officer will calibrate and check all field-screening instruments, as required.

4.2.1 Sampling of Septic Tanks

Samples were collected through each septic tank's sampling port. Liquid samples were collected from PRS 54-007(d) at two levels (0–2 ft, 2–4 ft) and were composited. The level of liquid remaining in PRS 51-001 was 3 in.; therefore, only one sample was collected. Sludge (semisolid) found at the bottom of each of the septic tanks was scraped with an implement to gather a representative sample. All samples collected from the septic tanks were sent to an off-site fixed laboratory. A full suite analysis will be performed; it will include pesticides/PCBs, TAL/TCLP metals (liquids/sludges), VOCs, SVOCs, soil pH, and radionuclides (gamma-emitting radionuclides by gamma spectrometry, tritium, isotopic plutonium, and isotopic uranium). Data will be used to determine the proper disposal route for liquids and sludges and the analytes for the confirmatory sampling of the seepage pit and drain field.

4.2.2 Sampling of Seepage Pit – PRS 51-001

Two subsurface samples will be collected from each of the boreholes (one approximately 5 ft northwest and one approximately 5 ft northeast of the seepage pit) at PRS 51-001; an auger rig will be used to collect samples at 40 ft and 60 ft to supplement the 1995 RFI data. All samples will be sent to an off-site fixed laboratory and analyzed. The types of analyses to be performed on these samples will be based on the analytical results from the septic tank sampling.

4.2.3 Sampling of Drain Field – PRS 54-007(d)

Three hand auger holes will be advanced on the south side of the drain field at PRS 54-007(d) to a depth of approximately 5 ft (a foot below the drain field). A 1-ft interval of core will be screened, and a minimum of four samples will be collected to supplement the 1995 data from samples collected on the north side of the drain field. All samples will be sent to an off-site fixed laboratory and analyzed. The types of analyses to be performed on these samples will be based on the analytical results from the septic tank samples.

4.3 Cleanup Activities

Results from sampling conducted during this investigation will determine the extent of cleanup activities. If data for septic tank sampling indicate that the liquids and sludges are sanitary waste, the liquids and sludges will be removed, and the septic tanks will be closed in place, cleaned, and filled with gravel according to 20NMAC7.3, "Abandoned Sewers and On-Site Liquid Waste Management Systems." If data indicate the liquids and sludges contain low-level radioactively contaminated, hazardous, or mixed waste, the liquids and sludges will be removed and placed in appropriate containers. The septic tanks will be steam cleaned if the waste is hazardous or mixed and transported off site and disposed of at a proper waste management facility. The final cleanup activities and the derivation of the cleanup levels will be described in detail in the VCA completion report for PRSs 51-001 and 54-007(d). Confirmatory sampling is discussed in Section 5, and waste management is discussed in detail in Section 6.

All cleanup activities will be conducted according to this VCA plan, the site-specific health and safety plan, and the Waste Characterization Strategy form.

4.4 Contingency Plan

Based on review of the conceptual model and the 1995 sampling data, it does not appear that potential COPCs in soil adjacent to and below the septic tanks, drain field, and seepage pit exceed human or ecological risk criteria. However, if waste characterization data indicate the liquids and sludges remaining in the septic tanks are hazardous, low-level, or mixed waste, the tanks will be removed, and confirmation samples will be collected from each tank excavation. If confirmatory sampling data indicate an unacceptable level of risk, the associated soils will be removed.

If analytical results for the confirmatory sampling (Section 5) indicate soil contamination adjacent to and/or under septic tanks and drain lines, seepage pit, and drain field that poses an unacceptable risk to human health and the environment, cleanup levels will be derived, and the soil will be excavated and loaded directly into the appropriate waste container. Contaminated soil will be disposed of at the proper waste management facility. If analytical results indicate no contamination, the soil from the excavation of the septic tanks will be placed back in the trench.

4.5 Site Restoration

Before VCA activities begin, photographs, field sketches, and/or video documentation will be prepared to record the conditions of the sites. After completion of activities, the site will be restored to preinvestigation contours and seeded with a mix of native grasses recommended by ESH-20. Stormwater best management practices will be installed, as needed, during and after completion of activities and will be inspected and maintained in accordance with ER requirements.

5.0 CONFIRMATORY SAMPLING

If analytical results from septic tank sampling indicate contamination is present, the septic tanks will be excavated, and confirmatory samples will be collected. All trench floors will be field examined during excavation. Field instrument readings and field observations of pre-existing breaks in the drain lines and septic tank, fractured areas in the underlying tuff, and areas of soil discoloration will be used to identify areas of possible contamination. Identified areas will be sampled at two depths from the bottom of the excavation (0–12 in. and 12–24 in.). These two depths have been chosen to confirm if contamination is present on the trench floor and to ascertain the extent of any contamination. If no areas of possible contamination are noted, soil samples will be collected at each end and in the middle of drain lines and

from the imprints of the septic tanks. The sampling locations will be moved to a nearby fracture within the tuff if one is evident. Table 5.0-1 identifies the depths and descriptions of samples proposed to be collected beneath the septic system drain lines and tanks. All samples will be sent to an off-site fixed laboratory for analysis. Types of analyses to be performed on these samples will be based on the analytical results from the septic tank samples.

Table 5.0-1
Confirmatory Sample Depths and Descriptions

Depth (in.)	Description
0–12	Collected from the south end of the imprint of the excavated tank beneath the connection to the inlet pipe, media may be fill or tuff
12–24	Collected from the south end of the imprint of the excavated tank beneath the connection to the inlet pipe, media may be fill or tuff
0–12	Collected from the media immediately below excavated inlet pipe, approximately half way between septic tank location and new SWCS manhole
12–24	Collected from the media immediately below excavated inlet pipe, approximately half way between septic tank location and new SWCS manhole
0–12	Collected from the center of the imprint of the excavated tank, media may be fill or tuff
12–24	Collected from the center of the imprint of the excavated tank, media may be fill or tuff
0–12	Collected from the north end of the imprint of the excavated tank beneath the connection to the outlet pipe, media may be fill or tuff
12–24	Collected from the north end of the imprint of the excavated tank beneath the connection to the outlet pipe, media may be fill or tuff

6.0 WASTE MANAGEMENT

6.1 Estimated Types and Volumes of Waste

Five separate waste streams are anticipated from this VCA. The waste streams, expected waste types, and volumes are summarized in Table 6.1-1. Waste stream descriptions, including the principal components of the waste and any uncertainties in volume calculations, are described in the paragraphs that follow.

Table 6.1-1
Waste Streams, Types, and Volumes at PRSs 51-001 and 54-007(d)

Waste Stream	Waste Type	Anticipated Volume
Concrete and other debris	Solid, potentially low-level waste	3 yd^3
Tank contents	Solid/sludge (semisolid), potentially low-level waste	1400 gal.
Contaminated soil	Solid, potentially low-level waste	10 yd^3
Decontamination water	Liquid, potentially low-level waste	55 gal.
Plastics, personal protective equipment (PPE), sampling waste	Solid, potentially low-level waste	2 yd^3

Concrete and Other Debris. This waste stream includes the septic tanks and possibly the VCP drain lines. The volume calculation assumes that the concrete will be broken up. The results of analyses on the tank contents will determine whether the septic tanks are removed or closed in place. This waste stream could range from nonradioactive/nonhazardous to either low-level waste or mixed low-level waste depending on the outcome of waste characterization results.

Tank Contents. A trash pump will be used to remove the liquids and sludge in the tanks. Characterization of the waste will be determined by direct sampling of the tank contents. Wastewater generated from steam cleaning of the tanks, if appropriate, will be handled in the same manner as the tank contents.

Contaminated Soil. This waste stream could contain radioactively contaminated soils that are excavated below the septic tanks and the drain lines of the septic tanks and soils below and around the seepage pit and drain field. This waste stream could range from nonradioactive/nonhazardous to either low-level waste or mixed low-level waste depending on the waste characterization results. The quantity estimates for this waste stream are based on 10% of the volume of the soil beneath/around the septic tanks. An additional 2 yd^3 is estimated as originating beneath the drain lines along the entire length of the drain lines. Resulting soil volumes were increased by 20% to account for volume expansion. There is considerable uncertainty in these quantity estimates because of the potential for encountering unexpected conditions in the field.

Decontamination Water. This waste stream consists of solutions generated from the on-site decontamination of tools. The anticipated volume of decontamination water is based on a minimum amount of wet decontamination; it is expected that the majority of decontamination will be performed with dry techniques. Decontamination solutions will be sampled to demonstrate compliance with waste acceptance criteria at the TA-50 Radioactive Liquid Waste Treatment Facility.

Plastics, PPE, and Sampling Wastes. This waste stream will include various types of plastic sheeting (e.g., tarps and contamination control covers), disposable gloves, and sampling supplies such as plastic scoops, plastic bags, jars, and dry decontamination waste. Plastics, PPE, and sampling-related wastes have the potential to become contaminated through direct contact with contaminated environmental media and debris. Characterization of this waste will be determined from the contamination levels found in the soil and septic tank liquid and sludge waste streams.

6.2 Method of Management and Disposal

This section describes the planned methods of managing the waste from the time of generation to final disposal.

Concrete and Other Debris. If the liquids and sludges in the septic tank are hazardous or mixed waste, the septic tanks will be steam cleaned, sampled, and broken up. The concrete debris will be loaded into an appropriate roll-off container. Composite samples of the concrete will be collected and sent to a fixed laboratory for analysis. Disposal site requirements will be determined after analytical results from the concrete have been evaluated.

Tank Contents. The liquids, sludges, and steam-cleaning liquids (if generated) will be placed into appropriate containers, based on the analytes identified during the waste characterization sampling. It is anticipated that the waste will be characterized as liquid low-level waste and transported for disposal at the TA-50 Radioactive Liquid Waste Treatment Facility. If the liquids are characterized as hazardous waste, i.e., mixed low-level waste, then the option of off-site shipment to a licensed mixed-waste disposal facility will be evaluated.

Contaminated Soil. Potentially contaminated soils will be placed on plastic sheeting bermed to prevent runoff and run-on and covered until analytical results are received. Soil with contaminant concentrations that are below the sites' cleanup levels will be returned to the excavation. Soils with concentrations above cleanup levels will be packaged in 55-gal. drums or roll-off containers depending on the final volume of the waste stream. Final disposal of contaminated soils is expected to be at TA-54, Area G, provided it is low-level waste. If the soils are characterized as hazardous waste, i.e., mixed low-level waste, then the option of off-site shipment to a licensed mixed-waste disposal facility will be evaluated.

Decontamination Water. Decontamination solutions will be collected daily in 55-gal. steel or poly (bung-type) drums approved by the US Department of Transportation. It is possible that one 55-gal. drum for decontamination solutions will be sufficient to complete this VCA. Wet decontamination will only be used if it is determined that the dry decontamination is insufficient to clean the equipment fully. Drums containing liquids will be stored in secondary containment. Liquid waste samples will be collected for characterization. Radioactively contaminated liquids will be transported to the TA-50 Radioactive Liquid Waste Treatment Facility for disposal. Sanitary liquids will be disposed of in the sanitary sewer system.

Plastics, PPE, and Sampling Wastes. Plastics, PPE, and miscellaneous sampling wastes will be collected in lined, 55-gal. drums and stored in a segregated low-level waste storage area. If feasible, the large plastic liners and tarps may be surveyed for release as nonradioactive material. The drums will be transported to TA-54, Area G, for disposal.

7.0 PROPOSED SCHEDULE AND UNCERTAINTIES

The field work portion of this VCA is expected to begin during September 2000 and will end in November 2000 (Table 7.0-1). Collection of the septic tank samples occurred in July 2000. Waste characterization results for the septic tank liquid and sludge samples will be reported by the end of August 2000. Six working days are allotted for a site readiness review, training, and mobilizing. Thirteen working days are allotted for excavations and confirmatory sampling of the site. Thirty working days have been allotted for all waste sampling, analysis, disposition, and disposal. This schedule should be achievable if laboratory analyses and waste disposition decisions can be completed in a timely fashion and if a proper waste disposal facility can be confirmed. Five working days have been allotted for site restoration activities. If excavation is needed to clean up the seepage pit or drain field portion of the septic, more restoration will be needed. If site restoration is more extensive than straw bale erosion controls, backfilling, and grading and reseeding of the site, a longer period of time may be needed. The VCA completion report will be prepared in Fiscal Year 2001.

Table 7.0-1
VCA Field Work Schedule

Activity	Work Day Duration	Start	Finish
Readiness review/preparation	6 days	September 5	September 12
Review of characterization data	2 days	August 22	August 23
Excavation and confirmatory sampling	13 days	September 13	September 29
Laboratory analysis	25 days	October 2	November 3
Waste management/disposal	30 days	October 9	November 17
Site restoration	5 days	November 20	November 28
Overall	59 days	September 5	November 28

8.0 REFERENCES

The following list includes all references cited in this document. Parenthetical information following each reference provides the author, publication date, and the ER ID number. This information also is included in the citations in the text. ER ID numbers are assigned by the Laboratory's ER Project to track records associated with the Project. These numbers can be used to locate copies of the actual documents at the ER Project's Records Processing Facility and in the ER Project reference library titled "Reference Set for Material Disposal Areas, Technical Area 54."

Copies of the reference library are maintained at NMED-HRMB; the DOE Los Alamos Area Office; United States EPA, Region VI; and the ER Project MDAs Focus Area. This library is a living collection of documents that was developed to ensure that the administrative authority (AA) has all the necessary material to review the decisions and actions proposed in this document. However, documents previously submitted to the AA are not included in the reference library.

DOE (US Department of Energy), October 1987. "Phase I: Installation Assessment, Los Alamos National Laboratory," Volumes 1 and 2, (draft), Comprehensive Environmental Assessment and Response Program, Albuquerque Operations Office, Albuquerque, New Mexico. (DOE 1987, 8663 and 8664)

EPA (US Environmental Protection Agency), April 10, 1990. Module VIII of RCRA Permit No. NM0890010515, EPA Region VI, issued to Los Alamos National Laboratory, Los Alamos, New Mexico, effective May 23, 1990, EPA Region VI, Hazardous Waste Management Division, Dallas, Texas. (EPA 1990, 1585)

Kelly, E., G. Gonzales, and L. Soholt, May 1, 1998. "Screening Level Ecological Risk Assessment Approach for the Environmental Restoration Project at Los Alamos National Laboratory." Los Alamos National Laboratory report LA-UR-98-1822, Los Alamos, New Mexico." (Kelly et al. 1998, 57916)

LANL (Los Alamos National Laboratory), August 31, 1983. "Environmental Science Laboratory, Civil: Sections and Details, Bldg. Ref. 12 TA-51" Engineering Drawing ENG-C44263, Sheet 4 of 27, Los Alamos, New Mexico. (LANL 1983, 66410)

LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1148," Los Alamos National Laboratory report LA-UR-92-855, Los Alamos, New Mexico. (LANL 1992, 7669)

Appendix A

List of Acronyms and Glossary

A-1.0 ACRONYMS

bgs	below ground surface
BMP	best management practice
COPC	chemical of potential concern
DOE	Department of Energy
EETF	Experimental Engineering Test Facility
EPA	Environmental Protection Agency
ER	environmental restoration
ERA	ecological risk assessment
HSWA	Hazardous and Solid Waste Amendments of 1984
Laboratory	Los Alamos National Laboratory
NFA	no further action
NMED	New Mexico Environment Department
OU	operable unit
PCB	polychlorinated biphenyl
PRG	preliminary remediation goal
PRS	potential release site
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
SVOC	semivolatile organic compound
SWSC	sanitary wastewater system consolidation
TA	technical area
VCA	voluntary corrective action
VCP	vitrified clay pipe
VOC	volatile organic compound

A-2.0 GLOSSARY

alpha radiation. Radiation composed of alpha particles emitted during the radioactive decay of certain nuclides. The least penetrating of the three common types of radiation (alpha, beta, and gamma), alpha radiation can be blocked easily (for example, by a sheet of paper or the outer layer of skin).

best management practices (BMPs). For facilities that manufacture, use, store, or discharge toxic or hazardous pollutants as defined by the 1977 Clean Water Act, a required program to control the

potential spill or release of those materials to surface waters. (The Facts on File Dictionary of Environmental Science, edited by L. Harold Stevenson and Bruce Wyman)

beta radiation. Radioactive transformation of a nuclide in which the nucleus emits a beta particle (electron or positron). Beta radiation can be blocked by an inch of wood or by a thin sheet of aluminum.

chemical of potential concern (COPC). A chemical, detected at a site, that has the potential to adversely affect human receptors due to its concentration, distribution, and mechanism of toxicity. A COPC remains a concern until exposure pathways and receptors are evaluated in a site-specific human health risk assessment.

chemical of potential ecological concern (COPEC). A chemical, detected at a site, that has the potential to adversely affect ecological receptors due to its concentration, distribution, and mechanism of toxicity.

cleanup levels. Media-specific contaminant concentration levels that must be met by a selected corrective action. Cleanup levels are established by using criteria such as protection of human health and the environment; compliance with regulatory requirements; reduction of toxicity, mobility, or volume through treatment; long- and short-term effectiveness; implementability; cost; and public acceptance.

gamma radiation. A form of electromagnetic, high-energy radiation emitted from a nucleus. Gamma rays are essentially the same as x-rays and require heavy shielding, such as concrete or steel, to be blocked.

hazardous waste. Any solid waste is generally a hazardous waste if it

- is not excluded from regulation as a hazardous waste,
- is listed in the regulations as a hazardous waste,
- exhibits any of the defined characteristics of hazardous waste (ignitability, corrosivity, reactivity, or toxicity), or
- is a mixture of solid waste and hazardous waste.

See 40 CFR 261.3 for a complete definition of hazardous waste.

mixed waste. Waste that contains both hazardous waste (as defined by RCRA) and radioactive waste (as defined by the Atomic Energy Act [AEA] and its amendments).

operable unit (OU). At the Laboratory, one of 24 areas originally established for administering the ER Project. Set up as groups of potential release sites, the OUs were aggregated based on geographic proximity for the purpose of planning and conducting RCRA facility assessments and RCRA facility investigations. As the project matured, it became apparent that 24 were too many to allow efficient communication and to ensure consistency in approach. Therefore, in 1994, the 24 OUs were reduced to six administrative "field units."

perched groundwater. Groundwater that lies above the regional water table and is separated from it by one or more unsaturated zones.

potential release site (PRS). Refers to potentially contaminated sites at the Laboratory that are identified either as solid waste management units (SWMUs) or areas of concern (AOCs). PRS refers to SWMUs and AOCs collectively.

preliminary remediation goal (PRG). Acceptable exposure levels, protective of human health and the environment, that are used as a risk-based tool for evaluating remedial alternatives.

regional aquifer. Geologic material(s) or unit(s) of regional extent whose saturated portion yields significant quantities of water to wells, contains the regional zone of saturation, and is characterized by the regional water table or potentiometric surface.

Resource Conservation and Recovery Act (RCRA). The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976. (40 CFR 270.2)

site conceptual model. A qualitative or quantitative description of sources of contamination, environmental transport pathways for contamination, and biota that may be impacted by contamination (called receptors) and whose relationships describe qualitatively or quantitatively the release of contamination from the sources, the movement of contamination along the pathways to the exposure points, and the uptake of contaminant by the receptors.

Appendix B

VCA Checklist and Field Work Authorization Form

Accelerated Corrective Action (ACA)
Checklist and Field Work Authorization Form

PRS Number: 54-007(d) ☐ HSWA ☒ Non-HSWA

Yes	No	
X		Fact sheet describing planned activities is complete and attached to checklist.
X		COPC(s) for human health risk (HH), ecological risk (ECO), or other requirements are known or will be determined during accelerated site characterization.
X		Nature and extent of contamination is defined or accelerated site characterization is planned as part of this action to define nature and extent and to guide cleanup.
X		Cleanup levels/preliminary remediation goals (PRGs) are appropriate.
X		Remedy is obvious.
X		Time for removal is less than six months.
X		Remedy is final.
X		Land use assumptions are straightforward.
X		Treatment, Storage, and Disposal (TSD) Facilities are available for waste type and volume.
X		Cleanup cost is reasonable for the planned action and meets accelerated decision logic criterion for decision to proceed with ACA.
	X	Briefing for NMED is required.

Explain criteria not checked above:

Los Alamos
Environmental Restoration Project

Accelerated Corrective Action (ACA)
Checklist and Field Work Authorization Form

PRS Number: _____ ☐ HSWA ☒ Non-HSWA

Upon reviewing the Accelerated Corrective Action Fact Sheet and the criteria checklist above, the appropriate Accelerated Corrective Action approach for the PRS(s) is (check one): ☐ VCA ☐ VCM

Signatures of the Representative for UC-Laboratory, DOE-LAAO, and NMED-HRMB:

UC: JOHN HOPKINS, FAPL, _____ 8/21/00
(Print Name and Title, then Sign) (Date)

DOE: _____ _____
(Print Name and Title, then Sign) (Date)

NMED: _____ _____
(Print Name and Title, then Sign) (Date)

The undersigned have reviewed the final plan and believe that it fully satisfies the appropriate Accelerated Corrective Action Approach.

Signatures of the Representative for UC-LANL and DOE-LAAO

UC: _____ _____
(Print Name and Title, then Sign) (Date)

DOE: _____ _____
(Print Name and Title, then Sign) (Date)

Action	Date	Correspondence ID
VCA or VCM plan submitted to NMED		
NOD or RSI received from NMED		
Laboratory response to NOD or RSI		
NMED approval of VCA or VCM plan		

After reviewing the VCA or VCM plan for the site(s) listed above and believing that the ACA process and VCA or VCM criteria have been met, I authorize the fieldwork to proceed.

DOE ER Program Manager _____ _____
(Signature) (Date)

Los Alamos
Environmental Restoration Project

Voluntary Corrective Action Fact Sheet for Potential Release Site 54-007(d)
Removal of Sludge, Closure of Septic System, and Characterization of Drain Field

Site Ranking System: 32

Erosion Matrix Score: 23.3

Operational History

Potential Release Site (PRS) 54-007(d) is an inactive/abandoned septic system that served Buildings 1001, 1002, 1003, and 1004 in Technical Area (TA) 54, formerly buildings TA-51-1, -2, -3, and -7. PRS 54-007(d) is not listed in Module VIII of the Laboratory's Hazardous Waste Facility Permit (EPA 1990, 1585). The system was constructed in 1962 and consists of a 972-gal. reinforced concrete septic tank (TA-54-4) located north of building TA-54-1004, formerly building TA-51-7 (Figure 1). The 4-in. cast iron drain line from the septic tank connects to a reinforced concrete distribution box, which diverted the effluent to the east and west to a drain field of 4-in.-diameter drain tile running approximately 60 ft in both directions. The influent now flows to a new manhole, TA-54-151, constructed south of the septic tank, and the distribution box and drain field have been abandoned.

The Radiation Exposure Facility, located in the western part of TA-54, was in operation from 1962 to the mid-1970s. The facility was used for biomedical research on the exposure of animals to gamma radiation from sealed cobalt-60 sources. The radiation sources were removed from the facility when research was terminated. In 1992, when the Operable Unit (OU) 1148 work plan was being written, the facility was used for research on the exposure of animals to the oxides of nitrogen. The septic system was installed in 1962 to provide sanitary sewer service to Buildings TA-54-1001, -1002, -1003, and -1004 and was abandoned in 1993 when the sanitary sewer line was installed as part of the Laboratory's Sanitary Wastewater Systems Consolidation (SWSC) Program.

Previous Investigations and Chemicals of Potential Concern

The septic system was investigated during the 1995 Resource Conservation and Recovery Act facility investigation (RFI) in accordance with the OU 1148 RFI Work Plan (LANL 1992, 7669). However, the nature and extent of potential contamination were not determined, and the data have not been assessed or presented in an RFI report. As part of this effort, the contents of the septic tank were sampled and analyzed. Subsurface soils adjacent to the discharge line and drain field were also sampled and analyzed. Previous sample locations are shown in Figure 2. The analytical suite for the sludge and soil samples included gross alpha, beta, and gamma; pesticides/polychlorinated biphenyls; volatile organic compounds (VOCs); semivolatile organic compounds; and total metals.

Based on the analytical results and data assessment, the chemicals of potential concern (COPCs) identified were low concentrations of three VOCs in the septic tank sludge and soils in the vicinity of the drain field. The RFI data were insufficient to determine if radionuclides are present above background levels; therefore, radionuclides remain as COPCs.

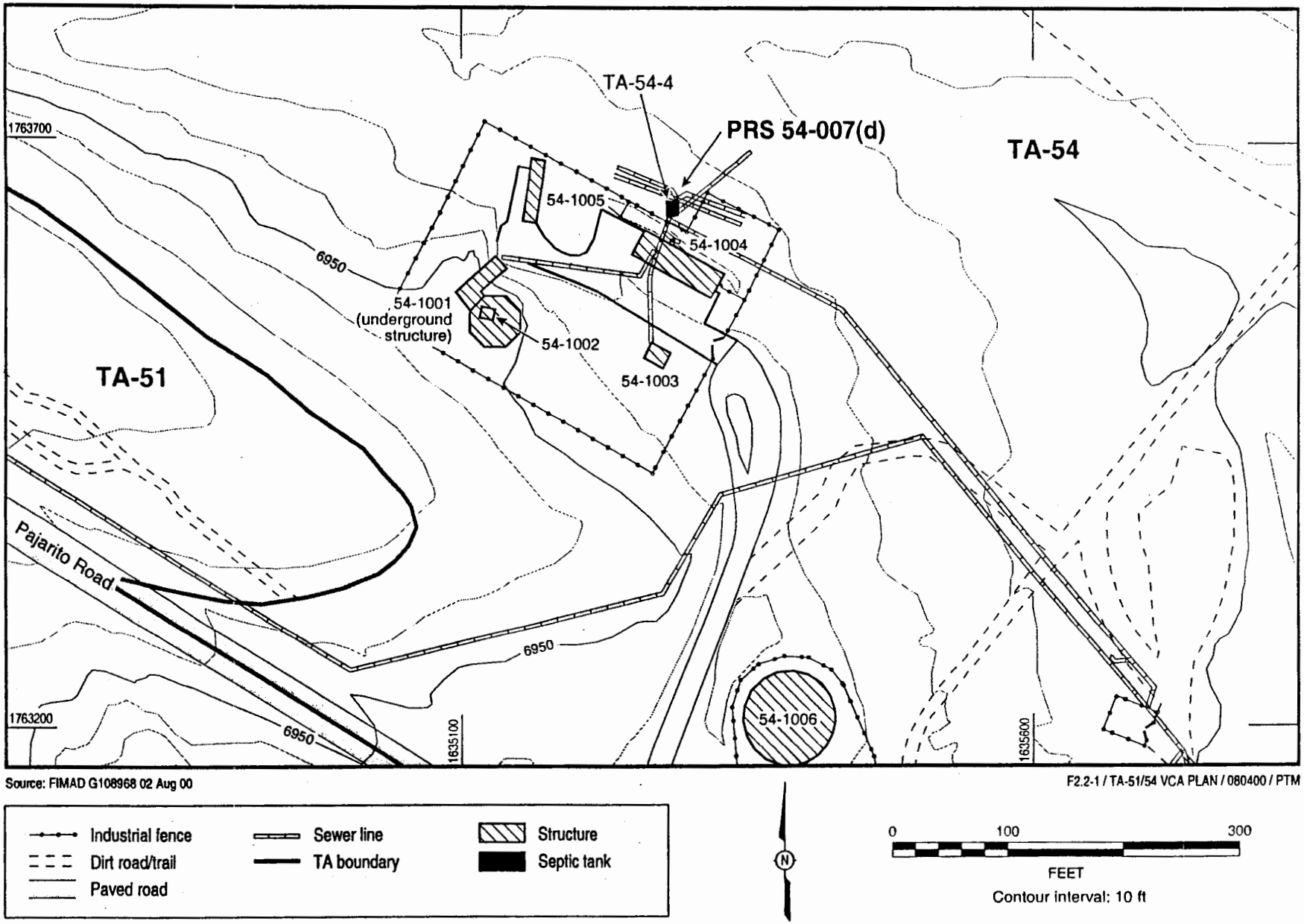
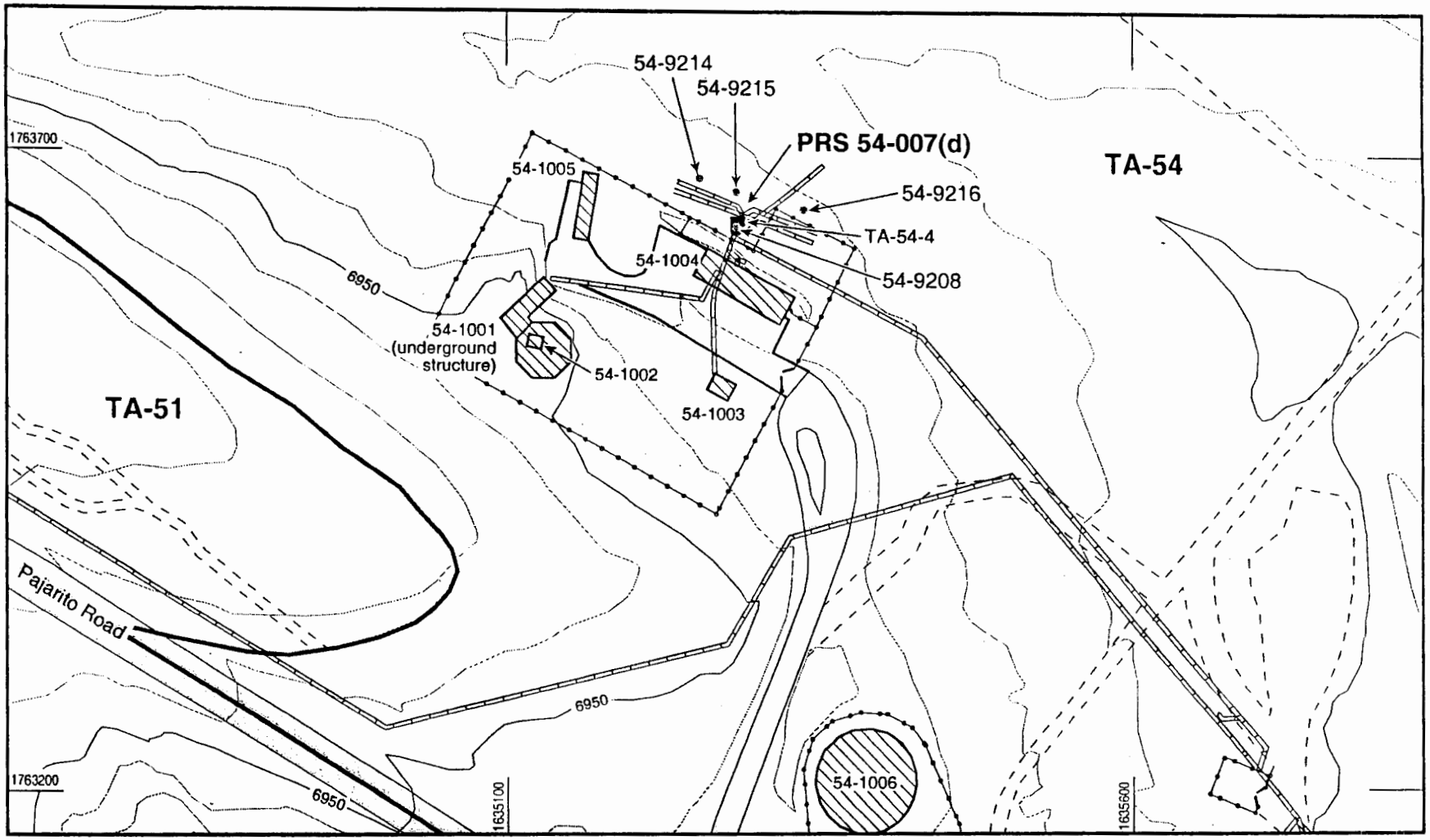


Figure 1. Location of PRS 54-007(d), septic system



Source: FIMAD G108970 02 Aug 00

F2.2-2 / TA-51/54 VCA PLAN / 080400 / PTM

Industrial fence
Dirt road/trail
Paved road
Sewer line
TA boundary
Sample location
Structure
Septic tank

N

0 100 300
FEET
Contour interval: 10 ft

Figure 2. Sample locations for the 1995 RFI at PRS 54-007(d)

VCA Rationale

The septic system identified as PRS 54-007(d) is located on Department of Energy property that will remain under institutional control for the foreseeable future. It is an ER Project best management practice to properly manage inactive/abandoned septic systems in accordance with applicable regulatory requirements and thereby mitigate potential environmental issues that may remain if the systems are not addressed, regardless of RFI results. The septic system is located on the mesa top near the canyon edge; sludge remains in the tank. Therefore, as a final and obvious remedy, the system will either be closed in place in accordance with 20NMAC7.3, "Abandoned Sewers and On-Site Liquid Waste Management Systems," or if contaminated, the tank will be removed, drain lines plugged, and the area around the drain lines and drain field characterized and remediated, if necessary, to levels protective of the pathways for exposure to humans or the ecosystem.

VCA Implementation

The corrective action will involve removal of sludge and liquid remaining in the septic tank. The level of corrective action required for this septic tank will be driven by waste characterization results from the sludge remaining in the tank. If the sludge is determined to be sanitary waste, it will be discharged to the Laboratory's SWSC. The septic tank will subsequently be closed in place and filled with gravel or another inert material and the drain lines cut, plugged, and/or capped in accordance with the Uniform Plumbing Code and Title 20 of the New Mexico Administrative Code, Chapter 7, "Wastewater and Water Supply Facilities," Part 3, "Liquid Waste Disposal" (20NMAC 7.3).

If data indicate the sludge remaining in the tank is determined to be low-level waste (LLW), hazardous waste, or mixed waste, it will be removed and placed into appropriate containers for subsequent transport and disposal through TA-54. The septic tank will be steam cleaned, if found to contain hazardous or mixed waste, broken up, sampled, and disposed of through TA-54. Samples will be collected from the tank excavation to determine if there was a release. To supplement the RFI, additional soil sampling surrounding the drain lines and drain field will be conducted to ensure that the nature and extent of any potential contamination is determined. Human health and ecological screening risk assessments will be conducted on analytical data from any tank excavation and characterization of the drain lines and drain field to determine if additional excavation of soil is required based on EPA Region VI Industrial preliminary remediation goals.

Site restoration will consist of filling the excavation, if the septic tank is removed; recontouring disturbed areas to be consistent with natural surroundings; replacing topsoil on the recontoured areas, as required; to re-establish vegetation; and reseeding recontoured areas with native vegetation.

Anticipated Waste Types and Volumes

Five separate waste streams are anticipated from this VCA as presented Table 1. Wastewater from steam cleaning the tank and waste associated with the removal of any drain lines or the septic tank itself would only be generated if waste characterization samples indicate the presence of LLW, hazardous waste, or mixed waste.

Table 1
Anticipated Waste Streams

Waste Stream	Waste Type	Anticipated Volume
Concrete and other debris	Solid, potentially LLW[a]	1.5 yd^3
Septic tank sludge, water layer, and wastewater from steam cleaning of tank	Solid, potentially LLW	800 gal.
Contaminated soil	Solid, potentially LLW	5 yd^3
Decontamination water	Liquid, potentially LLW	25 gal.
PPE[b], plastic sheeting, disposable sampling equipment, and soil samples from seepage pit and tank excavation	Solid, potentially LLW	1 yd^3

[a] LLW = low-level waste.

[b] PPE = personal protective equipment.

Estimated Cost

If waste characterization results show that the sludge can be handled as sanitary waste, the cost of corrective activities including planning, sludge removal, tank closure in place, additional characterization sample collection and analysis around the drain field, waste characterization (PPE and samples only), management and disposal, site restoration, and report preparation (including data assessment) for PRS 54-007(d) is estimated to be $80,000. If waste characterization results show that the sludge is to be handled as hazardous waste, LLW, or mixed waste, the cost of corrective activities will include all activities listed above for sanitary waste in addition to tank cleaning and removal, confirmatory sample collection and analysis from the tank excavation, and possible investigation and/or removal of the drain lines bringing the estimated cost to approximately $140,000. A contingency plan will be included in the VCA plan for the possible remediation of the drain lines and drain field if contaminant levels are determined to be present above acceptable levels.

Schedule

The field work portion of this VCA is expected to begin in late Fiscal Year 2000 or early Fiscal Year 2001 and take approximately three months for removal of the septic tank, cutting and plugging of the drain lines, characterization and confirmatory sample collection and analysis, waste management, and site restoration.

Bibliography

AEC (Atomic Energy Commission), April 5, 1973. "Animal Holding Facility, TA-51, Site Utilities" AEC Drawing LA-MM-C3, Sheet 3, Engineering Drawing C-42677, Los Alamos, New Mexico. (AEC 1973, 66650)

EPA (US Environmental Protection Agency), April 10, 1990. Module VIII of RCRA Permit No. NM0890010515, EPA Region VI, issued to Los Alamos National Laboratory, Los Alamos, New Mexico, effective May 23, 1990, EPA Region VI, Hazardous Waste Management Division, Dallas, Texas. (EPA 1990, 1585)

LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1148," Los Alamos National Laboratory report LA-UR-92-855, Los Alamos, New Mexico. (LANL 1992, 7669)

LANL (Los Alamos National Laboratory), October 22, 1993. "TA-54 Forcemain" Engineering Drawing C-45887, Sheet 31 of 166, Los Alamos, New Mexico. (LANL 1993, 66713)

LANL (Los Alamos National Laboratory), October 22, 1993. "TA-54 Line" Engineering Drawing C-45887, Sheet 32 of 166, Los Alamos, New Mexico. (LANL 1993, 66712)

Accelerated Corrective Action (ACA)
Checklist and Field Work Authorization Form

PRS Number: PRS 51-001 ☐ HSWA ☒ Non-HSWA

Yes	No	
X		Fact sheet describing planned activities is complete and attached to checklist.
X		COPC(s) for human health risk (HH), ecological risk (ECO), or other requirements are known or will be determined during accelerated site characterization.
X		Nature and extent of contamination is defined or accelerated site characterization is planned as part of this action to define nature and extent and to guide cleanup.
X		Cleanup levels/preliminary remediation goals (PRGs) are appropriate.
X		Remedy is obvious.
X		Time for removal is less than six months.
X		Remedy is final.
X		Land use assumptions are straightforward.
X		Treatment, Storage, and Disposal (TSD) Facilities are available for waste type and volume.
X		Cleanup cost is reasonable for the planned action and meets accelerated decision logic criterion for decision to proceed with ACA.
	X	Briefing for NMED is required.

Explain criteria not checked above:

Los Alamos
Environmental Restoration Project

Accelerated Corrective Action (ACA)
Checklist and Field Work Authorization Form

PRS Number: _____ ☐ HSWA ☒ Non-HSWA

Upon reviewing the Accelerated Corrective Action Fact Sheet and the criteria checklist above, the appropriate Accelerated Corrective Action approach for the PRS(s) is (check one): ☐ VCA ☐ VCM

Signatures of the Representative for UC-Laboratory, DOE-LAAO, and NMED-HRMB:

UC: JOHN HOPKINS, FAPL, [signature] 8/21/00
(Print Name and Title, then Sign) (Date)

DOE: _____ _____
(Print Name and Title, then Sign) (Date)

NMED: _____ _____
(Print Name and Title, then Sign) (Date)

The undersigned have reviewed the final plan and believe that it fully satisfies the appropriate Accelerated Corrective Action Approach.

Signatures of the Representative for UC-LANL and DOE-LAAO

UC: _____ _____
(Print Name and Title, then Sign) (Date)

DOE: _____ _____
(Print Name and Title, then Sign) (Date)

Action	Date	Correspondence ID
VCA or VCM plan submitted to NMED		
NOD or RSI received from NMED		
Laboratory response to NOD or RSI		
NMED approval of VCA or VCM plan		

After reviewing the VCA or VCM plan for the site(s) listed above and believing that the ACA process and VCA or VCM criteria have been met, I authorize the fieldwork to proceed.

DOE ER Program Manager _____ _____
(Signature) (Date)

Los Alamos
Environmental Restoration Project

Voluntary Corrective Action Fact Sheet for Potential Release Site 51-001
Removal of Sludge, Closure of Septic System, and Characterization of Seepage Pit

Site Ranking System: 32

Erosion Matrix Score: 8.8

Operational History

Potential Release Site (PRS) 51-001 is an inactive/abandoned septic system that served buildings 11, 12, and 26 at Technical Area (TA) and is not listed in Module VIII of Los Alamos National Laboratory's (the Laboratory's) Hazardous Waste Facility Permit (EPA 1990, 1585). This PRS includes a 1000-gal. concrete septic tank (TA-51-03), drain lines, and a seepage pit (TA-51-31) (Figure 1). The seepage pit is 4 ft in diameter and 50 ft deep. The septic tank is connected to the seepage pit by a 4-in.-diameter vitrified clay pipe (VCP) buried in a trench that is 2 ft 6 in. deep. The VCP connects to a 4-in.-diameter perforated polyvinyl chloride (PVC) drop pipe that extends to within 2 ft of the bottom of the pit. The pit is backfilled with screened gravel to between 40 ft and 50 ft below ground surface (bgs).

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 (LANL 1992, 7669). The EETF was built in 1980, and support offices for staff were constructed in 1986. PRS 51-001 is a septic system that served the EETF. The septic system was installed in 1988 and was decommissioned in 1993 when the sanitary sewer line was installed as part of the Laboratory's Sanitary Wastewater Systems Consolidation (SWSC) Program. A greenhouse and laboratory occupied Building TA-51-12; the building was equipped with sinks and lavatories. Building TA-51-26 has housed offices since its construction in 1986. Building TA-51-11 housed the Environmental Science Laboratory.

Previous Investigations and Chemicals of Potential Concern

The septic system was investigated during the 1995 Resource Conservation and Recovery Act facility investigation (RFI) in accordance with the Operable Unit 1148 RFI work plan (LANL 1992, 7669). However, the nature and extent of potential contamination were not determined, and the data have not been assessed or presented in an RFI report. Previous sample locations are shown in Figure 2. The analytical suite for the sludge and soil samples included gross alpha, beta, and gamma; pesticides/PCBs; cyanide; volatile organic compounds (VOCs); semivolatile organic compounds; and total metals.

Based on the analytical results and data assessment, the chemicals of potential concern (COPCs) identified during the RFI were low concentrations of two VOCs in the septic tank sludge and a tuff sample collected beneath the seepage pit. The RFI data were insufficient to determine if radionuclides are present above background levels; therefore, radionuclides remain as COPCs.

VCA Rationale

The septic system identified as PRS 51-001 is located on Department of Energy property that will remain under institutional control for the foreseeable future. It is an Environmental Restoration Project best management practice to properly manage inactive/abandoned septic systems in accordance with applicable regulatory requirements and thereby mitigate potential environmental issues that may remain if the systems are not addressed, regardless of RFI results. The septic system is located on a mesa top near the canyon edge; sludge remains in the tank. Therefore, as a final and obvious remedy, the system will either be closed in place in accordance with 20NMAC7.3, "Abandoned Sewers and On-Site Liquid Waste Management Systems," or if contaminated, the tank will be removed, drain lines plugged, and the area around the drain lines and seepage pit characterized and remediated, if necessary, to levels protective of the pathways for exposure to humans or the ecosystem.

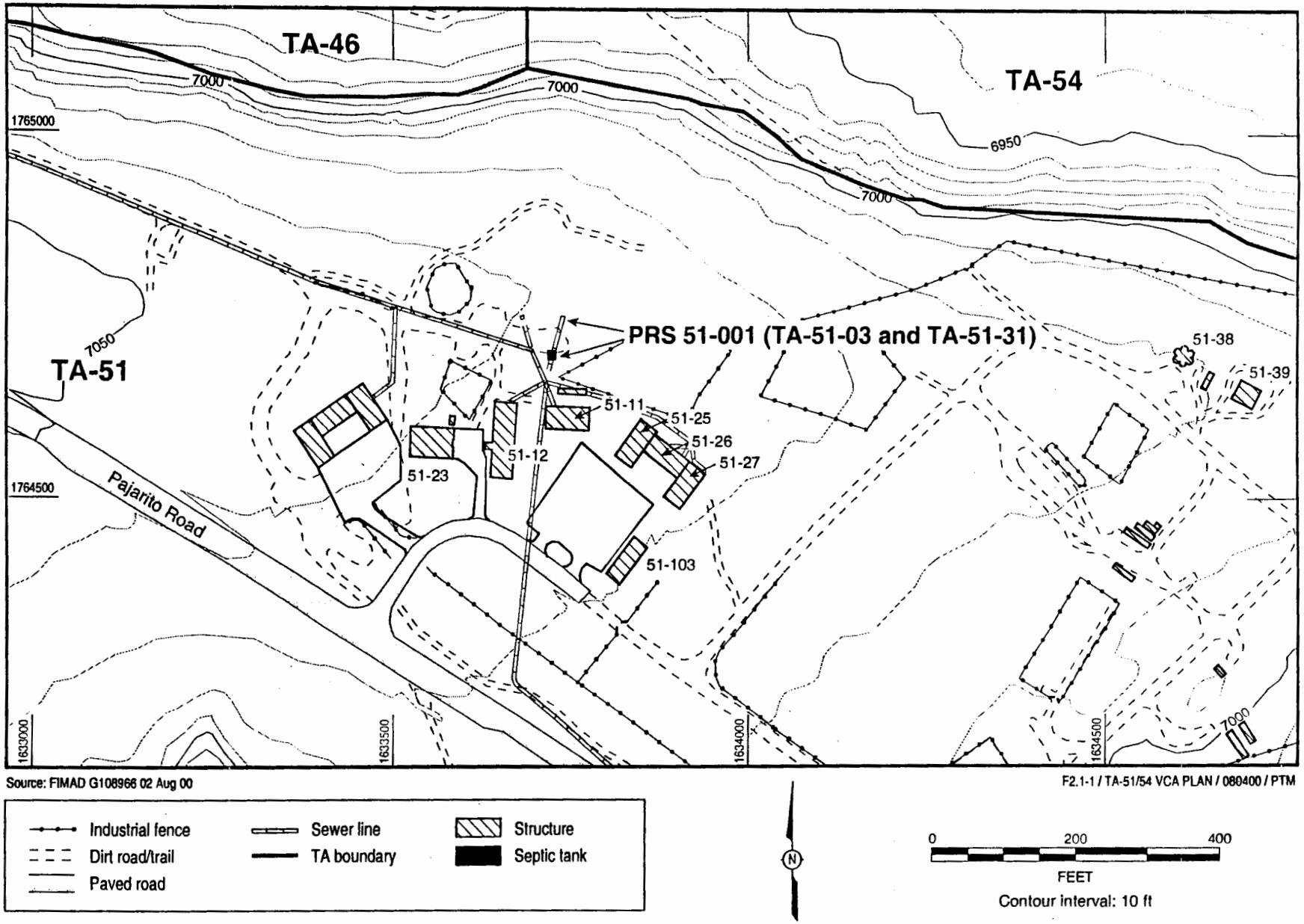
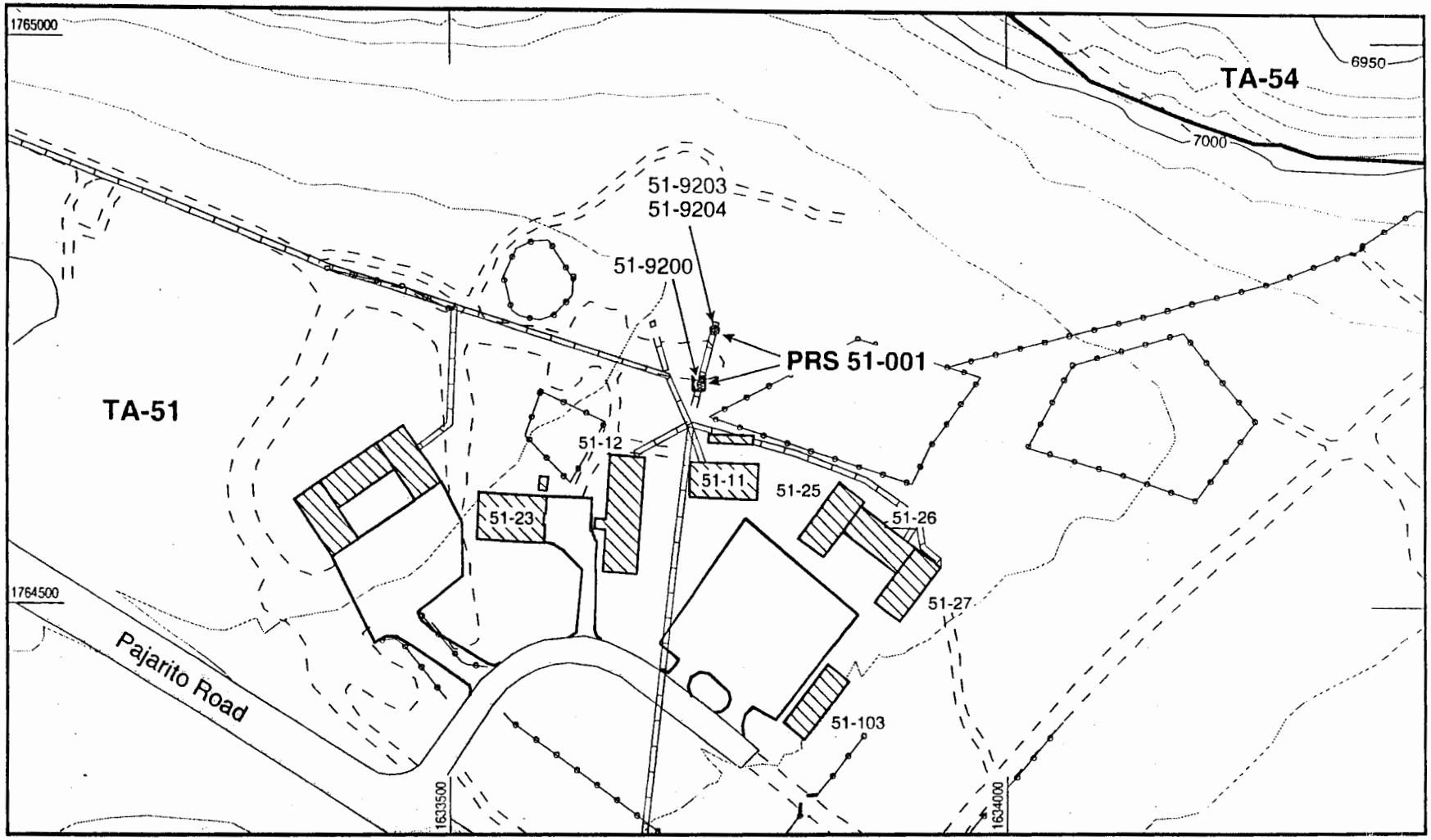


Figure 1. Location of PRS 51-001, septic system



Source: FIMAD G108969 02 Aug 00

F2.1-3 / TA-51/54 VCA PLAN / 080400 / PTM

Industrial fence
Dirt road/trail
Paved road
Sewer line
TA boundary
Sample location
Structure
Septic tank

N

0 100 300
FEET

Contour interval: 10 ft

Figure 2. Sample locations for the 1995 RFI at PRS 51-001

VCA Implementation

The corrective action will involve removal of sludge and liquid remaining in the septic tank. The level of corrective action required for this septic tank will be driven by waste characterization results from the sludge remaining in the tank. If the sludge is determined to be sanitary waste only, it will be discharged to the Laboratory's SWSC. The septic tank will subsequently be closed in place and filled with gravel or another inert material and the drain lines cut, plugged, and/or capped in accordance with the Uniform Plumbing Code and Title 20 of the New Mexico Administrative Code, Chapter 7, "Wastewater and Water Supply Facilities," Part 3, "Liquid Waste Disposal" (20NMAC 7.3).

If data indicate the sludge remaining in the tank is low-level, hazardous, or mixed waste, it will be removed and placed into appropriate containers for subsequent transport and disposal through TA-54. The septic tank will be steam cleaned, if found to contain hazardous or mixed waste, broken up, sampled, transported off site, and disposed of through TA-54. Samples will be collected from the tank excavation to determine if there was a release. To supplement the RFI, additional soil sampling under the drain lines and near the seepage pit will be conducted to ensure that the nature and extent of any potential contamination is determined. Human health and ecological screening risk assessments will be conducted on analytical data from any tank excavation and characterization of the drain lines and seepage pit to determine if additional excavation of soil is required.

Site restoration will consist of filling the excavation if the septic tank is removed; recontouring disturbed areas to be consistent with natural surroundings; replacing topsoil on the recontoured areas, as required; to re-establish vegetation; and reseeding recontoured areas with native vegetation.

Anticipated Waste Types and Volumes

Five separate waste streams are anticipated from this VCA, as presented in Table 1. Wastewater from steam cleaning the tank and waste associated with the removal of any drain lines or the septic tank itself would only be generated in the event waste characterization samples indicate the presence of low-level, hazardous, or mixed waste.

Table 1
Anticipated Waste Streams

Waste Stream	Waste Type	Anticipated Volume
Concrete and other debris	Solid, potentially LLW[a]	1.5 yd^3
Septic tank sludge, water, and wastewater from steam cleaning of tank	Solid, potentially LLW	500 gal.
Contaminated soil	Solid, potentially LLW	5 yd^3
Decontamination water	Liquid, potentially LLW	25 gal.
PPE[b], plastic sheeting, disposable sampling equipment, and soil samples from seepage pit and tank excavation	Solid, potentially LLW	1 yd^3

[a] LLW = low-level waste.

[b] PPE = personal protective equipment.

Estimated Cost

If waste characterization results show that the sludge can be handled as sanitary waste, the cost of corrective activities including planning, sludge removal, tank closure in place, additional characterization

sample collection and analysis around the seepage pit, waste characterization (PPE and samples only), management and disposal, site restoration, and report preparation (including data assessment) for PRS 51-001 is estimated to be $80,000. If waste characterization results show that sludge is to be handled as hazardous, LLW, or mixed waste, the cost of corrective activities will include all activities listed above for sanitary waste in addition to tank cleaning and removal, confirmatory sample collection and analysis from the tank excavation, and possible investigation and/or removal of the drain lines bringing the estimated cost to approximately $140,000.

A contingency plan will be included in the VCA plan for the possible remediation of the drain lines and/or seepage pit in the event contaminant levels are determined to be present above acceptable levels.

Schedule

The field work portion of this VCA is expected to begin in late Fiscal Year 2000 or early Fiscal Year 2001 and take approximately three months to complete. The fieldwork includes sludge removal, the possible steam cleaning and/or removal of the septic tank, cutting and plugging of the drain lines, confirmatory sample collection and analysis, waste management, and site restoration.

Bibliography

EPA (US Environmental Protection Agency), April 10, 1990. Module VIII of RCRA Permit No. NM0890010515, EPA Region VI, issued to Los Alamos National Laboratory, Los Alamos, New Mexico, effective May 23, 1990, EPA Region VI, Hazardous Waste Management Division, Dallas, Texas. (EPA 1990, 1585)

LANL (Los Alamos National Laboratory), June 30, 1983. "Structure Location Plan, TA-51 Radiation Exposure Facility," Engineering Drawing ENG-R 5128, Los Alamos, New Mexico. (LANL 1983, 66714)

LANL (Los Alamos National Laboratory), August 31, 1983. "Environmental Science Laboratory, Civil: Sections and Details, Bldg. Ref. 12 TA-51" Engineering Drawing ENG-C44263, Sheet 4 of 27, Los Alamos, New Mexico. (LANL 1983, 66410)

LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1148," Los Alamos National Laboratory report LA-UR-92-855, Los Alamos, New Mexico. (LANL 1992, 7669)

Appendix C

Standard Operating Procedure 2.01

Los Alamos National Laboratory

Environment, Safety & Health Division
ESH-18 Water Quality & Hydrology Group

Surface Water Assessment
Erosion Matrix for PRS 51-001

CRITERIA EVALUATED	Value	Erosion/Sediment Transport Potential: Low 0.1	Medium 0.5	High 1.0	Calculated Score
Site Setting (43)					
On mesa top	1	Defined based on topographic setting			1.0
Within bench of canyon	4				
Within the canyon floodplain but not watercourse	13				
Within bottom of canyon channel in watercourse	17				
Estimated % ground and canopy cover	13	>75%	25-75%	<25%	6.5
Slope	13	0-10%	10-30%	>30%	1.3
Surface Water Factors-Run-off (46)					
Visible evidence of runoff discharging? (Yes/No)	5	If no, score of 0 for runoff section.			0.0
		If yes, score 5 and proceed with section.			
Where does runoff terminate?	19	Other	Bench Setting	Drainage/Wetland	0.0
Has runoff caused visible erosion? (Yes/No)	22	Sheet	Rill	Gully	0.0
		If no, score as 0. If yes, calculate as appropriate.			
Surface Water Factors-Run-on (11)					
Structures adversely affecting run-on (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0.0
Current operations adversely impacting (Yes/No)	4	If yes, score as 4. If no, score as 0.			0.0
Natural drainages onto site (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0.0
**Select either structures or natural drainages.*					
MAX. POSSIBLE EROSION MATRIX SCORE:	**100**			**Total Score**	8.8

Report Printed 8/22/01 9:40:52 AM.

Los Alamos National Laboratory
SURFACE WATER
SITE ASSESSMENT

SITE INFORMATION

1a) PRS Number: 51-001 | 1b) Structure Number: 51-11 | 1c) FMU Number:

2. Date/Time (M/D/Y H:M am/pm): 5/5/00

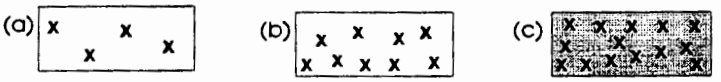
SITE SETTING (check all that apply)

3. (●) On mesa top (a). ( ) In the canyon floor, but not in an established channel (c)
   ( ) Within a bench of a canyon (b). ( ) Within established channel in the canyon floor (d).

Explanation: Septic system located behind (51-11).

4. Estimated ground and/or canopy cover at site: (deciduous leaves, pine needles, rocks, vegetation, trees,

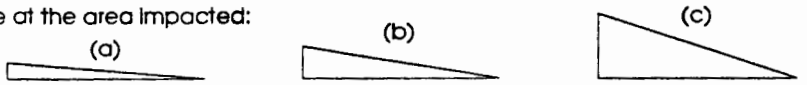
(Illustration)



Estimated % of ground/canopy cov ( ) 0% to 25% (●) 25% to 75% ( ) 75% to 100%

Explanation: Mixed grasses and soil.

5. Steepest slope at the area impacted:



(●) Less than 10% ( ) 10% to 30% ( ) 30% and greater

Explanation: Mostly flat with gentle slope toards the north.

RUNOFF FACTORS

Y / N

☐ ☑ **6. Is there visible evidence of runoff discharging from site? If yes, answer a) - c) below:**

☐ ☑ 6a) Is runoff channelized? If yes, describ ( ) Man-made channel. ( ) Natural channel.

Explanation: None observed.

This page is for ESH-18 notes, recommendations, and photos.

	Y	N	
12. a)	○	◉	Is there visible trash/debris on the site?
b)	○	◉	Is there visible trash/debris in a watercourse?

Description of existing BMPs:

○	○	Are BMPs being properly maintained? If no, describe in "Other Internal Notes."
○	○	Are BMPs effectively keeping sediment in place and reducing erosion potential?

OTHER INTERNAL NOTES:

RUNOFF FACTORS, CONT'D

6b) Where does evidence of runoff terminate?

- ○ **Drainage or wetland (name)** Canada del Buey
- ○ **Within bench of canyon setting (name)**
- ○ **Other (i.e., retention pond, meadow, mesa top)**

Explanation:

Y / N

☐ ☑ 6c) Has runoff caused visible erosion at the site? If yes, explain below: ○ Sheet ○ Rill ○ Gully

Explanation: None observed.

RUN-ON FACTORS

Please rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)

☐ ☑ **7.** Are structures (i.e., buildings, roof drains, parking lots, storm drains) creating run-on to the site?

Explanation: No structural impact.

☐ ☑ **8.** Are current operations (i.e., fire hydrants, NPDES outfalls) adversely impacting run-on to the site?

Explanation: No operational impact.

☐ ☑ **9.** Are natural drainage patterns directing stormwater onto site?

Explanation: No upslope drainage.

ASSESSMENT FINDING:

☐ ☑ **10. Based on the above criteria and the assessment of this site, does soil erosion potential exist? (REFER TO EROSION POTENTIAL MATRIX.)**

Veenis, Steve

11. Signature of Water Quality/Hydrology Representative

SV Initials of independent reviewer.

Check here when information is entered in database: ☑

Appendix D

Ecological Scoping Checklist

D-1.0 Ecological Scoping Checklist for Potential Release Site 51-001

Part A—Scoping Meeting Documentation

Site ID	PRS 51-001
Form of site releases (solid, liquid, vapor). Describe all relevant known or suspected mechanisms of release (spills, dumping, material disposal, outfall, explosive testing), and describe potential areas of release. Reference locations on a map as appropriate.	Liquid discharge to leach field; potential leakage from underground septic tank
List of Primary Impacted Media Indicate all that apply.	Surface soil – Surface water/sediment – Subsurface – Yes Groundwater – Other, explain –
FIMAD vegetation class based on Arcview vegetation coverage Indicate all that apply.	Water – Bare ground/unvegetated – Spruce/fir/aspen/mixed conifer – Ponderosa pine – Piñon juniper/juniper savannah – Grassland/shrubland – Developed – Yes
Is threatened and endangered (T&E) species habitat present? If applicable, list species known or suspected that use the site for breeding or foraging.	No
Provide a list, of neighboring/contiguous/ upgradient sites; include a brief summary of COPCs and the form of releases for relevant sites, and reference a map, as appropriate. Use this information to evaluate the need to aggregate sites for screening.	None
Surface Water Erosion Potential Information Summarize information from the standard operating procedure 2.01, including the runoff subscore (maximum of 46), terminal point of surface water transport, slope, and surface water run-on sources.	Not available
Other Scoping Meeting Notes	

Part B—Site Visit Documentation

Site ID	51-001
Date of Site Visit	7/21/00
Site Visit Conducted by	Lars Soholt, John Hopkins

Receptor Information

Estimate Cover	Relative vegetative cover (high, medium, low, none) = none to low Relative wetland cover (high, medium, low, none) = Relative structures/asphalt, etc. cover (high, medium, low, none) = high cover of disturbed and gravel-covered ground, transportable structures, heavy equipment storage
Field Notes on the FIMAD Vegetation Class to Assist in Ground-Truthing the Arcview Information	The area lies within the developed portion of TA-51, which lies within native piñon juniper woodland association.
Field Notes on T&E Habitat (if applicable) Consider the need for a site visit by a T&E subject matter expert to support the use of the site by T&E receptors.	Virtually no significant habitat for foraging and none for nesting
Are ecological receptors present at the site? (yes/no/uncertain) Describe the general types of receptors present at the site (terrestrial and aquatic), and make notes on the quality of habitat present at the site.	Yes. There are scattered grasses and shrubs. The site dominated by disturbed ground from vehicular traffic, the leach field is covered with gravel, and transportable storage units and heavy equipment are stored on the surface of the leach field. The habitat is very poor at the site of the VCA but improves to mature piñon-juniper as one moves away to the north. Signs of animal activity such as elk scat and gopher burrowing indicate that the area is used by wildlife but probably mostly as a movement corridor. It is a low-quality forage and nesting habitat. However, signs of wildlife are restricted to the immediate area around the septic tank. The surface over the leach field is covered with gravel, and little or no vegetation is growing in it.

Contaminant Transport Information

Surface Water Transport Field notes should summarize the erosion potential, including a discussion of the terminal point of surface water transport, if applicable.	The area is relatively flat, and drainages around buildings tend to divert any run-on. Water may pool somewhat in the area. Because potential releases would be subsurface, surface transport at this site is not applicable.
Are there any off-site transport pathways (surface water, air, or groundwater)? (yes/no/uncertain)	No. The releases would have been subsurface but too shallow to reach the regional aquifer. There is no known shallower groundwater in this area.
Is an interim action (IA) needed to limit off-site transport? (yes/no/uncertain) Provide explanation/ recommendation for IA to project lead.	No

Ecological Effects Information

Physical Disturbance Provide list of major types of disturbances, including erosion and construction activities; review historical aerial photos where appropriate.	The area is highly disturbed by vehicle traffic, storage, and a layer of gravel over much of the leach field.
Are there obvious ecological effects? (yes/no/uncertain) Provide an explanation and apparent cause (e.g., contamination, physical disturbance, other).	Heavy physical disturbance
IA needed to limit apparent ecological effects? (yes/no/uncertain) Provide explanation and recommendations for IA to mitigate apparent exposure pathways to project lead.	No

No Exposure/Transport Pathways

If there are no complete exposure pathways to ecological receptors on site and no transport pathways to off-site receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No further action recommendation (if needed). At a minimum, the potential for future transport should include the likelihood that future construction activities could make contamination more available for exposure or transport.

Subsurface releases in very poor-quality habitat indicate that no complete pathways exist because of lack of significant receptors.

Adequacy of Site Characterization

Do existing or proposed data provide information on the nature, rate, and extent of contamination? (yes/no/uncertain) Provide explanation (consider if the maximum value was captured by existing sample data).	
Do existing or proposed data for the site address potential transport pathways of site contamination? (yes/no/uncertain) Provide explanation (consider if other sites should be aggregated to characterize potential ecological risk).	

Additional Field Notes

Provide additional field notes on the site setting and potential ecological receptors.

Part C—Ecological Pathways Conceptual Exposure Model

Question A

Could soil contaminants reach receptors by way of vapors?

- **Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant >10-5 atm-me/mol and molecular weight <200 g/mol).**

Answer (likely/unlikely/uncertain): Likely

Provide explanation:

Question B

Could the soil contaminants reach receptors through fugitive dust carried in air?

- **Soil contamination would have to be on the actual surface of the soil to become available for dust.**
- **In the case of dust exposures to burrowing animals, the contamination would have to occur in the depth interval where these burrows occur.**

Answer (likely/unlikely/uncertain):

Provide explanation:

Question C

Can contaminated soil be transported to aquatic ecological communities? (use SOP 2.01 run-off score and terminal point of surface water runoff to help answer this question)?

- If the SOP 2.01 runoff score* for each PRS included in the site is equal to zero, this suggests that erosion at the site is not a transport pathway. (* note that the runoff score is not the entire erosion potential score, rather it is a subtotal of this score with a maximum value of 46 points).
- If erosion is a transport pathway, evaluate the terminal point to see if aquatic receptors could be affected by contamination from this site.

Answer (likely/unlikely/uncertain):

Provide explanation:

Question D

Is contaminated groundwater potentially available to biological receptors through seeps or springs or shallow groundwater?

Known or suspected presence of contaminants in groundwater

- The potential for contaminants to migrate by way of groundwater and discharge into habitats and/or surface waters
- Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone (~1 m depth).
- Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.

Answer (likely/unlikely/uncertain):

Provide explanation:

Question E

Is infiltration/percolation from contaminated subsurface material a viable transport and exposure pathway?

- Suspected ability of contaminants to migrate to groundwater
- The potential for contaminants to migrate by way of groundwater and discharge into habitats and/or surface waters
- Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone (~1 m depth).
- Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.

Answer (likely/unlikely/uncertain):

Provide explanation:

Question F

Might erosion or mass-wasting events be a potential release mechanism for contaminants from subsurface materials or perched aquifers to the surface?

- This question is only applicable to release sites located on or near the mesa edge.
- Consider the erodability of surficial material and the geologic processes of canyon/mesa edges.

Answer (likely/unlikely/uncertain):

Provide explanation:

Question G

Could airborne contaminants interact with receptors through respiration of vapors?

- Contaminants must be present as volatiles in the air.
- Consider the importance of inhalation of vapors for burrowing animals.
- Foliar uptake of organic vapors is typically not a significant exposure pathway.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants:

Terrestrial Animals:

Provide explanation:

Question H

Could airborne contaminants interact with plants through deposition of particulates or with animals through inhalation of fugitive dust?

- Contaminants must be present as particulates in the air or as dust for this exposure pathway to be complete.
- Exposure by way of inhalation of fugitive dust is particularly applicable to ground-dwelling species that would be exposed to dust disturbed by their foraging or burrowing activities or by wind movement.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants:

Terrestrial Animals:

Provide explanation:

Question I

Could contaminants interact with plants through root uptake or rain splash from surficial soils?

- Contaminants in bulk soil may partition into soil solution, making them available to roots.
- Exposure of terrestrial plants to contaminants present in particulates deposited on leaf and stem surfaces by rain striking contaminated soils (i.e., rain splash)

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants:

Provide explanation:

Question J

Could contaminants interact with receptors through food web transport from surficial soils?

- The chemicals may bioaccumulate in animals.
- Animals may ingest contaminated food items.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals:

Provide explanation:

Question K

Could contaminants interact with receptors by way of incidental ingestion of surficial soils?

- Incidental ingestion of contaminated soil could occur while animals grub for food in the soil, feed on plant matter covered with contaminated soil, or while grooming themselves clean of soil.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals:

Provide explanation:

Question L

Could contaminants interact with receptors through dermal contact with surficial soils?

- Significant exposure by way of dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals:

Provide explanation:

Question M

Could contaminants interact with plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants:

Terrestrial Animals:

Provide explanation:

Question N

Could contaminants interact with plants through direct uptake from water and sediment or sediment rain splash?

- **Contaminants may be taken up by terrestrial plants whose roots are in contact with surface waters.**
- **Terrestrial plants may be exposed to particulates deposited on leaf and stem surfaces by rain striking contaminated sediments (i.e., rain splash) in an area that is only periodically inundated with water.**
- **Contaminants in sediment may partition into soil solution, making them available to roots.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants:

Provide explanation:

Question O

Could contaminants interact with receptors through food web transport from water and sediment?

- **The chemicals may bioconcentrate in food items.**
- **Animals may ingest contaminated food items.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals:

Provide explanation:

Question P

Could contaminants interact with receptors by way of ingestion of water and suspended sediments?

- If sediments are present in an area that is only periodically inundated with water, terrestrial receptors may incidentally ingest sediments.
- Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals:

Provide explanation:

Question Q

Could contaminants interact with receptors through dermal contact with water and sediment?

- If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods.
- Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals:

Provide explanation:

Question R

Could contaminants interact with plants or animals through external irradiation?

- External irradiation effects are most relevant for gamma-emitting radionuclides.
- Burial of contamination attenuates radiological exposure.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants:

Terrestrial Animals:

Provide explanation:

Question S

Could contaminants bioconcentrate in free floating aquatic plants, attached aquatic plants, or emergent vegetation?

- Aquatic plants are in direct contact with water.
- Contaminants in sediment may partition into pore water, making them available to submerged roots.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Aquatic Plants/Emergent Vegetation:

Provide explanation:

Question T

Could contaminants bioconcentrate in sedimentary or water column organisms?

- Aquatic receptors may actively or incidentally ingest sediment while foraging.
- Aquatic receptors may be directly exposed to contaminated sediments or may be exposed to contaminants through osmotic exchange, respiration, or ventilation of sediment pore waters.
- Aquatic receptors may be exposed through osmotic exchange, respiration, or ventilation of surface waters.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Aquatic Animals:

Provide explanation:

Question U

Could contaminants bioaccumulate in sedimentary or water column organisms?

- Lipophillic organic contaminants and some metals may concentrate in an organism's tissues.
- Ingestion of contaminated food items may result in contaminant bioaccumulation through the food web.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Aquatic Animals:

Provide explanation:

Question V

Could contaminants interact with aquatic plants or animals through external irradiation?

- External irradiation effects are most relevant for gamma-emitting radionuclides.
- The water column acts to absorb radiation; thus, external irradiation is typically more important for sediment-dwelling organisms.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

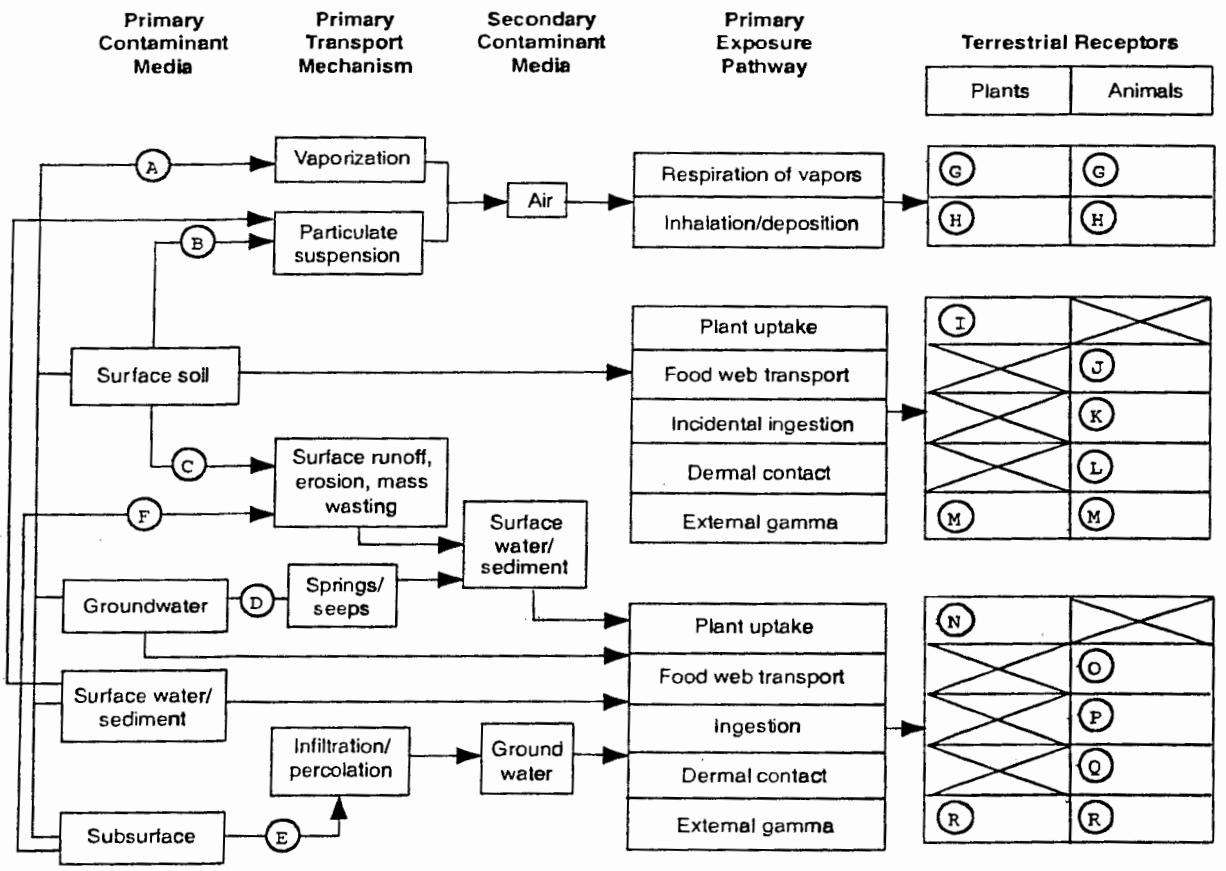
Aquatic Plants:

Aquatic Animals:

Provide explanation:

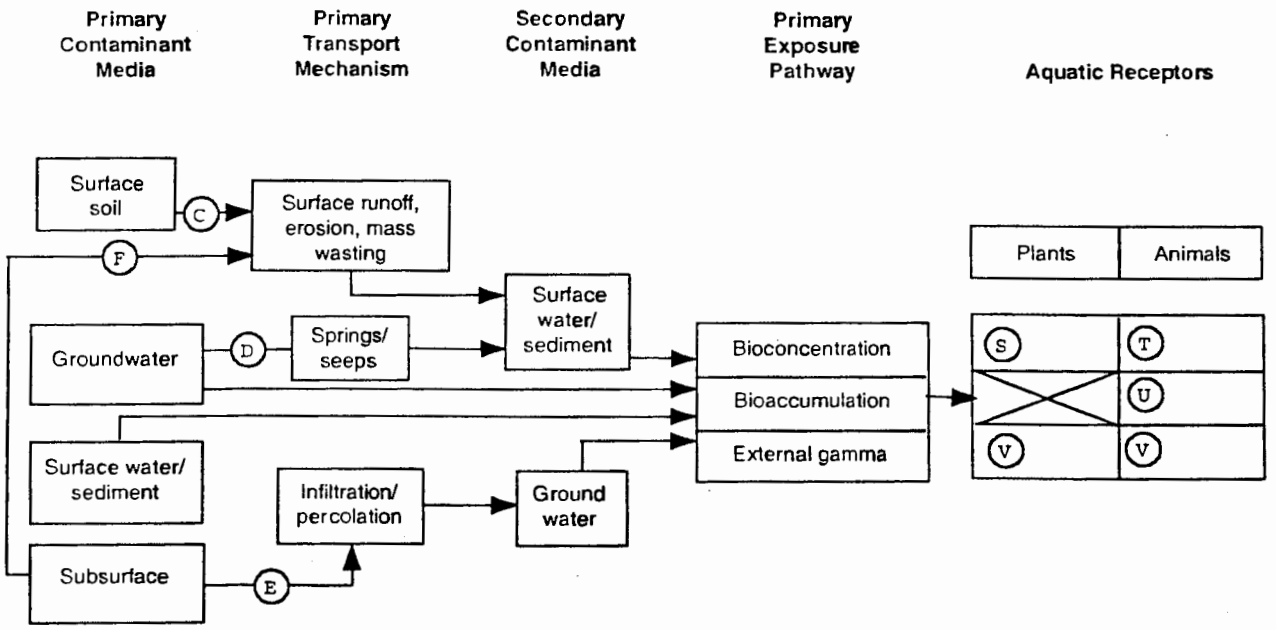
Ecological Scoping Checklist
Terrestrial Receptors
Ecological Pathways Conceptual Exposure Model

NOTE: Letters in circles refer to questions on the scoping checklist



Ecological Scoping Checklist
Aquatic Receptors
Ecological Pathways Conceptual Exposure Model

NOTE:
Letters in circles refer to questions on the Scoping Checklist



Signatures and certifications:

Checklist completed by (provide name, organization and phone number):

Name (printed): Lars Soholt, Ph.D.

Name (signature): Lars P. Soholt

Organization: LANL E/ER

Phone number: 505/667-2256

Date completed: _____

Verification by a member of ER Project Ecological Risk Task Team (provide name, organization and phone number):

Name (printed): Richard Mirenda, Ph.D.

Name (signature): Richard Mirenda

Organization: LANL EES-13

Phone number: 505/665-6953

D-2.0 Ecological Scoping Checklist for Potential Release Site 51-007(d)

Part A—Scoping Meeting Documentation

Site ID	PRS 54-007(d)
Form of site releases (solid, liquid, vapor). Describe all relevant known or suspected mechanisms of release (spills, dumping, material disposal, outfall, explosive testing), and describe potential areas of release. Reference locations on a map as appropriate.	Liquid discharge to leach field; potential leakage from underground septic tank and lines
List of Primary Impacted Media Indicate all that apply.	Surface soil – Surface water/sediment – Subsurface – Yes Groundwater – Other, explain –
FIMAD vegetation class based on Arcview vegetation coverage Indicate all that apply.	Water – Bare Ground/Unvegetated – Spruce/fir/aspen/mixed conifer – Ponderosa pine – Piñon juniper/juniper savannah – Yes Grassland/shrubland – Developed – Yes
Is threatened and endangered (T&E) species habitat present? If applicable, list species known or suspected that use the site for breeding or foraging.	No
Provide a list, of neighboring/contiguous/ upgradient sites; include a brief summary of COPCs and the form of releases for relevant sites, and reference a map, as appropriate. Use this information to evaluate the need to aggregate sites for screening.	None
Surface Water Erosion Potential Information Summarize information from the standard operating procedure 2.01, including the runoff subscore (maximum of 46), terminal point of surface water transport, slope, and surface water run-on sources.	Not available
Other Scoping Meeting Notes	

Part B—Site Visit Documentation

Site ID	54-007(d)
Date of Site Visit	7/21/00
Site Visit Conducted by	Lars Soholt, John Hopkins

Receptor Information

Estimate Cover	Relative vegetative cover (high, medium, low, none) = low to high Relative wetland cover (high, medium, low, none) = none Relative structures/asphalt, etc. cover (high, medium, low, none) = low to medium cover of dirt road and disturbance
Field Notes on the FIMAD Vegetation Class to Assist in Ground-Truthing the Arcview Information	The area lies adjacent to a developed part of TA-54, which lies within native piñon/juniper woodland association.
Field Notes on T&E Habitat (if applicable) Consider the need for a site visit by a T&E subject matter expert to support the use of the site by T&E receptors.	No T&E species were identified in this area in the ESHID process.
Are ecological receptors present at the site? (yes/no/uncertain) Describe the general types of receptors present at the site (terrestrial and aquatic), and make notes on the quality of habitat present at the site.	Yes. Mixed grasses and forbs around septic tank with some disturbance and gopher activity provide some foraging habitat. Over the leach field, a rich and dense piñon/juniper community has developed. Signs of passerines and gopher burrowing and the richness of the leach field community indicate wildlife usage of the area. No aquatic communities occur here or nearby.

Contaminant Transport Information

Surface Water Transport Field notes should summarize the erosion potential, including a discussion of the terminal point of surface water transport, if applicable.	Drainage is toward the north, to the leach field. Runoff could terminate at the road or in the leach field just beyond the road.
Are there any off-site transport pathways (surface water, air, or groundwater)? (yes/no/uncertain)	No. The releases would have been subsurface but too shallow to reach the regional aquifer. There is no known shallower groundwater in this area. The leach field might contain saturated media occasionally when septic tank fills with storm water and overflows into the drain pipe.
Is an interim action (IA) needed to limit off-site transport? (yes/no/uncertain) Provide explanation/ recommendation for IA to project lead.	No

Ecological Effects Information

Physical Disturbance Provide list of major types of disturbances, including erosion and construction activities; review historical aerial photos where appropriate.	The area is moderately disturbed by vehicle traffic.
Are there obvious ecological effects?	Moderate physical disturbance near the septic tank itself

(yes/no/uncertain) Provide an explanation and apparent cause (e.g., contamination, physical disturbance, other).	
IA needed to limit apparent ecological effects? (yes/no/uncertain) Provide explanation and recommendations for IA to mitigate apparent exposure pathways to project lead.	No

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors on site and no transport pathways to off-site receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No further action recommendation (if needed). At a minimum, the potential for future transport should include the likelihood that future construction activities could make contamination more available for exposure or transport.

Adequacy of Site Characterization

Do existing or proposed data provide information on the nature, rate, and extent of contamination? (yes/no/uncertain) Provide explanation (consider if the maximum value was captured by existing sample data).	Characterization will be carried out to define VCA waste streams to confirm that cleanup has occurred or that no releases occurred.
Do existing or proposed data for the site address potential transport pathways of site contamination? (yes/no/uncertain) Provide explanation (consider if other sites should be aggregated to characterize potential ecological risk).	See above

Additional Field Notes

Provide additional field notes on the site setting and potential ecological receptors.

Part C—Ecological Pathways Conceptual Exposure Model

Question A

Could soil contaminants reach receptors by way of vapors?

- **Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant >10^{-5} atm-me/mol and molecular weight <200 g/mol).**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: Releases would be subsurface in this case; volatile chemicals would be released only slowly if at all through the ground surface.

Question B

Could the soil contaminants reach receptors through fugitive dust carried in air?

- **Soil contamination would have to be on the actual surface of the soil to become available for dust.**
- **In the case of dust exposures to burrowing animals, the contamination would have to occur in the depth interval where these burrows occur.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: Releases are subsurface.

Question C

Can contaminated soil be transported to aquatic ecological communities (use SOP 2.01 run-off score and terminal point of surface water runoff to help answer this question)?

- **If the SOP 2.01 runoff score* for each PRS included in the site is equal to zero, this suggests that erosion at the site is not a transport pathway. (* note that the runoff score is not the entire erosion potential score, rather it is a subtotal of this score with a maximum value of 46 points).**
- **If erosion is a transport pathway, evaluate the terminal point to see if aquatic receptors could be affected by contamination from this site.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: No aquatic receptors occur in this area.

Question D

Is contaminated groundwater potentially available to biological receptors through seeps or springs or shallow groundwater?

Known or suspected presence of contaminants in groundwater.

- **The potential for contaminants to migrate by way of groundwater and discharge into habitats and/or surface waters**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone (~1 m depth).**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: No springs occur in the area.

Question E

Is infiltration/percolation from contaminated subsurface material a viable transport and exposure pathway?

- **Suspected ability of contaminants to migrate to groundwater**
- **The potential for contaminants to migrate by way of groundwater and discharge into habitats and/or surface waters**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone (~1 m depth).**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: The depth to regional aquifer and low rainfall in the area are not likely to preclude movement of contamination to that aquifer. No shallow groundwater is known to occur here.

Question F

Might erosion or mass-wasting events be a potential release mechanism for contaminants from subsurface materials or perched aquifers to the surface?

- **This question is only applicable to release sites located on or near the mesa edge.**
- **Consider the erodability of surficial material and the geologic processes of canyon/mesa edges.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: Site is well removed from mesa edges and not subject to mass wasting. Erosion potential is low, although this site has not been scored for erosion potential.

Question G

Could airborne contaminants interact with receptors through respiration of vapors?

- **Contaminants must be present as volatiles in the air.**
- **Consider the importance of inhalation of vapors for burrowing animals.**
- **Foliar uptake of organic vapors is typically not a significant exposure pathway.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 2

Provide explanation: Limited exposure for burrowing animals in the leach field could occur.

Question H

Could airborne contaminants interact with plants through deposition of particulates or with animals through inhalation of fugitive dust?

- **Contaminants must be present as particulates in the air or as dust for this exposure pathway to be complete.**
- **Exposure by way of inhalation of fugitive dust is particularly applicable to ground-dwelling species that would be exposed to dust disturbed by their foraging or burrowing activities or by wind movement.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: Releases would be subsurface and not susceptible to aerial entrainment.

Question I

Could contaminants interact with plants through root uptake or rain splash from surficial soils?

- **Contaminants in bulk soil may partition into soil solution, making them available to roots.**
- **Exposure of terrestrial plants to contaminants present in particulates deposited on leaf and stem surfaces by rain striking contaminated soils (i.e., rain splash)**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 2

Provide explanation: Roots could extend down into the leach field and take up some contaminants of concern.

Question J

Could contaminants interact with receptors through food web transport from surficial soils?

- The chemicals may bioaccumulate in animals.
- Animals may ingest contaminated food items.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 0

Provide explanation: No bioaccumulators were detected.

Question K

Could contaminants interact with receptors by way of incidental ingestion of surficial soils?

- Incidental ingestion of contaminated soil could occur while animals grub for food in the soil, feed on plant matter covered with contaminated soil, or while grooming themselves clean of soil.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 0

Provide explanation: Releases would be in the subsurface.

Question L

Could contaminants interact with receptors through dermal contact with surficial soils?

- Significant exposure by way of dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 0

Provide explanation: No strong dermal absorbing compounds were detected.

Question M

Could contaminants interact with plants or animals through external irradiation?

- External irradiation effects are most relevant for gamma-emitting radionuclides.
- Burial of contamination attenuates radiological exposure.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: Releases would be subsurface.

Question N

Could contaminants interact with plants through direct uptake from water and sediment or sediment rain splash?

- **Contaminants may be taken up by terrestrial plants whose roots are in contact with surface waters.**
- **Terrestrial plants may be exposed to particulates deposited on leaf and stem surfaces by rain striking contaminated sediments (i.e., rain splash) in an area that is only periodically inundated with water.**
- **Contaminants in sediment may partition into soil solution, making them available to roots.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 0

Provide explanation: Subsurface releases with no aquatic habitat present

Question O

Could contaminants interact with receptors through food web transport from water and sediment?

- **The chemicals may bioconcentrate in food items.**
- **Animals may ingest contaminated food items.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 0

Provide explanation: No aquatic habitat present

Question P

Could contaminants interact with receptors by way of ingestion of water and suspended sediments?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial receptors may incidentally ingest sediments.**
- **Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.**

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 0

Provide explanation: No aquatic habitat is present. Releases would be subsurface.

Question Q

Could contaminants interact with receptors through dermal contact with water and sediment?

- If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods.
- Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Animals: 0

Provide explanation: No strong dermal absorbers detected

Question R

Could contaminants interact with plants or animals through external irradiation?

- External irradiation effects are most relevant for gamma-emitting radionuclides.
- Burial of contamination attenuates radiological exposure.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: Releases would be subsurface.

Question S

Could contaminants bioconcentrate in free-floating aquatic plants, attached aquatic plants, or emergent vegetation?

- Aquatic plants are in direct contact with water.
- Contaminants in sediment may partition into pore water, making them available to submerged roots.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Aquatic Plants/Emergent Vegetation: 0

Provide explanation: No aquatic habitat present

Question T

Could contaminants bioconcentrate in sedimentary or water column organisms?

- Aquatic receptors may actively or incidentally ingest sediment while foraging.
- Aquatic receptors may be directly exposed to contaminated sediments or may be exposed to contaminants through osmotic exchange, respiration, or ventilation of sediment pore waters.
- Aquatic receptors may be exposed through osmotic exchange, respiration, or ventilation of surface waters.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Aquatic Animals: 0

Provide explanation: No aquatic habitat present

Question U

Could contaminants bioaccumulate in sedimentary or water column organisms?

- Lipophillic organic contaminants and some metals may concentrate in an organism's tissues.
- Ingestion of contaminated food items may result in contaminant bioaccumulation through the food web.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

Aquatic Animals: 0

Provide explanation: No aquatic habitat present

Question V

Could contaminants interact with aquatic plants or animals through external irradiation?

- External irradiation effects are most relevant for gamma-emitting radionuclides.
- The water column acts to absorb radiation; thus, external irradiation is typically more important for sediment-dwelling organisms.

Provide quantification of exposure pathway (0 = no pathway, 1 = unlikely pathway, 2 = minor pathway, 3 = major pathway):

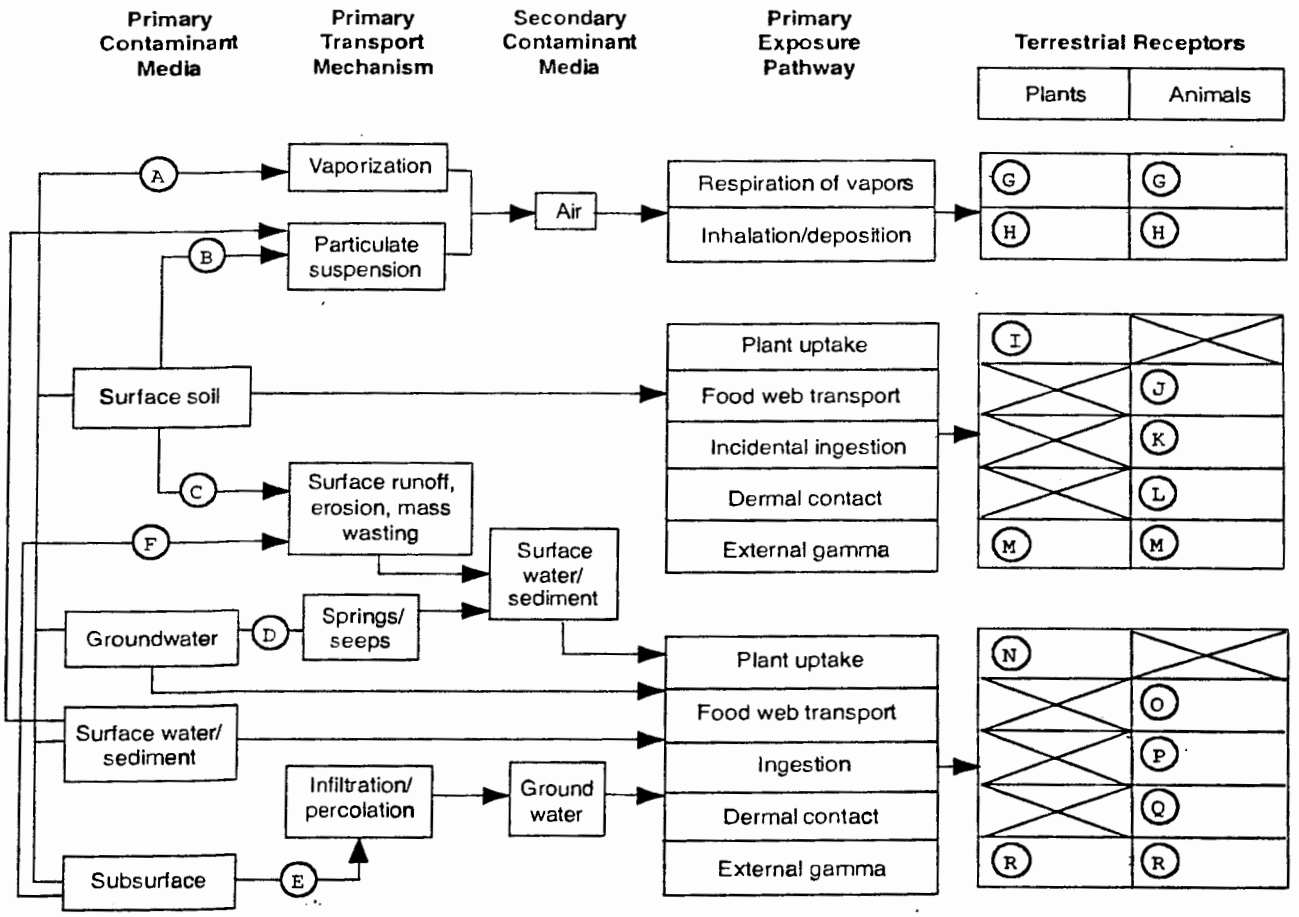
Aquatic Plants: 0

Aquatic Animals: 0

Provide explanation: No aquatic habitat present

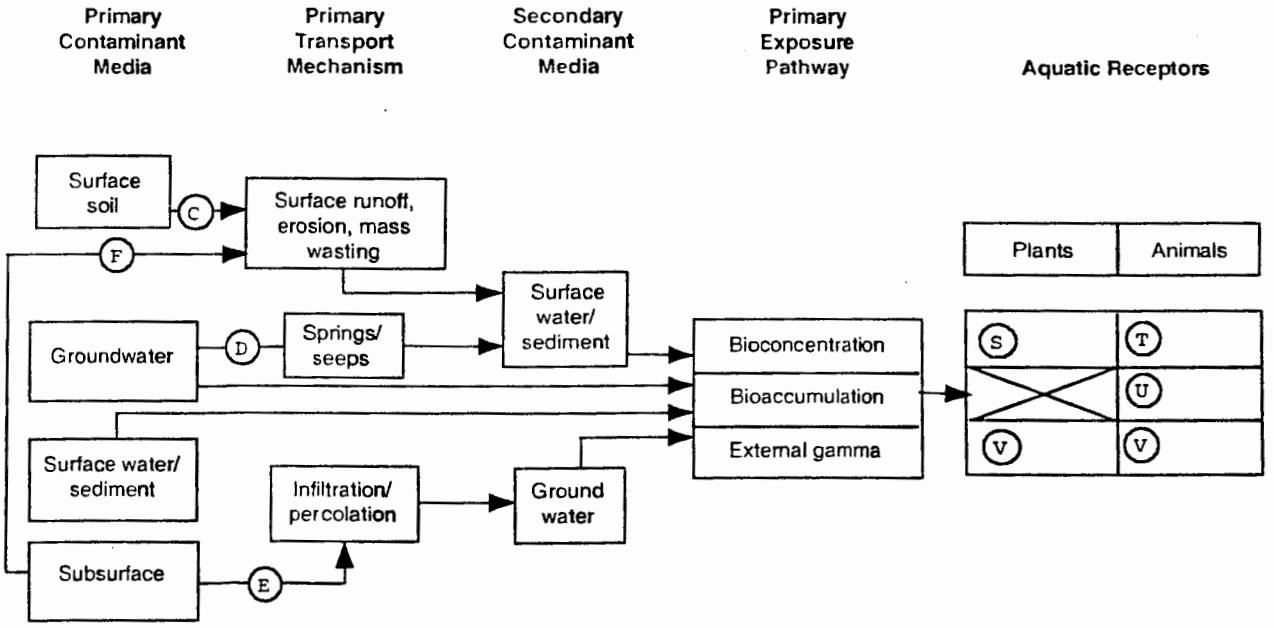
Ecological Scoping Checklist
Terrestrial Receptors
Ecological Pathways Conceptual Exposure Model

NOTE:
Letters in circles refer to questions on the scoping checklist



Ecological Scoping Checklist
Aquatic Receptors
Ecological Pathways Conceptual Exposure Model

NOTE:
Letters in circles refer to questions on the Scoping Checklist



Signatures and certifications:

Checklist completed by (provide name, organization and phone number):

Name (printed): Lars Soholt, Ph.D.

Name (signature): Lars P. Soholt

Organization: LANL E/ER

Phone number: 505/667-2256

Date completed: 7/27/00

Verification by a member of ER Project Ecological Risk Task Team (provide name, organization and phone number):

Name (printed): Richard Mirenda, Ph.D.

Name (signature): Richard Mirenda

Organization: LANL EES-13

Phone number: 505/665-6953

Los Alamos National Laboratory

Environment, Safety & Health Division
ESH-18 Water Quality & Hydrology Group

Surface Water Assessment
Erosion Matrix for PRS 54-007(d)

CRITERIA EVALUATED	Value	Erosion/Sediment Transport Potential Low 0.1	Medium 0.5	High 1.0	Calculated Score
Site Setting (43)					
On mesa top	1	Defined based on topographic setting			1.0
Within bench of canyon	4				
Within the canyon floodplain but not watercourse	13				
Within bottom of canyon channel in watercourse	17				
Estimated % ground and canopy cover	13	>75%	25-75%	<25%	6.5
Slope	13	0-10%	10-30%	>30%	1.3
Surface Water Factors-Run-off (46)					
Visible evidence of runoff discharging? (Yes/No)	5	If no, score of 0 for runoff section.			5.0
		If yes, score 5 and proceed with section.			
Where does runoff terminate?	19	Other	Bench Setting	Drainage/Wetland	9.5
Has runoff caused visible erosion? (Yes/No)	22	Sheet	Rill	Gully	0.0
		If no, score as 0. If yes, calculate as appropriate.			
Surface Water Factors-Run-on (11)					
Structures adversely affecting run-on (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0.0
Current operations adversely impacting (Yes/No)	4	If yes, score as 4. If no, score as 0.			0.0
Natural drainages onto site (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0.0
**Select either structures or natural drainages.*					
MAX. POSSIBLE EROSION MATRIX SCORE:	**100**			**Total Score**	23.3

Report Printed 8/22/01 9:41:07 AM.

Los Alamos National Laboratory
SURFACE WATER
SITE ASSESSMENT

SITE INFORMATION

1a) PRS Number: 54-007(d) 1b) Structure Number: 54-7 1c) FMU Number: 64

2. Date/Time (M/D/Y H:M am/pm): 5/5/00

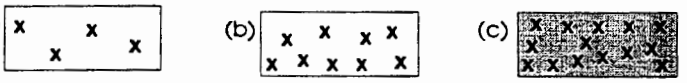
SITE SETTING (check all that apply)

3. (●) On mesa top (a). ( ) In the canyon floor, but not in an established channel (c)
( ) Within a bench of a canyon (b). ( ) Within established channel in the canyon floor (d).

Explanation: Septic distribution box located outside fence, north of building. Could not locate outfall (if it exists).

4. Estimated ground and/or canopy cover at site: (deciduous leaves, pine needles, rocks, vegetation, trees.

(Illustration) (a) (b) (c)

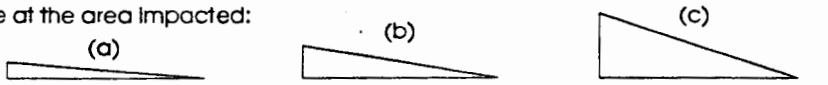


Estimated % of ground/canopy cov ( ) 0% to 25% (●) 25% to 75% ( ) 75% to 100%

Explanation: Mostly native vegetation with mix of grasses, shrubs and pinon pine.

5. Steepest slope at the area impacted:

(a) (b) (c)



(●) Less than 10% ( ) 10% to 30% ( ) 30% and greater

Explanation: Mostly flat with gentle slope to the north.

RUNOFF FACTORS

Y / N

[x] [ ] **6. Is there visible evidence of runoff discharging from site? If yes, answer a) - c) below:**

[ ] [x] 6a) Is runoff channelized? If yes, describ ( ) Man-made channel. ( ) Natural channel.

Explanation: Swales existing around site, but no channelization observed.

RUNOFF FACTORS, CONT'D

6b) Where does evidence of runoff terminate?

- ○ **Drainage or wetland (name)** Canada del Buey
- ◉ **Within bench of canyon setting (name)** bench or swales
- ○ **Other (i.e., retention pond, meadow, mesa top)**

Explanation: Runoff appears to terminate within the swales or bench above the canyon.

Y / N

☐ ☑ 6c) Has runoff caused visible erosion at the site? If yes, explain below: ○ Sheet ○ Rill ○ Gully

Explanation: None observed.

RUN-ON FACTORS

Please rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)

☐ ☑ **7.** Are structures (i.e., buildings, roof drains, parking lots, storm drains) creating run-on to the site?

Explanation: No structural impact.

☐ ☑ **8.** Are current operations (i.e., fire hydrants, NPDES outfalls) adversely impacting run-on to the site?

Explanation: No operational impact.

☐ ☑ **9.** Are natural drainage patterns directing stormwater onto site?

Explanation: No upslope drainage.

ASSESSMENT FINDING:

☐ ☑ **10. Based on the above criteria and the assessment of this site, does soil erosion potential exist? (REFER TO EROSION POTENTIAL MATRIX.)**

Veenis, Steve

11. Signature of Water Quality/Hydrology Representative

SV Initials of independent reviewer.

Check here when information is entered in database: ☑

This page is for ESH-18 notes, recommendations, and photos.

	Y	N	
12. a)	○	◉	Is there visible trash/debris on the site?
b)	○	◉	Is there visible trash/debris in a watercourse?

Description of existing BMPs:

○	○	Are BMPs being properly maintained? If no, describe in "Other Internal Notes."
○	○	Are BMPs effectively keeping sediment in place and reducing erosion potential?

OTHER INTERNAL NOTES:

Appendix E

Estimated Costs

The Environmental Restoration Project baseline cost estimate for removing these two septic tanks is $220,000. The estimate does not include the cost for removal of the seepage pit and drain field.

Appendix I

Photographs

APPENDIX I PHOTOGRAPHS

Figures I-1 through I-3 show voluntary corrective action (VCA) activities at Potential Release Site (PRS) 51-001. Figures I-4 and I-5 show VCA activities at PRS 54-007(d).

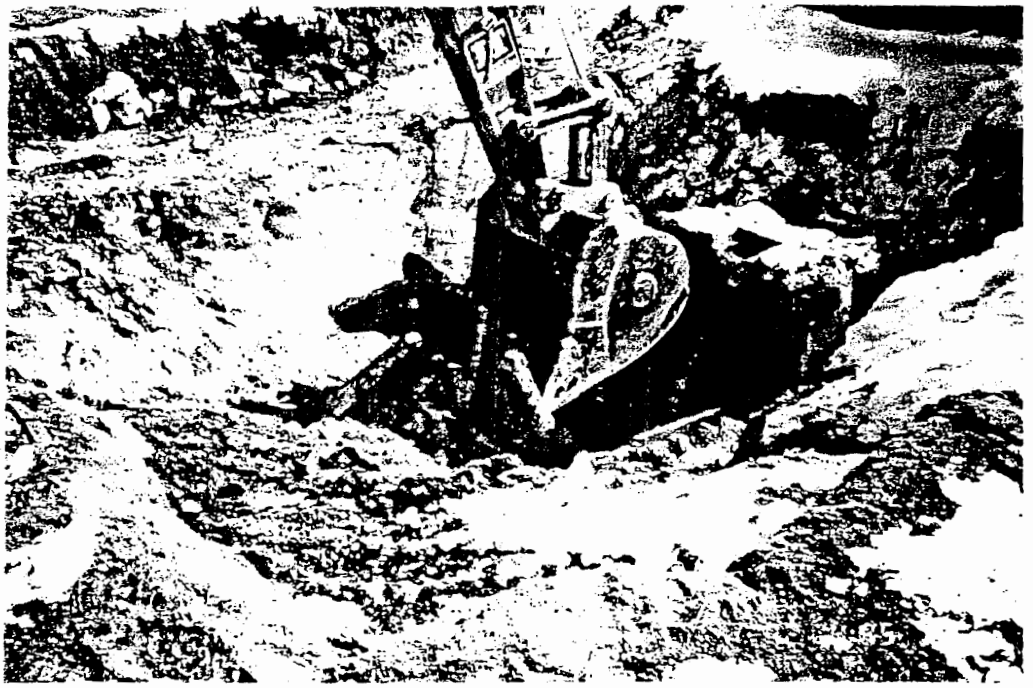


Figure I-1. South view of tank removal at PRS 51-001

Figure I-2. View of tank interior after high-pressure wash at PRS 51-001

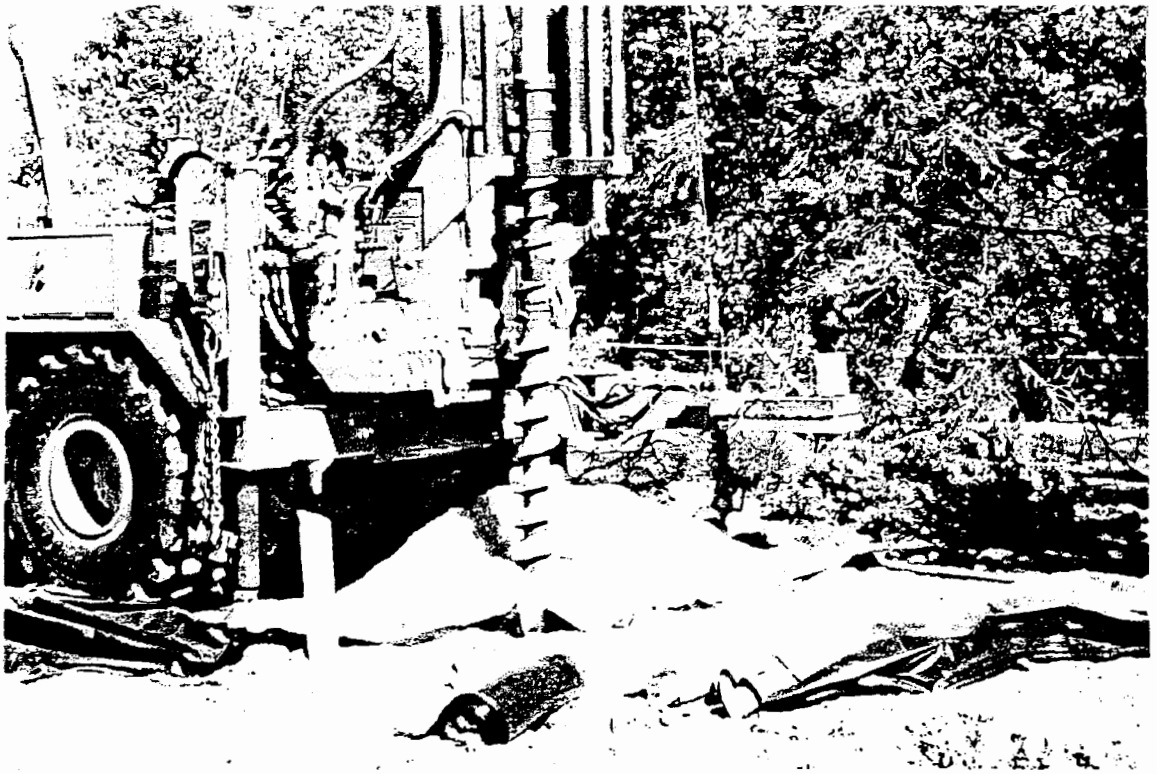


Figure I-3. North view of drilling operations at PRS 51-001

Figure I-4. Stage of septic tank break up in place at PRS 54-007(d)

Figure I-5. View of the removed septic tank at PRS 54-007(d)

Appendix J

Borehole Logs

Los Alamos National Laboratory
Environmental Restoration Project
Borehole Log for PRS 51-001

Borehole Number: 51-10000	Coordinates: N 1764750.276 E 1633733.286	Page: 1 of 1
Elevation: 7040.295		
Engineer/Geologist: Randy Johnson	Groundwater level: n/a	Date Started: 2-13-01
Drilling Methods: LANL ER-SOP-6.24, LANL ER-SOP-12.01		Date Completed: 2-13-01

Depth (ft)	Sample Type and Number	Run Interval	Recovery (%)	Description	USCS Symbol	Lithologic Symbol	Remarks
0	n/a	1	100	Silts and clay, dry, light brown, soil/tuff interface at 3 ft	CL		Silts and clay
	n/a	1	100	Tuff, non welded, nonweathered, 25% phenocrysts, 15% lithic, light gray, dry, crushed, 10R7/1	Tuff		Qbt 3a
	n/a	2	100	Tuff, nonwelded, nonweathered, 25% phenocrysts, 15% lithic, light gray, dry, crushed, 10R7/1, minor roots and clay	Tuff		Qbt 3a
10	n/a	3	100	Tuff, nonwelded, nonweathered, 25% phenocrysts, 15% lithic, light gray, dry, crushed, 10R7/1	Tuff		Qbt 3a
	n/a	4	100	Tuff, nonwelded, nonweathered, 25% phenocrysts, 20% lithic, light gray, dry, crushed, 10R7/1	Tuff		Qbt 3a
20	n/a	5	100	Tuff, nonwelded, nonweathered, 25% phenocrysts, 15% lithic, light gray, dry, crushed, 10R7/1, sanadine present, 2-3mm in size	Tuff		Qbt 3a
	n/a	6	100	Tuff, nonwelded, nonweathered, 25% phenocrysts, 15% lithic, light gray, dry, crushed, 10R7/1, sanadine present, 2-3mm in size	Tuff		Qbt 3a
30	n/a	7	100	Tuff, nonwelded, nonweathered, 25% phenocrysts, 15% lithic, light gray, dry, crushed, 10R7/1, sanadine present, 2-3mm in size	Tuff		Qbt 3a
	n/a	8	100	Tuff, nonwelded, nonweathered, 25% phenocrysts, 15% lithic, light gray, dry, crushed, 10R7/1, sanadine present, 2-3mm in size	Tuff		Qbt 3a
40	n/a	9	100	Tuff, nonwelded, nonweathered, 25% phenocrysts, 15% lithic, light gray, dry, crushed, 10R7/1, sanadine present, 2-3mm in size	Tuff		Qbt 3a
	n/a	10	100	Tuff, nonwelded, nonweathered, 30% phenocrysts, <5% lithic, 0% pumice, light gray, dry, crushed, 10R7/1, clay layers and staining moist, gray areas dry	Tuff		Qbt 3a
	MD51-01-0001	11	100	Tuff, nonwelded, nonweathered, 30% phenocrysts, <5% lithic, 10% pumice, light gray, dry, crushed, 10R7/1, clay layers and staining moist, gray areas dry	Tuff		Qbt 3a
50	n/a	12	100	Tuff, nonwelded, nonweathered, 30% phenocrysts, <5% lithic, 10% pumice, light gray, dry, crushed, 10R7/1, clay layers and staining moist, gray areas dry	Tuff		Qbt 3a
	n/a	13	100	Tuff, nonwelded, nonweathered, 30% phenocrysts, <5% lithic, 10% pumice, light gray, dry, crushed, 10R7/1, clay layers and staining moist, gray areas dry, large dacite lithic at 58.5 ft and rootlets at 57.5 ft	Tuff		Qbt 3a
60	MD51-02-0002 MD51-02-0017	14	100		Tuff		Qbt 3a

Total depth 60.0 ft

n/a = not applicable
USCS = Unified Soil Classification System
CL = Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays

Los Alamos National Laboratory
Environmental Restoration Project
Borehole Log for PRS 51-001

Borehole Number: 51-10001	Coordinates: N 1764747.62 E 1633743.382	Page: 1 of 1
Elevation: 7040.666		
Engineer/Geologist: Randy Johnson	Groundwater level: n/a	Date Started: 2-13-01
Drilling Methods: LANL ER-SOP-6.24, LANL ER-SOP-12.01		Date Completed: 2-13-01

Depth (ft)	Sample Type and Number	Run Interval	Recovery (%)	Description	USCS Symbol	Lithologic Symbol	Remarks
0	n/a	1	100	Silts and clay, dry, light brown, soil/tuff interface at 3 ft	CL		Silts and clay
	n/a	2	100	Weathered tuff, 5YR5/4, dry	Tuff		Qbt 3a
10	n/a	3	100	Tuff, 25% phenocryst, 15% lithic, no pumice, 10R7/1 light gray	Tuff		Qbt 3a
	n/a	4	100	Tuff, 25% phenocryst, 15% lithic, no pumice, 10R7/1 light gray	Tuff		Qbt 3a
20	n/a	5	100	Slightly welded tuff, 25% phenocryst, 20% vitrified pumice, <5% lithic, 10R7/1 light gray, dry	Tuff		Qbt 3a
	n/a	6	100	Slightly welded tuff, 25% phenocryst, 20% vitrified pumice, <5% lithic, 10R7/1 light gray, dry	Tuff		Qbt 3a
30	n/a	7	100	Slightly welded tuff, 25% phenocryst, 20% vitrified pumice, <5% lithic, 10R7/1 light gray, dry	Tuff		Qbt 3a
	n/a	8	100	Slightly welded tuff, 25% phenocryst, 20% vitrified pumice, <5% lithic, 10R7/1 light gray, dry	Tuff		Qbt 3a
40	n/a	9	100	Slightly welded tuff, 25% phenocryst, 20% vitrified pumice, <5% lithic, 10R7/1 light gray, dry	Tuff		Qbt 3a
	n/a	10	100	Slightly welded tuff, 25% phenocryst, 20% vitrified pumice, <5% lithic, 10R7/1 light gray, dry	Tuff		Qbt 3a
	MD51-01-0003	11	100	Slightly welded tuff, 25% phenocryst, 20% vitrified pumice, <5% lithic, 10R7/1 light gray, dry, fracture at 47.5 with rootlets	Tuff		Qbt 3a
50	n/a	12	100	Slightly welded tuff, 25% phenocryst, 20% vitrified pumice, <5% lithic, 10R7/1 light gray, dry	Tuff		Qbt 3a
	n/a	13	100	Slightly welded tuff, 25% phenocryst, 20% vitrified pumice, <5% lithic, 10R7/1 light gray, dry	Tuff		Qbt 3a
	MD51-01-0004	14	100	Slightly welded tuff, 30% phenocryst, 10% devitrified pumice, <5% lithic, 7.5YR7/1 light gray, dry	Tuff		Qbt 3a
60							

Total depth 60.0 ft

n/a = not applicable
USCS = Unified Soil Classification System
CL = Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays

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