Los Alamos National Laboratory

UNIVERSITY OF CALIFORNIA

Environmental Restoration

Environmental Restoration Project
MS M992
Los Alamos, New Mexico 87545
505-667-0808/FAX 505-665-4747

Date: May 14, 1997
Refer to: EM/ER:97-179

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RECEIVED MAY 1997

Mr. Ted Taylor
Los Alamos Area Office
US Department of Energy, MS A316
Los Alamos, NM 87544

SUBJECT: FINAL VCA PLAN FOR TA-49, PRS 49-008(d) ACTIVITIES

Dear Ted:

Enclosed for your records please find two copies of the final Voluntary Corrective Action (VCA) Plan for Technical Area 49, Potential Release Site 49-008(d) activities. These activities are planned for completion in Fiscal Year 1997.

Informational copies of this VCA Plan are being distributed to the regulators.

Your Field Project Manager participated in developing and reviewing this plan. The VCA Checklist and Field Authorization Form have been completed and signed and are also included in the enclosed plan.

If you have any questions, please call Don Krier at (505) 665-7834 or Mike Gilgosch at (505) 667-5794.

Sincerely,

Jorg Jansen
Program Manager

JJ/ss

Enclosure: (1) Final VCA Plan for TA-49, PRS 49-008(d)

5/1144/49

LANL
5/1144/49

3979

Cy (w/ enc.):
M. Gilgosch, LAAO, MS A316
D. Griswold, AL-ERD, MS A906
J. Harry, EES-5, MS M992
D. Krier, EES-1, MS D462
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Cy (w/o encs.):
T. Baca, EM, MS J591
D. Bradbury, EM/ER, MS M992
T. Glatzmaier, DDEES/ER, MS M992
M. Johansen, LAAO, MS A316
T. Longo, DOE-HQ, EM 45
D. McInroy, EM/ER, MS M992
J. Levings, AL-ERD, MS A906
K. Zamora, LAAO, MS A316
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Voluntary Corrective Action Plan

for

Potential Release Site at TA-49

49-008(d)
Area 12 Bottle House

Field Unit 5

Environmental Restoration Project

May 1997

A Department of Energy
Environmental Cleanup Program

Los Alamos
NATIONAL LABORATORY

LA-UR-96-4596

Voluntary Corrective Action Plan for PRS 49-008(d), Area 12 Bottle House Surface Soil

1.0 INTRODUCTION

1.1 Site Type and Description

The Area 12 Bottle House PRS 49-008(d) is located in Technical Area 49 which is on the southern boundary of Los Alamos National Laboratory on Frijoles Mesa. Area 12 is located immediately east of Material Disposal Area AB. The Bottle House site is on a relatively flat, open area on the mesa top. The depth to the main aquifer is about 1200 ft and there are no perched aquifers known or expected in the area. A 700 foot borehole was drilled in 1993 as part of the RFI characterization of Area 2. The borehole, located approximately 100 feet south of the Bottle House, encountered no saturated water zones. The location of the 49-008(d) Bottle House is shown in Figures 1 and 2. The area around the Bottle House is shown in Figure 3.

1.1.1 Operational History

The main historic activities in Area 12 were confinement experiments in 1960 and 1961 that were related to the TA-49 hydronuclear program. These experiments consisted of HE detonations in sealed metal "bottles" (up to 5-ft in diameter by 16-ft in length) placed in a 10-ft-diameter by 30-ft-deep shaft. The shaft was surrounded by the Bottle House, which is one of only two surface structures remaining in Area 12.

Approximately 26 confinement experiments involving HE detonations were carried out in the Area 12 shaft. Several experiments involved a few kilograms of uranium-238. Six experiments involved a few microcuries of irradiated uranium tracer (typically 3.5 g of uranium-238, and in one case, 10.6 g of uranium-235). Up to 7 tons of road salt were used as an energy absorbent for each of the major experiments. In each experiment, after the HE was detonated, the containment vessel was unsealed and the salt was removed, sometimes with the help of jackhammers. According to several site employees, the salt was disposed of at the TA-54 waste disposal site. Following the final experiment, the containment bottle also was disposed of off-site, probably at TA-54.

During the containment experiments, the area was monitored routinely for the release of radiation. Field notes indicate that after several experiments in May 1961, low levels of gross alpha contamination were noted on the interior surfaces of the containment vessel and the compressed salt. According to the OU 1144 RFI Work Plan, there was no indication from any records or interviews that contamination was released to the site environment from the confinement experiments or from any other Area 12 activities (LANL May 1992, LA-UR-92-900). As discussed below, however, the Phase One RFI soil sampling investigation discovered the presence of radioactive contaminants originating from an unknown source.

1.1.2 COPCs and Rationale for Proposed Remedial Action

RFI surface soil sampling on a 15 foot grid revealed the presence of elevated uranium-isotopes above screening action levels at one location (49-9096) east of the bottle house building. The sample laboratory-measured activities and corresponding SALs in pCi/g at this location for U-234, U-235 and U-238 , respectively, were: 56.5 (SAL 13); 12 (SAL 10); and 685 (SAL 67). More detailed information on sample results is presented in Section 7.2.2. Clean-up levels were calculated using RESRAD and are shown in Section

3.2. The U-238 activity found at location 49-9096 (i.e., 685 pCi/g) is greater than the industrial scenario clean-up level of 231 pCi/g. Further, a FIDLER radiological survey identified an area around this sample location as having elevated radiation readings above background. The contamination appears to be in the upper 6 inches of the soil and is within an estimated area of 100 ft^2 around location 49-9096 (see Figure 2). The contaminated soil area around 49-9096 needs to be removed down to industrial scenario clean-up levels to allow PRS 49-008(d) to be recommended for 'no further action' to the DOE. PRS 49-0008[d] is not listed as a SWMU on the Hazardous and Solid Waste Amendments Module VIII of the Laboratory's RCRA operating permit. A second region around location 49-9019 also had elevated survey measurements above background. The radiochemistry analysis for the sample from 49-9019 had one uranium isotope above SAL (U-234 at 14.9 pCi/g) and one result slightly below SAL (U-238 at 66 pCi/g). As shown in Section 3.2, soil contamination at 49-9019 is above the calculated residential scenario clean-up goal for U-238, but well below the industrial scenario clean-up goals for all three uranium isotopes. Therefore, the area around location 49-9019 will not be targeted for soil removal, except as noted in Section 3.1. The area south and east around the Bottle House was posted as a soil contamination area by ESH-1 in May of 1995 and currently is barricaded off. Although the site is relatively flat, soil erosion over time could result in the contamination being transported to Water Canyon which lies to the north. In addition, Area 12 could be used as a support area for any remediation activities at the adjacently located Area 2. It is proposed to remove the contaminated soil area around location 49-9096 down to a depth of one foot or less, re-grade the area and allow Area 12 to be used for future support activities at TA-49.

2.0 SITE CHARACTERIZATION

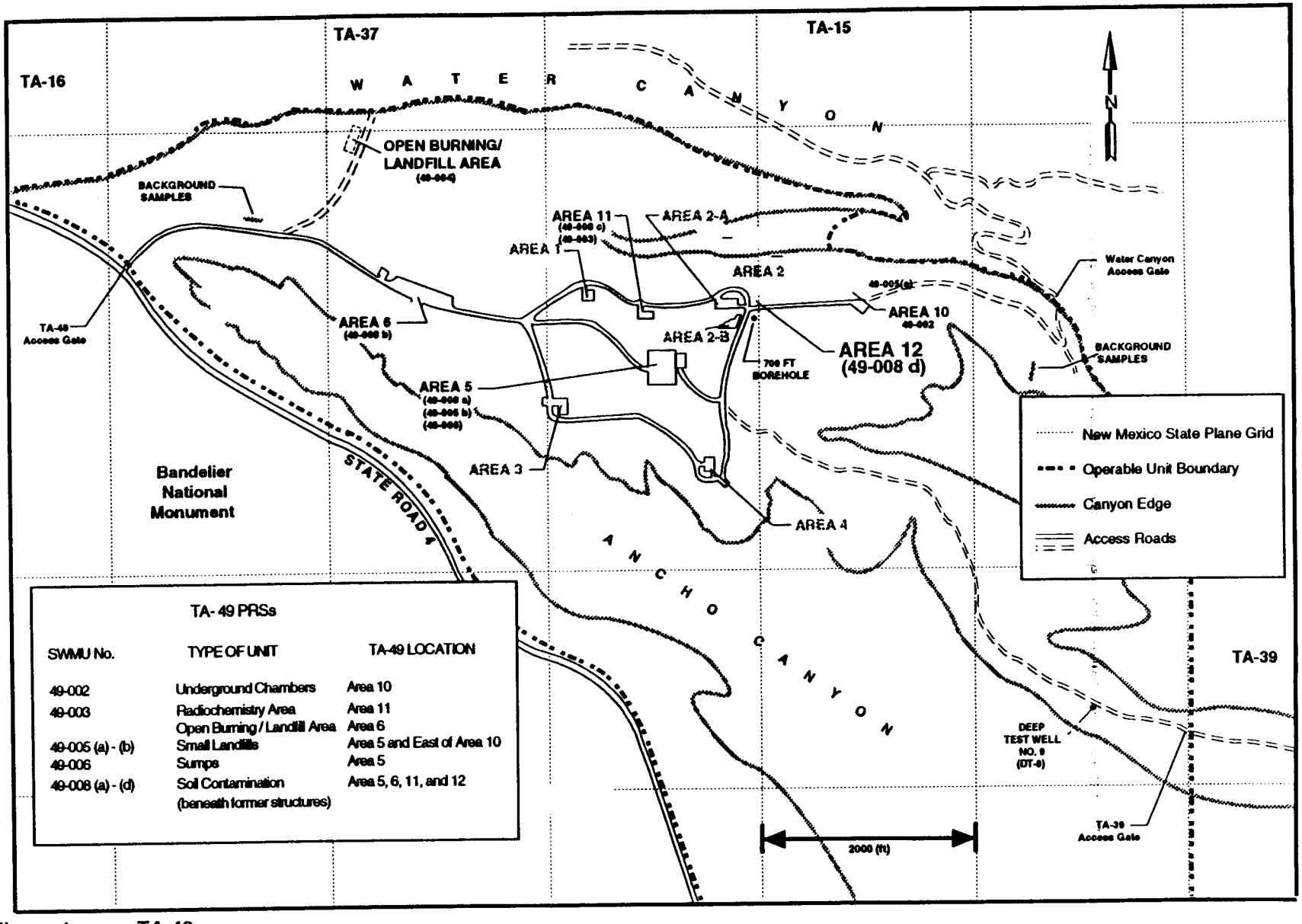
2.1 RFI Information/Other Decision Data

PRS 49-008(d) is described in the RFI Work Plan for OU 1144 (LANL 1992, 0786). Data available for site characterization include a study of surface soils conducted in 1987, an RFI Phase 1 radiological field survey, and a Phase 1 surface soil sampling event.

2.1.1 Previous Investigations

As part of DOE's management of MDAs containing buried radioactive waste, an intensive study of surface soils and vegetation at MDA AB and several other areas, including Area 12, of TA-49 was conducted in 1987 (Soholt 1990,0698). This study is referred to as the "A-411 survey". As part of the A-411 survey, 12 soil samples and 11 vegetation samples were collected around the Bottle House and analyzed for radionuclides. The A411 survey results are discussed extensively in chapters 6 and 7 of the RFI Work Plan for OU 1144. Although most samples had analyte concentrations near background or analytical detection limits, a few samples showed radionuclide levels slightly above background but well within action levels. The most elevated contaminant level is for plutonium 239/240; one sample exhibited 0.69 pCi/g. Based on that study, the RFI Work Plan concluded that surface contamination at Area 12 was low level and highly discontinuous in distribution, which is typical for other PRSs at TA-49 and consistent with the limited activities that took place there.

In 1990, soil samples from the road way south of the Bottle House were surveyed for gross alpha/beta and gamma radioactivity (Romero 1990, 03-0040). Levels of radionuclides were found to be at or below regional background levels or analytical detection limits. Refer to the A411 survey and the Laboratory's Annual Surveillance Reports for detailed discussion and results of environmental surveillance activities at TA-49.



TA- 49 PRSs

SWMU No.	TYPE OF UNIT	TA-49 LOCATION
49-002	Underground Chambers	Area 10
49-003	Radiochemistry Area	Area 11
	Open Burning / Landfill Area	Area 6
49-005 (a) - (b)	Small Landfills	Area 5 and East of Area 10
49-006	Sumps	Area 5
49-008 (a) - (d)	Soil Contamination (beneath former structures)	Area 5, 6, 11, and 12

Figure 1 TA-49

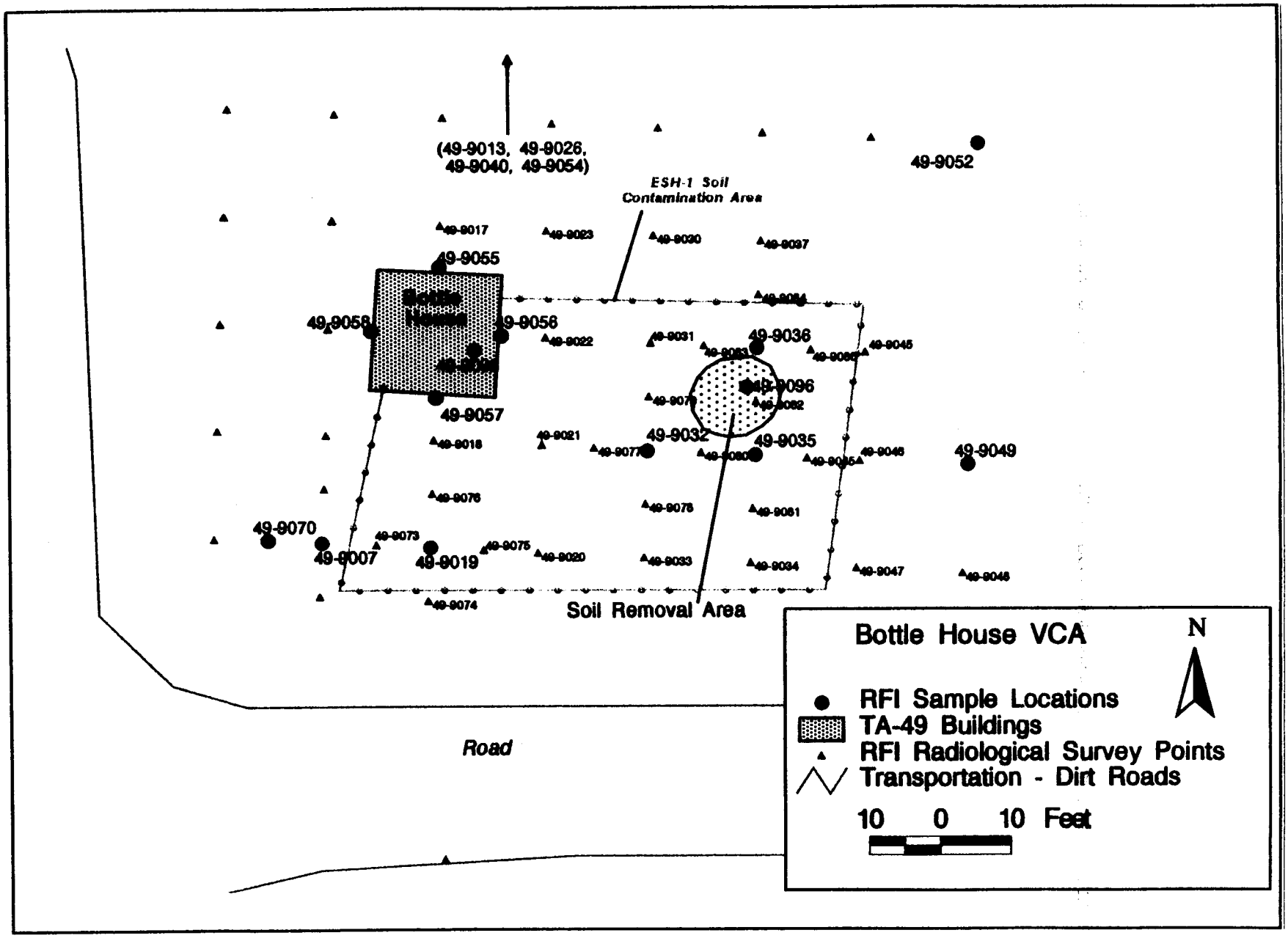


Figure 2 **Bottle House Soil Removal Area**

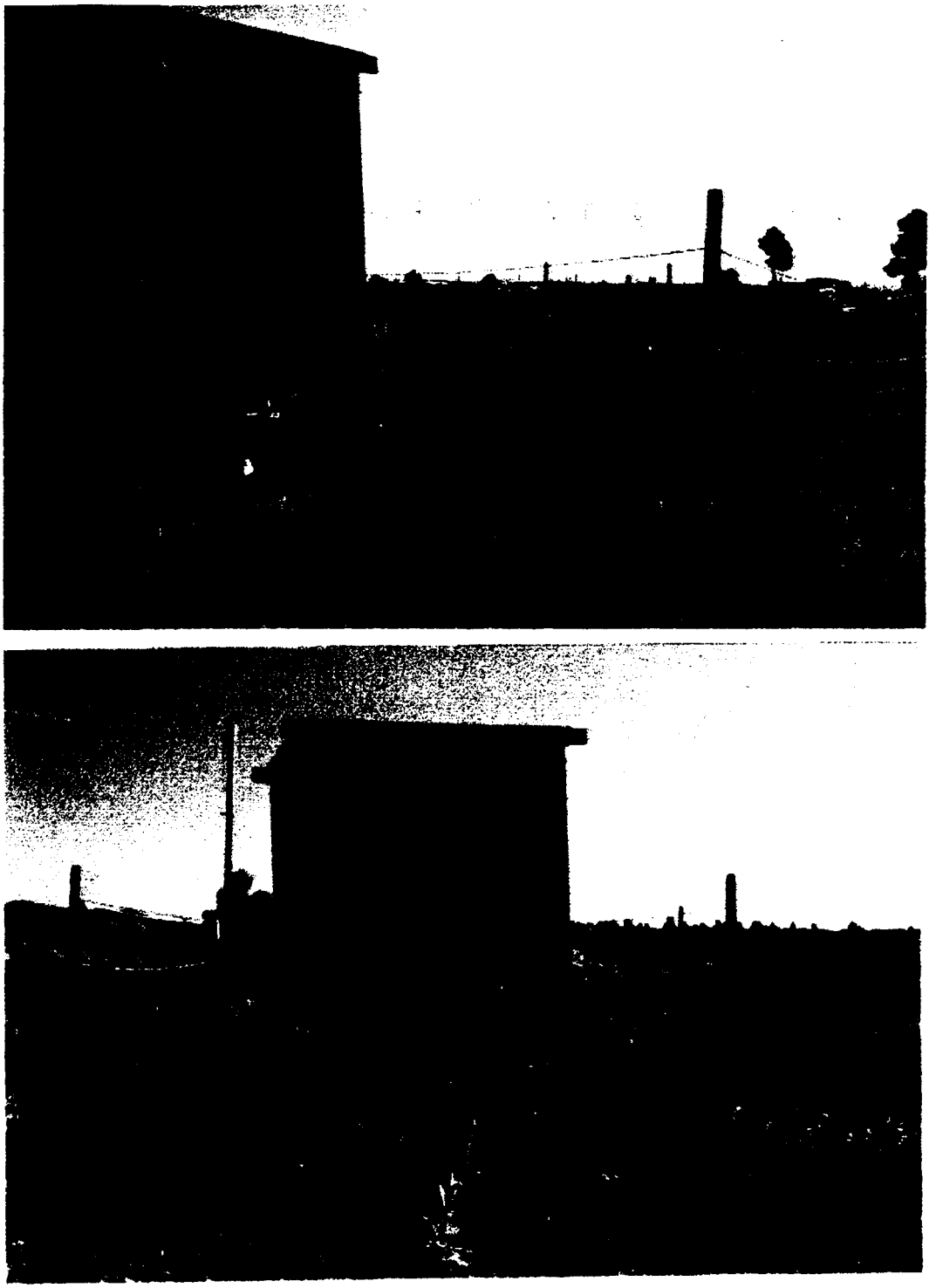


Figure 3 **Area 12 Bottle House: View facing northeast (upper photo) and north (lower photo).**

2.1.2 RFI Field Investigation

In 1995, a field investigation was made to characterize surface soils and shallow subsurface materials at TA-49. The investigation at Area 12 included:

1. A radiological survey using FIDLER portable gamma spectroscopy instruments.

2. Collection of discrete, randomly selected, surface soil samples (0-6 in.) from the 15 foot mesh grid around the Bottle House area, and surface soil samples (0-6 and 6-12 in.) at areas identified as "hot spots" by the radiological survey, for fixed laboratory analysis for radionuclides and metals.

2.1.2.1 FIDLER Radiological Survey

The radiological survey at Area 12 was performed at locations seen in Figure 2. The grid surveyed over the Bottle House area identified locations that exceeded three standard deviations of average background. Background was determined by measurements taken at two areas in TA-49 with no known previous laboratory activities. Elevated readings were identified at survey locations 49-9007, 49-9019, 49-9036, 49-9073, 49-9080, and 49-9082.

2.1.2.2 Soil Sampling

As proposed by the OU 1144 work plan, sample locations were established at PRS 49-008(d) at the Bottle House area. On 10 August 1995, surface soil samples were collected at Area 12 (see Figure 2). Twelve samples, randomly chosen from the 15 by 15 foot grid, were collected (0-6 in.) around the Bottle House area and twelve (location ids 49-9007, 49-9019, 49-9032, 49-9035, 49-9036, and 49-9096) were collected (0-6 and 6-12 in.) from six hot spots identified by the radiological survey. All surface soil samples were collected according to LANL-ER-SOP-06.09,R0, Spade and Scoop Method for Collection of Soil Samples.

All the samples collected were analyzed for gross alpha/beta and gamma spec; one-half of the samples plus all twelve hot spot samples were analyzed for isotopic plutonium, total uranium, and RCRA metals. Table 1 in Annex 7.2 summarizes the samples collected and analysis performed.

At each of the sample locations in Area 12, beta/gamma screening was conducted using an ESP-1 portable meter subsequent to sample removal. The range of beta/gamma measurements was 174 to 17,500 cpm with the average being 1,200 cpm. As expected, the elevated measurements came from the hot spot sample locations. The normal LANL background is from 150-250 cpm.

All the samples collected were also screened for gross alpha/beta before shipment to the analytical laboratory. Minimum, average, and maximum radioactivities of the samples from Area 12, PRS 49-008(d), were 0.4, 89, and 2308 pCi/g gross beta and 0.0, 9.0, and 160 pCi/g gross alpha. No LANL background UTL has been established for gross alpha or beta activity; however, these data can be compared to TA-49 on-site background data collected in 1993 as part of the OU1144 RFI characterization. At nine on-site monitoring locations, the minimum, average and maximum gross alpha activities were 0, 2.9, and 5.9 pCi/g, and gross beta activities were 2.6, 12.1, and 19.8 pCi/g.

2.2 Nature and Extent of Contamination

A detailed screening assessment to determine COPCs at the Bottle House Area is presented in Annex 7.2. As discussed in Annex 7.2, COPCs at the site are isotopes of uranium, mostly U-238, and to a lesser degree U-234. Plutonium-239 was found at levels (maximum of 0.9 pCi/g) much lower than the SAL, 24 pCi/g. Copper and silver were also found at levels far below the SALs for these metals. Gross beta screening measurements and laboratory analyses for U-238 are shown in Table 5 in and are plotted in Figure 4 in Annex 7.2. The primary contamination at this PRS appears to be confined to an area around sample location 49-9096 (see Figure 2). A second area near 49-9019 has slightly elevated levels. Samples collected at the depth interval of 6 to 12 inches have significantly lower level of uranium. Therefore the contamination appears to be in the upper 6 inches of the soil. The source of this contamination is unknown, but it may have originated from small leaks or spills of material temporarily stored at Area 12 in the 1960s for use in the Area 2 hydronuclear experiments.

3.0 PROPOSED REMEDY

3.1 Description of the Proposed Remedial Action

The site is lightly vegetated with grasses and some brush. Vegetation will be cleared, as needed, with hand tools. An initial radiation survey of the area will be conducted using hand-held instruments and by the collection of spot soil samples for gross beta radiation screening. The contaminated area will be surveyed for beta/gamma radiation using hand held instruments which measure in cpm units. Soil at locations with any beta/gamma ESP-1 readings above 3000 cpm will be removed. It is estimated that 3000 cpm or less will correspond to a uranium activity of 231 pCi/g or less (i.e, the clean-up goal). An estimate can only be made prior to conducting the actual field work because the available beta/gamma data from the 1995 RFI investigation does not correlate well to the analytical laboratory isotopic uranium results. Therefore, this level of 3000 cpm may be revised downward following the initial radiation survey to be conducted prior to soil removal. The surface soil contamination will be removed using hand tools to an anticipated maximum depth of 1 foot, containerized in drums, and disposed of at TA-54, MDA G. The size of the area to be removed is approximately 100 ft^2. Hand-held radiation measurement instruments e.g., a beta/gamma meter, can readily detect soil with uranium and these will be used to guide the soil removal. Gross beta measurements of soil samples at the ESH-19 soil counting facility will also be used to provide preliminary confirmation of contaminant removal. A good correlation exists between the on-site gross beta data and the analytical laboratory isotopic uranium results as shown in Section 7.2.2 (Table 5 and Figure 4). The advantage to using these two methods is the low cost and rapid measurement time (1 minute for the beta/gamma and about two hours for the gross beta).

The generation of dust will be minimized by the use of hand-held water sprayers. Personnel will work from the upwind side of the soil removal area. CST-7 procedures indicate that waste drums should be filled to capacity. If needed, soil from around location 49-9019 will be used to complete the filling of the final drum. A drum storage area recently used for storing drill cuttings from the Area 2 RFI field investigation will be utilized for temporary storage of the containerized soil. The excavated site will be re-graded using on-site soils. If needed, clean fill material known to be contaminant free, will be used to return the site to the original grade. Storm water runoff from the site should not be problem because the area is relatively flat. Hand tools and other equipment will be cleaned onsite using 'dry' decontamination procedures, i.e., Fantastic cleaner and paper towels.

3.2 Basis for Cleanup Levels

PRS 49-008(d) lies within DOE-owned land on a mesa top. The area is removed from public access roads. Access to Technical Area 49 is controlled by a perimeter fence and locked gate. In the foreseeable future, the land is anticipated to be used exclusively for Laboratory (industrial) operations.

RESRAD default input parameters for mesa-top soils from "Derivation and Use of Radionuclide Soil Cleanup Guidelines", LANL, PCT Policy Notebook, EM/ER:96-PCT-013, 1996 were used to calculate these generic cleanup guidelines.

Nuclide	Residential	Industrial
U-234	30.8 pCi/g	244 pCi/g
U-235	6.5 pCi/g	54.2 pCi/g
U-238	32.2 pCi/g	231 pCi/g

The future use at TA-49 will remain under institutional control and thus any foreseeable use would be industrial. The proposed soil removal will attain the industrial clean-up standards. It appears from Figure 4 in Annex 7.2 that a screening activity of 400 pCi/g gross beta could be conservatively used to achieve the U-238 clean-up goal of 231 pCi/g. Laboratory analyses for isotopic uranium will be used for final confirmation that clean-up standards were achieved.

An ecological risk evaluation was not performed because the Laboratory ER Project, in cooperation with the New Mexico Environment Department and EPA Region 6, is developing an approach for ecological risk assessment. This site will be evaluated for ecological concerns as soon as the ecological risk screening assessment methodology can be conducted for this ecological unit.

3.3 Site Restoration

When sample results confirm that the site has been remediated in accordance with this plan, the excavated area will be returned to the original grade.

4.0 WASTE MANAGEMENT

4.1 Estimated Types and Volumes of Waste

Item	Waste Type	Anticipated Volume
Sampling waste/PPE	solid - potential rad	1 ft^3
Contaminated soils	solid - radiation	50-100 ft^3

4.2 Method of Management and Disposal

Contaminated soil and PPE will be placed into properly labeled drums and stored on site for transportation and final disposal at Area G. The drums should be removed from the site within 4 weeks or less. Periodic inspections of the storage area will be made, as required, prior to removal of the drums.

5.0 DESCRIPTION OF CONFIRMATORY/VERIFICATION SAMPLING

The excavated area will be surveyed for radiation using hand held instruments which measure in cpm units. Soil at locations with any beta/gamma ESP-1 readings above 3000 cpm will be removed. It is estimated that 3000 cpm or less will correspond to a uranium activity of 231 pCi/g or less (i.e, the clean-up goal). However, this level of 3000 cpm may be revised downward following the initial radiation survey to be conducted prior to soil removal. When the soil removal efforts have been completed, spot soil samples will be collected and screened for Gross Beta radioactivity using the ESH-19 Berthold proportional gas counter. Any areas with gross beta measurements exceeding 400 pCi/g will result in additional soil removal. Two confirmatory soil samples will then be collected and submitted for isotopic uranium analysis. If the sample results are at or below the clean-up levels, the site will be re-graded. If the results are above the industrial scenario clean-up goals, the area will be re-surveyed and additional soil will be removed as needed. If during the clean-up, the soil contamination appears to at a depth greater than 1 foot over a large area, the soil removal will cease and a modified VCA plan will be developed and submitted for approval.

6.0 ESTIMATED TIME TO COMPLETE THE ACTION AND UNCERTAINTIES

Approximately three days will be required for pre-field and mobilization activities. These include tailgate safety meetings, vegetation removal, establishment of work zones and waste storage area preparation. It is estimated that three days will be required to remove the contaminated soil using hand tools. Soil removal workers will be wearing air purifying respirators, so an allowance will need to be made for frequent rest breaks. Confirmatory sample collection, sample screening and submittal will require ½ day. Follow-up remediation and sampling, if needed should be completed with one additional day's work. The amount of non-contaminated soil removed (and thus total cost) will be minimized by screening with hand-held meters. It is anticipated that the excavation depth will be kept at less than 1 foot through frequent radiation surveying of the soil surface, removal of soil in lifts of 2 to 3 inches depth and then re-surveying with the meters to determine if a greater depth of soil removal is needed.

7.0 ANNEXES

7.1 Risk-Based Cleanup Level Assumptions and Calculations

RESRAD default parameters and assumptions from the "Derivation and Use of Radionuclide Soil Cleanup Guidelines", LANL, EM/ER:96-PCT-0131996 were used to calculate the cleanup guidelines. Pathways selected for the RESRAD model included external gamma, inhalation (w/o radon), soil ingestion, and radon. The generic guidelines shown in Section 3.2 are based on target dose rates of 30 mrem/yr above background for the industrial scenario future use and 15 mrem/yr above background residential scenario. The actual calculated values were 732.2, 162.7 and 693.5 pCi/g of U-234, U-235 and U-238, respectively. When more than one radionuclide is present, the EM/ER:96-PCT-013 guidelines referenced above require that collective impact of the radionuclides be evaluated. This is similar to a multi-chemical evaluation in that the final activities of the three uranium radionuclides in the remediated soils are divided by the RESRAD calculated values. The sum of these ratios are required to be less than unity. In order to assure this, the calculated values for the three radionuclides were divided by 3 and these are the clean-up values shown in Section 3.2. The generic soil cleanup guidelines represent the worst case exposure conditions within the bounds of the exposure scenario, i.e. industrial future use with limited TA-49 site access and continuation of institutional controls over the foreseeable future.

7.2 RFI Analytical Results

TABLE 1
Summary of Samples Taken at PRS 49-008(d)-Area 12- Bottle House

LOCATION ID	SAMPLE ID	DEPTH (FT)	MATRIX	SVOCs	PCBs	METALS	GAMMA	ISO PU	TOTAL U
49-9007	0549-95-0265	0 - 0.5	SOIL	nr	nr	x	x	x	x
49-9007	0549-95-0266	0.5 - 1.0	SOIL	nr	nr	x	x	x	x
49-9013	0549-95-0267	0 - 0.5	SOIL	nr	nr	nr	x	nr	nr
49-9019	0549-95-0268	0 - 0.5	SOIL	nr	nr	x	x	x	x
49-9019	0549-95-0269	0.5 - 1.0	SOIL	nr	nr	x	x	x	x
49-9019R	0549-95-0270	0.5 - 1.0	SOIL	nr	nr	x	x	x	x
49-9026	0549-95-0271	0 - 0.5	SOIL	nr	nr	nr	x	nr	nr
49-9032	0549-95-0272	0 - 0.5	SOIL	nr	nr	x	x	x	x
49-9032	0549-95-0273	0.5 - 1.0	SOIL	nr	nr	x	x	x	x
49-9035	0549-95-0274	0 - 0.5	SOIL	nr	nr	x	x	x	x
49-9035	0549-95-0275	0.5 - 1.0	SOIL	nr	nr	x	x	x	x
49-9036	0549-95-0276	0 - 0.5	SOIL	nr	nr	x	x	x	x
49-9036	0549-95-0277	0.5 - 1.0	SOIL	nr	nr	x	x	x	x
49-9040	0549-95-0278	0 - 0.5	SOIL	nr	nr	nr	x	nr	nr
49-9049	0549-95-0279	0 - 0.5	SOIL	nr	nr	nr	x	nr	nr
49-9052	0549-95-0280	0 - 0.5	SOIL	nr	nr	nr	x	nr	nr
49-9054	0549-95-0281	0 - 0.5	SOIL	nr	nr	nr	x	nr	nr
49-9055	0549-95-0282	0 - 0.5	SOIL	nr	nr	nr	x	nr	nr
49-9056	0549-95-0283	0 - 0.5	SOIL	nr	nr	nr	x	nr	nr
49-9057	0549-95-0284	0 - 0.5	SOIL	nr	nr	nr	x	nr	nr
49-9058	0549-95-0285	0 - 0.5	SOIL	nr	nr	nr	x	nr	nr
49-9070	0549-95-0291	0 - 0.5	SOIL	x	nr	nr	x	nr	nr
49-9095	0549-95-0015	0 - 0.5	SOIL	x	x	x	x	x	x
49-9096	0549-95-0013	0 - 0.5	SOIL	nr	nr	x	x	x	x
49-9096	0549-95-0014	0.5 - 1.0	SOIL	nr	nr	x	x	x	x

x = Laboratory Analysis completed
nr = Laboratory Analysis not requested
R = Field Replicate Sample

7.2.1 Evaluation of Inorganics

Fourteen soil samples collected at PRS 49-008(d) were analyzed for metals and total uranium. Seven inorganics (chromium, copper, lead, silver, sodium, uranium, and zinc) were detected at concentrations above their respective background screening values. Further background comparisons were performed for chromium, copper, lead, sodium, uranium, and zinc. Silver was not subjected to further background comparisons because the background data for this metal is inadequate to support other statistical tests. Silver is carried forward to the screening assessment because of the lack of background information.

Because the data for the other six metals (chromium, copper, lead, sodium, uranium, and zinc) do not appear to satisfy normality assumptions, non-parametric tests were preferred for further background comparisons. The Gehan modification to the Wilcoxon Rank Sum

test and the Quantile test were used for these evaluations. The Gehan test is best suited for assessing complete shifts in distribution, whereas the Quantile test is better suited for assessing partial shifts. These two tests can detect most types of differences between distributions. Observed significance levels (p-values) for these tests are presented in Table 2. If a p-value is less than some small probability, 0.05, then there is some reason to suspect that there is a difference between the background and site distributions; otherwise, no difference is indicated.

TABLE 2
STATISTICAL TESTS FOR BACKGROUND COMPARISON

ANALYTE	GEHAN TEST P-VALUE	QUANTILE TEST P-VALUE
Chromium	0.99	0.96
Copper	0.0001	<0.00005
Lead	0.91	0.81
Sodium	0.23	0.81
Uranium	<0.00005	<0.00005
Zinc	0.08	0.29

The results for chromium, lead, sodium, and zinc are indicative of site concentrations that are not statistically elevated above background. The results for copper and uranium are indicative of site concentrations that are greater than background. The data for these analytes are presented in Table 3.

TABLE 3
INORGANICS WITH CONCENTRATIONS EXCEEDING BACKGROUND SCREENING VALUES AT PRS 49-008(d)

Location ID	Depth (ft)	Sample ID	Copper (mg/kg)	Silver (mg/kg)	Uranium (mg/kg)
UTL	N/A	N/A	15.5	0.42 [b]	5.45
SAL	N/A	N/A	2800	380	230
49-9007	0 - 0.5	0549-95-0265	14.9	0.44	49.6
49-9007	0.5 - 1	0549-95-0266	NA	NA	23
49-9019	0 - 0.5	0549-95-0268	22.9	0.43 (U)	209
49-9019	0.5 - 1	0549-95-0269	NA	NA	42.9
49-9019	0.5 - 1	0549-95-0270	NA	NA	10.4
49-9032	0 - 0.5	0549-95-0272	19.1	0.42 (U)	16.8
49-9032	0.5 - 1	0549-95-0273	NA	NA	13.7
49-9035	0 - 0.5	0549-95-0274	8.8	0.43 (U)	18.1
49-9036	0 - 0.5	0549-95-0276	NA	NA	68.4
49-9036	0.5 - 1	0549-95-0277	7.5	0.49	8.6
49-9096	0 - 0.5	0549-95-0013[a]	114	3.8	2087
49-9096	0.5 - 1	0549-95-0014	4.3	0.85	67.9

a = Value represents the maximum of a sample concentration and its laboratory duplicate.
b = For silver, the detection limit is used as a background screening value.
N/A = Not applicable.
n/a = Not available.
NA = Not analyzed.

Uranium metal is the only COPC above SAL.

7.2.2 Evaluation of Radionuclides

Fourteen soil samples collected at PRS 49-008(d) were analyzed for isotopic plutonium and isotopic uranium. These fourteen samples and an additional seventeen samples were also analyzed by gamma spectroscopy.

Analyses of radionuclides by gamma spectroscopy often leads to the reporting of concentrations for certain radionuclides that are inappropriate to evaluate as potential site contaminants. These include: short-lived activation/fission products, naturally occurring background radionuclides, and daughter radionuclides of naturally occurring radionuclides. These three classes of radionuclides are generally not considered site contaminants for the reasons discussed below.

Five short-lived activation/fission products reported at PRS 49-008(d) (cesium-134, cobalt-57, manganese-54, ruthenium-106, and sodium-22) have half-lives ranging from a few days to 2.6 years. Several of these radionuclides are used as internal standards to measure equipment performance, laboratory background (or contamination), etc. Because activation/fission products with short half-lives are routinely reported for reasons not related to RFI investigations, and are not expected to be occur at this PRS, these short-lived activation/fission products are eliminated as potential radionuclide contaminants.

Potassium-40 is a naturally-occurring radionuclide that is also routinely reported by the analyst because it is used as an internal standard to measure such things as equipment performance, laboratory background (or contamination), etc. There is no process knowledge of the use of potassium-40 at this PRS, and reported concentrations are generally within known background ranges for potassium-40 (Longmire et al. 1995,1142; Longmire et al. 1995,1266), including the background range of TA-49 background data. Potassium-40 will not be considered a potential radionuclide contaminant at this site.

Daughters of naturally occurring radionuclides (uranium and thorium) are also reported by gamma-spectroscopy analyses. These daughters (e.g., isotopes of actinium, bismuth, lead, protactinium, radium, radon, thallium, and thorium) are normally present in secular equilibrium concentrations and are not directly evaluated as potential radionuclide contaminants.

Cesium-137, plutonium-238, plutonium-239/240, uranium-234, uranium-235, and uranium-238 are the remaining radionuclides that were detected. Cesium-137 and plutonium-238 were eliminated from further consideration based on comparison to background screening values. Plutonium-239/240, uranium-234, uranium-235, and uranium-238 were detected above their respective background screening values. The data for each sample that has at least one detected concentration above background screening values for these radionuclides are presented in Table 4.

TABLE 4

RADIONUCLIDES WITH CONCENTRATIONS EXCEEDING BACKGROUND SCREENING VALUES AT PRS 49-008(d)

Location ID	Depth (ft)	Sample ID	Plutonium-239/240 (pCi/g)	Uranium-234 (pCi/g)	Uranium-235 (pCi/g)	Uranium-238 (pCi/g)
UTL	N/A	N/A	0.092[a]	1.94	0.084	1.82
SAL	N/A	N/A	24	13	10	67
49-9096	0 - 0.5	0549-95-0013	0.903	**56.5**	**12** b	**685**
49-9096	0.5 - 1	0549-95-0014 b	0.016	2.65	0.49 b	22
49-9007	0 - 0.5	0549-95-0265	0.077	3.84	0.42 b	18
49-9007	0.5 - 1	0549-95-0266	0.05	1.88	0.16 b	7.71
49-9019	0 - 0.5	0549-95-0268	0.064	14.9	1.42 b	66
49-9019	0.5 - 1	0549-95-0269	0.015	3.86	0.42 b	14.7
49-9019	0.5 - 1	0549-95-0270	0.013	1.8	0.1 b	4.73
49-9032	0 - 0.5	0549-95-0272	0.483	1.61	0.28 b	6.5
49-9032	0.5 - 1	0549-95-0273	0.198	1.31	0.23 b	3.36
49-9035	0 - 0.5	0549-95-0274	0.22	1.51	0.12 b	6.7
49-9035	0 - 0.5	0549-95-0275	0.079	1.34	0.12 b	2.76
49-9036	0 - 0.5	0549-95-0276	0.211	2.85	0.4 b	22.7
49-9036	0.5 - 1	0549-95-0277	0.012	1.32	0.09 b	3.23

a = Value represents the maximum activity from the Environmental Surveillance reports.
b = Uranium-235 was analyzed by alpha spectroscopy and gamma spectroscopy. The alpha spectroscopy result is reported.
N/A = Not applicable.
Shaded cells = Above the background UTL.
Bolded numbers = Above the SAL.

Uranium-234 and Uranium-238 are the radiological COPC above SAL. The gross beta screening measurements, beta/gamma hand-held meter measurements and the U-238 laboratory results from the RFI investigation are shown in Table 5. Gross beta measurements vs. laboratory U-238 analyses for Phase 1 soil samples are graphed in Figure 4. As proposed in Section 3.1, the use of hand-held radiation meters that provide real-time data can expedite the removal of soil contaminated above clean up levels. However, the poor correlation between the available beta/gamma measurement results and the laboratory data hinders the direct selection of a beta/gamma level to be used to guide soil removal. The highest beta/gamma measurement away from the contaminated soil area around location 49-9096 was 635 cpm. A stronger correlation exists between the gross beta measurements and the U-238 data. As indicated from Figure 4, a gross beta level of 400 pCi/g could be conservatively used to ensure removal of any contaminated soil at or above the U-238 clean-up goal of 231 pCi/g. The gross beta measurements, however require about 2 hours to complete and have to be made off-site at TA-59. Therefore, an initial minimum value on the hand-held beta/gamma meters of 3000 cpm will be used to guide the soil removal decisions in the field. During the clean-up, this minimum beta/gamma value will be lowered, as needed, until the soil left in place is at 400 pCi/g or less gross beta. Final attainment of the clean up goals will be confirmed when samples of the left in place soil are at 231 pCi/g or less of U-238 as determined by analytical laboratory analyses.

TABLE 5

RFI PHASE 1 GROSS BETA SCREENING, HAND-HELD ESP-1 BETA/GAMMA MEASUREMENTS AND LABORATORY U-238 RESULTS

LOCATION ID	SAMPLE ID	DEPTH (inches)	Gross Beta pCi/g	Beta/Gamma cpm	U-238 pCi/g
49-9007	0549-95-0265	0 - 6	40	606	17.97
49-9007	0549-95-0266	6 - 12	40	NA	7.71
49-9013	0549-95-0267	0 - 6	15	222	NA
49-9019	0549-95-0268	0 - 6	230	596	65.96
49-9019	0549-95-0269	6 - 12	30	NA	14.73
49-9026	0549-95-0271	0 - 6	15	259	NA
49-9032	0549-95-0272	0 - 6	35	618	6.5
49-9032	0549-95-0273	6 - 12	35	NA	3.36
49-9035	0549-95-0274	0 - 6	45	288	6.7
49-9035	0549-95-0275	0 - 6	20	288	2.76
49-9036	0549-95-0276	0 - 6	90	635	22.74
49-9036	0549-95-0277	6 - 12	15	NA	3.23
49-9040	0549-95-0278	0 - 6	15	NA	NA
49-9049	0549-95-0279	0 - 6	10	196	NA
49-9052	0549-95-0280	0 - 6	30	237	NA
49-9054	0549-95-0281	0 - 6	5	263	NA
49-9055	0549-95-0282	0 - 6	15	178	NA
49-9056	0549-95-0283	0 - 6	45	305	NA
49-9057	0549-95-0284	0 - 6	25	243	NA
49-9058	0549-95-0285	0 - 6	5	174	NA
49-9070	0549-95-0291	0 - 6	35	277	NA
49-9095	0549-95-0015	0 - 6	15	218	1.31
49-9096	0549-95-0013	0 - 6	2300	17500	685
49-9096	0549-95-0014	6 - 12	55	NA	21.95

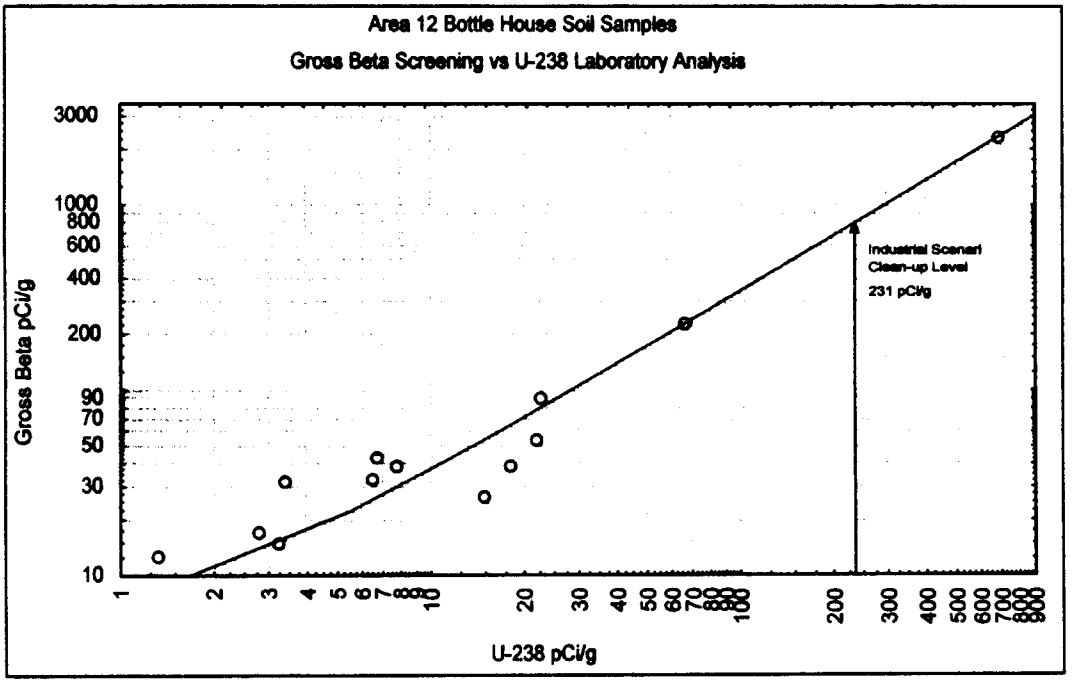


Figure 4. Phase 1 Gross beta data vs. U-238 Laboratory Analyses

7.3 Implementation Standard Operating Procedures

Site applicable Environmental Restoration Standard Operating Procedures, Volumes I and II, November 17, 1993, Los Alamos National Laboratory.

7.4 Quality Assurance Plan

See Quality Assurance Project Plan for Environmental Restoration, February 1995 revision, Los Alamos National Laboratory.

7.5 Site-Specific Health and Safety Plan

See Attachment A

7.6 Waste Management Checklist

See Attachment B

7.7 VCA Checklist and Field Work Authorization Form

See Attachment C

7.8 Cost Estimate

Labor Hours

	TSM	Tech	GRA	Support
Pre-Field Activities				
Tailgate Meeting	4	6	4	6
Brush Clearing	2	16	0	0
Waste Area Setup	2	16	0	0
Zone Setup	2	16	0	0
Field Activities				
Cleanup	24	72	0	48
Confirmatory Sampling	0	4	8	4
Waste Management Disposal	0	16	0	0
Post-Field Activities				
Re-grading	2	8	0	0
VCA Report	80	0	80	48
	116 hours	154 hours	92 hours	106 hours

Labor Costs			**$29,720**
Other Costs			
Sampling/Analytical Isotopic Uranium	2 samples @ $231 ea	=	**$462**
Waste Surcharge	10 Drums (7ft^3/drum) @ $9/ft^3	=	**$490**
Clean Fill Material (if needed)	8 yd^3	=	**$300**
Total			**$30,972**

8.0 REFERENCES

LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1144," Los Alamos National Laboratory report LA-UR-92-900, Los Alamos, New Mexico (LANL 1992, 0786)

Longmire, P., S. Reneau, P. Watt, L. McFadden, J. Gardner, C. Duffy, and R. Ryti, January 1995. "Natural Background Geochemistry, Geomorphology, and Pedogenesis of Selected Soil Profiles and Bandelier Tuff, Los Alamos, New Mexico," (draft) Los Alamos National Laboratory Report LA -12913- MS, Los Alamos, New Mexico. (Longmire et al. 1995, 1142)

Longmire, P. A., D. E. Broxton, and S. L Reneau (Eds.), October 1995. "Natural Background Geochemistry and Statistical Analysis of Selected Soil Profiles, Sediments, and Bandelier Tuff, Los Alamos, New Mexico, Los Alamos National Laboratory Report LA-UR-95-3486, Los Alamos, New Mexico. (Longmire et al. 1995, 1266)

Romero, Richard, 1987. Personal Communication to P. G. Eller (Los Alamos National Laboratory) from R. Romero, Los Alamos National Laboratory, Los Alamos, New Mexico. (Romero, Eller 1987, 03-0040)

Soholt, Lars F.; (Compilation) November 1990, 0698 "Environmental Surveillance of Low-Level Radioactive-Waste-Management Areas at Los Alamos, During 1987", Los Alamos National Laboratory Report LA-UR-90-3283, Los Alamos, New Mexico. (Soholt 1990, 0698)

9.0 ATTACHMENTS

Attachment A

Site Specific Health and Safety Plan

Los Alamos National Labora

ER PROJECT SHORT FORM SSHASP

SSHASP Number 141

Location TA-49, Bottle House (Area 12) (map attached) **Field Unit** 5

Task Name VCA **Date** November 18 1996

Prepared by Trung Nguyen **Date**

Field Unit HS Rep. Approval Ann Rundle Trung Nguyen FOR AR **Date** 11/18/96

ESH-1 ER/D&D Team Leader Pat LaFrate **Date** 11/19/96

Field Team Leader Approval Albert Dye **Date** 11/19/96

Field Project Leader Approval Don Krier **Date** 11/27/96

Facility - Mgr. or ESH Rep. Concurrence Ronald Brodd **Date** 11/18/96

Key Personnel

Facility Manager Ronald Brodd/FSS-7 **Phone/Pager** 7-4657

Field Team Manager Bill Kopp/ESH-19 **Phone/Pager** 5-6081

Field Team Leader Albert Dye/ESH-19 **Phone/Pager** 7-4715

Site Safety Officer Dan Sandoval/ESH-5 **Phone/Pager** 5-3380 / 104-3281

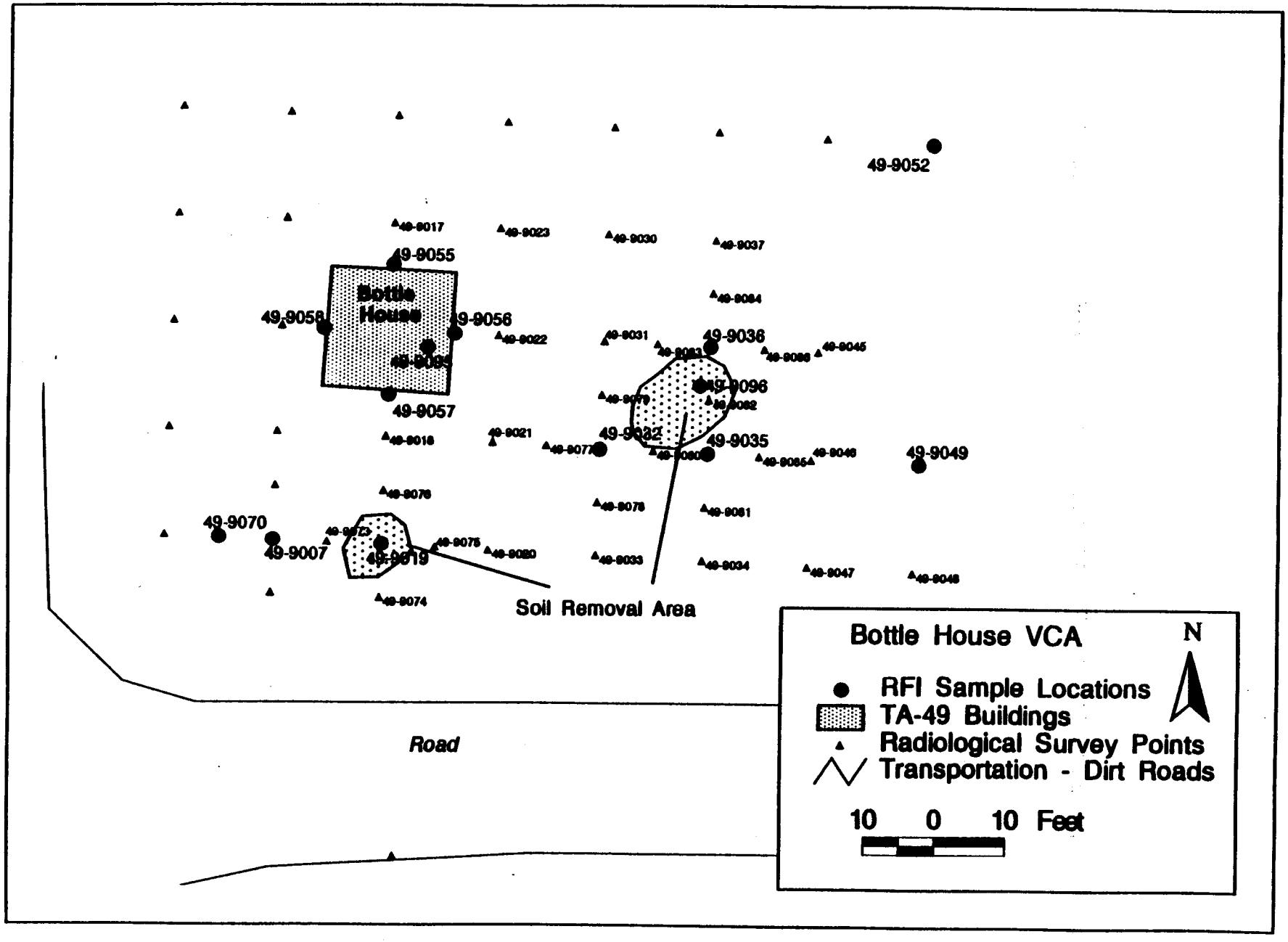
RCT/HPT/RSP (circle) Jody Armijo/ESH-19 **Phone/Pager** 7-8119

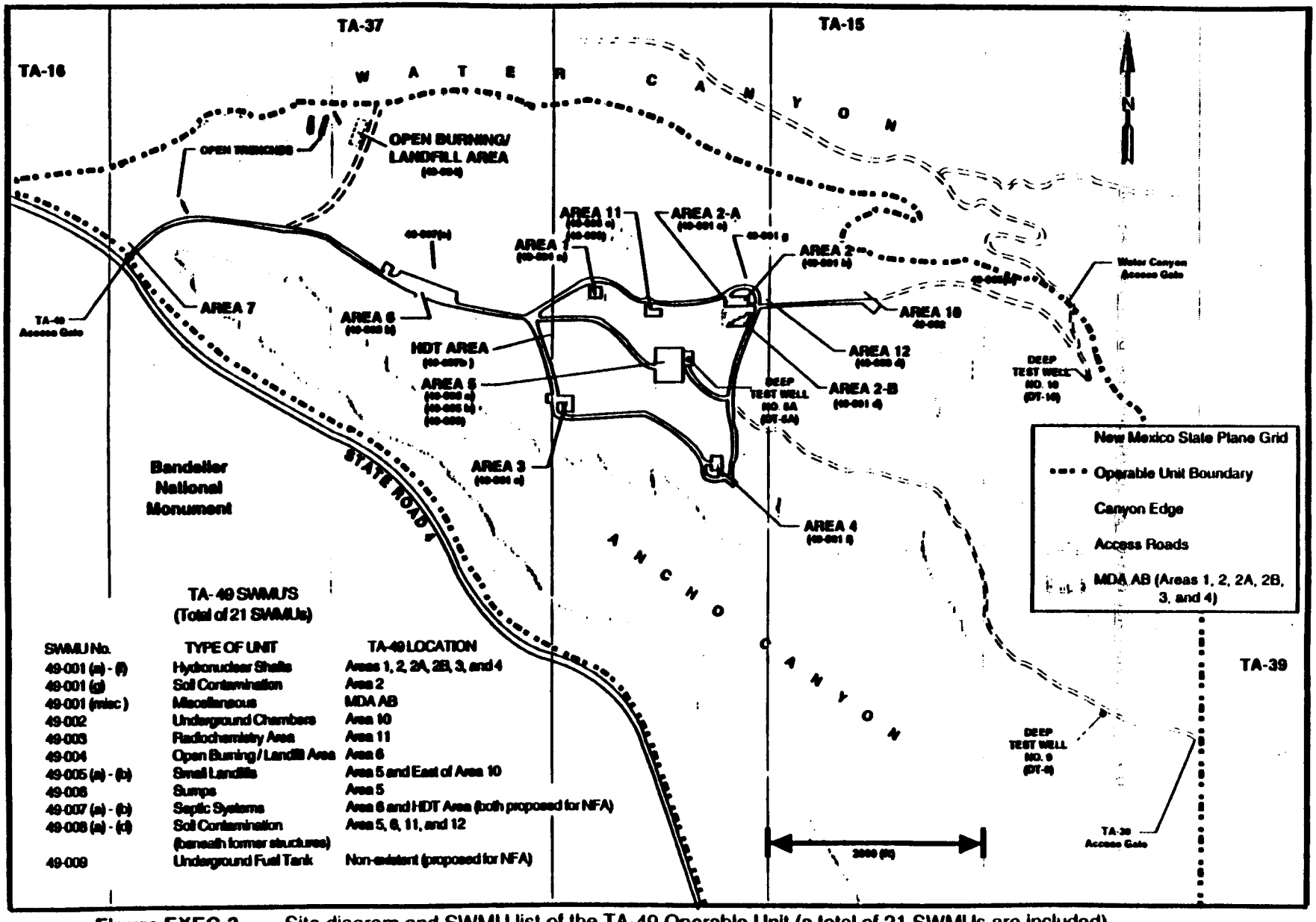
Field Unit HS Representative Trung Nguyen/ESH-5 **Phone/Pager** 667-7905 / 104-6650

ESH-1 Oversight Clarita Trujillo/ESH-1 **Phone/Pager** 7-3999 / 104-6663

Task Description

ESH-19 personnel will screen surface soil (up to 1-ft in depth) for radiological contamination in accordance with Radiological Work Permit (RWP) No. 49-ER-96-015. Soil at locations warranting cleanup will be removed using shovel(s) or a front end loader and placed into containers to be labeled, and disposed at LANL Area G based on review of the analytical data.


Bottle House VCA
N
RFI Sample Locations
TA-49 Buildings
Radiological Survey Points
Transportation - Dirt Roads
10 0 10 Feet
Bottle House
49-9052
49-9055
49-9058
49-9056
49-9057
49-9036
49-9096
49-9032
49-9035
49-9049
49-9070
49-9007
49-9019
Soil Removal Area
Road



TA-49 SWMUS
(Total of 21 SWMUs)

SWMU No.	TYPE OF UNIT	TA-49 LOCATION
49-001 (a) - (f)	Hydronuclear Shafts	Areas 1, 2, 2A, 2B, 3, and 4
49-001 (g)	Soil Contamination	Area 2
49-001 (misc.)	Miscellaneous	MDA AB
49-002	Underground Chambers	Area 10
49-003	Radiochemistry Area	Area 11
49-004	Open Burning/Landfill Area	Area 6
49-005 (a) - (b)	Small Landfills	Area 5 and East of Area 10
49-006	Sumps	Area 5
49-007 (a) - (b)	Septic Systems	Area 6 and HDT Area (both proposed for NFA)
49-008 (a) - (d)	Soil Contamination (beneath former structures)	Area 5, 6, 11, and 12
49-009	Underground Fuel Tank	Non-existent (proposed for NFA)

Figure EXEC-3 Site diagram and SWMU list of the TA-49 Operable Unit (a total of 21 SWMUs are included).

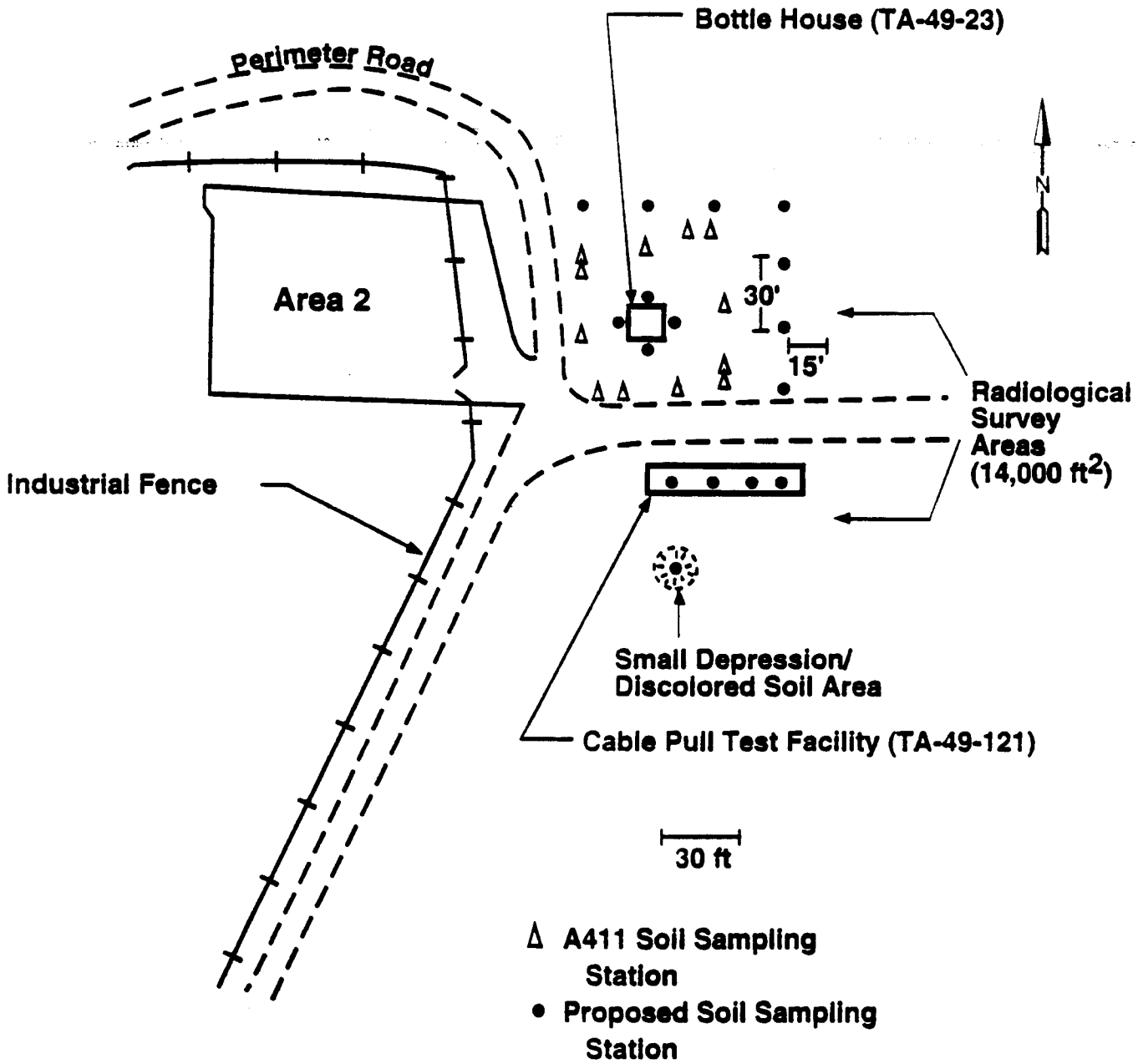


FIGURE 6.6-3 Proposed Area 16 RFI sampling locations. Four additional soil samples will be collected from the Bottle House floor.

Hazard Analysis

List all chemical, biological, physical, and radiological hazards associated with this task including hazard assessment ratings (per ER Project HASP, Appendix C).

Radiological: Negligible to Moderate - possible exposure to radioactive contaminants could occur Uranium - 2086.66 mg/Kg; Uranium-234 - 743 pCi/g, Uranium-235 - 31pCi/g, Uranium-238 - 690 pCi/g, Plutonium-239/240 - 0.903 pCi/g,

Physical: Negligible to Minor hazard due to potential for reversible injury. Primary hazard potential is slips, trips, or falls (< 6-ft) due to uneven outdoor terrain. Refer to Table 1 (attached) for general physical hazards associated with field work at LANL.

Chemical: Negligible hazard - none of occupational or environmental health concern (chromium - 32 mg/Kg, copper - 114 mg/Kg, lead - 8.2 mg/Kg, zinc - 45.2 mg/Kg)

Biological: Refer to Table 1 (attached) for general biological hazards associated with field work at LANL

Associated Special Work Permits/Procedures and Number: LANL Excavation Permit No. 96E-520-49; LANL RWP No. 49-ER-96-015

Will task affect other LANL operations, other employees, or other tasks? No X Yes

If yes, explain precautions taken and contacts notified Coordination with facility personnel will be handled by FTL and/or SSO as necessary; refer to Emergency Contact List (attached) for names and numbers

Hazard Controls

Engineering/Administrative Controls, Special Equipment, etc. Refer to Table 1 (attached)

PPE (Personal Protective Equipment)

Head: Use of hard hat where overhead hazard exists; Compliance with 29 CFR 1910.135, ANSI Z89.1-1986

Face & Eye: Safety glasses with sideshields required for all tasks unless full-face respirators are used; Compliance with 29 CFR 1910.133, ANSI Z87.1-1989

Gloves: As necessary per RWP No. 49-ER-96-015

Hearing: NA

Body: As necessary per RWP No. 49-ER-96-015

Foot: Steel-toed leather boots and any other as necessary per RWP No. 49-ER-96-015

Respiratory: Type of Respirator as necessary per RWP No. 49-ER-96-015

Type of Cartridge as necessary per RWP No. 49-ER-96-015

TABLE 1

HAZARD ASSESSMENT and ADMINISTRATIVE and ENGINEERING (A&E) CONTROLS

Administrative and engineering controls shall be implemented as the first line of defense for mitigating personnel exposure to hazards, and shall be implemented in accordance with applicable LANL, DOE and OSHA requirements.

Hazard	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering Controls (Prevention/Mitigation Measures)
Hazardous Waste Operations (HAZWOPER) Sites			
General	MINOR	Reversible illness/injury could occur from exposure to radiological, health, and safety hazards associated with HAZWOPER work	Compliance with OSHA HAZWOPER Standard (29 CFR 1926.65) for tasks involving PRSs and SWMUs and where there is reasonable possibility of exposure to HS hazards. Refer also to requirements for exposure monitoring, PPE, decon, emergency response planning, training, and medical surveillance.
Radiological Hazards			
Alpha Radiation	NEGLIGIBLE to MODERATE	Minor to moderate exposure to radioactive materials con possibly occur	Minimize exposure and maximize distance to source. Compliance with RWP No. 49-ER-96-015
Beta/Gamma Radiation	NEGLIGIBLE to MODERATE	Minor to moderate exposure to radioactive materials con possibly occur	Minimize exposure and maximize distance to source. Compliance with RWP No. 49-ER-96-015
Safety Hazards			
FIRE and HAZARDOUS SPILLS/RELEASES	Not applicable		
EXCAVATION/	**PERMIT REQUIRED** for excavating/trenching > 1 foot		
Underground Utilities	MINOR to SERIOUS	Hazard severity could be catastrophic resulting in irreversible harm or death, and although unlikely to occur, possibly could occur	Determine estimated locations of utilities (i.e., sewer, telephone, gas, electric, water lines, etc.) prior to excavating. Notify utility owners of intended work and request they demarcate on ground surface location(s) of underground utilities; have field team member accompany utility owner rep. to identify intended excavation location(s) and to find out specifics of utility location(s). If utility owner cannot establish exact location of utility installation(s), excavating may proceed with caution, provided detection equipment or other acceptable means to locate utility installation(s) are used. As excavating operations approach estimated location of underground utility, exact location of installation shall be determined by safe and acceptable means (i.e., using hand held excavating equipment). While excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard site personnel
WORKING AT HEIGHTS			
Uneven terrain, slips, trips, falls	MINOR to MODERATE	Variable terrain - working conditions could possibly result in reversible injury	Use caution and be observant while moving in areas of potential concern; minimize threat of slick surfaces.

TABLE 1 (ctd.)

HAZARD ASSESSMENT and ADMINISTRATIVE and ENGINEERING (A&E) CONTROLS

Hazard	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering Controls (Prevention/Mitigation Measures)
MOTORIZED / MECHANIZED EQUIPMENT OPERATION			
Vehicular Equipment Operation/ Maintenance	MINOR to SERIOUS	Hazard severity resulting in irreversible injury or death possibly could occur	Motorized vehicles and heavy equipment; engineering controls and equipment operation shall comply with applicable sections of 29 CFR 1926.201 and Subparts N and O, including use of seatbelts and provision of rollover protection..
MISCELLANEOUS			
Sanitation	MINOR to MODERATE	Unsanitary working conditions possibly could result in reversible or irreversible injury/illness	Compliance with OSHA Housekeeping Standard (29 CFR 1926.25). Provide and maintain sanitary potable water supply and portable toilet facilities at location onsite; compliance with 29 CFR 1926.51. Personnel to wash hands and face (as necessary) prior to eating, drinking, smoking, or chewing and after using toilet facilities
EQUIPMENT DECON	Handheld equipment will be deconned at TA-59 per ESH-19 procedure(s); heavy equipment at TA-50 per CST-7 procedure(s).		
ELECTRICAL	Not Applicable		
CONFINED-SPACE ENTRY	Not Applicable		
Physical Health Hazards			
Lightning Strikes	NEGLIGIBLE to MINOR	Life-threatening illness or death possibly could occur, although unlikely during September/October	Refer to Table 1 of the HASP for indications of exposure and response actions.
Heat/Cold Stress	NEGLIGIBLE to MINOR	Life-threatening illness or death possibly could occur if extreme hot or cold ambient temperatures occur	Inform personnel of signs and symptoms of heat/cold stress (Table 1 of HASP). Monitor personnel for indications of stress. Strive to prevent exposure by implementing appropriate work regimen, including work breaks so personnel can warm up or cool down and intake fluids as necessary., Install barriers or facilities to provide personnel protection from weather extremes.
Ergonomics	MINOR	Reversible injury possibly could occur	Implement appropriate training and precautionary measures in accordance with employer's ergonomics program.
Biological Hazards			
Refer to HASP Table 1			
Chemical Hazards			
None of occupational health concern			

Monitoring

List all personnel and area monitoring to be performed for this task, including action levels and equipment to be used, and any dosimetry requirements.

Radiological: Refer to Table 2 (attached). Air monitoring will not be required if hand shoveling with dust suppression. Front - end loader operations will require air sampling. . Continuous RCT support to be present. Dose rates shall be taken periodically in the EZ. Action levels in Table 2 and in RWP No. 49-ER-96-015 must be strictly adhered.

Dosimetry per RWP No. 49-ER-96-015 required for all site personnel.

Perimeter survey shall be conducted periodically using a FIDLER and 2" x 2" NaI around the EZ/Controlled Area to indicate any spread of contamination from the affected area

Chemical, Biological, Physical: NA

Site Control

Describe how site access and control will be maintained. (Site map attached - page 2).

In accordance with RWP No. 49-ER-96-015. An Exclusion Zone (EZ) will be established enclosing a 25-ft radius around sampling locations. A Contamination Reduction Zone (CRZ) will be located immediately adjacent to and upwind of the EZ. Postings of these areas as a Controlled Area or Soil Contamination Area will be made by the RCT depending on soil rad screening results in accordance with LANL LS107-02.0. The Support Zone (SZ) will be situated beyond and upwind of the CRZ.

Workers in the EZ will work in groups of at least two people (buddy system). Workers within EZ must have means of direct communication or maintain visual contact with support personnel outside EZ at all times.

The RCT shall survey for free release all material and equipment from the site in accordance with LP107-04.1, *Releasing Materials and Equipment*

Decontamination

Describe how decon will be performed and which option will be used (ER Project HASP, Section 8).

All rad decon shall be conducted under the direction of the RCT in accordance with RWP No. 49-ER-96-015. Dry decon only for rad (Fantastic® and masslinn).

Personnel: Decon according to Standard or Extensive Levels D or C (HASP Appendix D) depending on site conditions and RWP No. 49-ER-96-015 requirements, including frisking out of the EZ to be conducted using appropriate instruments.

Materials and Equipment: Rad release surveys in accordance with LP107-04.1, *Releasing Materials and Equipment*. Soil waste containers shall be dose-rated prior to removal from EZ. Vehicles and waste containers shall be smear surveyed prior to leaving the site; smears measured with either a Ludlum 2929 or Berthold LB770.

TABLE 2
DIRECT-READING INSTRUMENT REQUIREMENTS

Hazardous Condition/ Substance	Instrument	Procedure	Location and Frequency of Monitoring	Action Level(s)	Response Action(s)	Action Level Rationale
HEALTH PHYSICS						
Radiation Gross α and gross-β/γ contamination (specific radio-isotopes listed on page 2)	β/γ Eberline ESP-1 with HP-260 probe or equiv. α -Ludlum 139 with air proportional probe or equiv.	Per LANL RadCon Manual and training ESH-1 Procedures Manual	Surface Sampling/Excavations/ Drilling: Intermittent RCT coverage Excavated soil, cores, ground surface, and water samples to be screened prior to disturbance	Background	Field team member trained in ESH-1 procedures performs surveys (soil, core, personnel, etc.) Intermittent ESH-1 coverage Large area swipes for α (2000 cm^2) counted using field alpha screening instrument; direct frisk for β/γ	Standard levels set by ESH-1
	Ludlum Model 19 μR meter or equiv. dose rate meter Hi-vol air sampler (about 3 CFM) Front end loader only.	Per LANL RadCon Manual and training ESH-1 Procedures Manual	Non-intrusive Activities: Ground surface near source (as applicable based on potential for soil contamination) Personnel: Prior to exiting EZ, CRZ	Action Level I: > Background α < 500 cpm/probe area β/γ < 5,000 cpm/probe area	Notify ESH-1 of elevated readings Dedicated field team member trained in ESH-1 procedures performs surveys (soil, core, personnel, etc.) Increased intermittent ESH-1 coverage α swipes counted using Ludlum 2000 tray counter or equiv.; direct frisk for β/γ	Standard levels set by ESH-1
			Equipment: Prior to decon and for release	Action Level II: Any smear contamination on equip. or any detectable activity on personnel α > 500 cpm/probe area β/γ > 5,000 cpm/probe area	Work may only proceed according to approved RWP and with continuous coverage by an onsite ESH-1 technician (or equiv.) in accordance with Sections 3.2.4 and 3.3.4 of the HASP.	Standard levels set by ESH-1
	μR meter/ion chamber	Per LANL RadCon Manual and training	Initially to determine pre-job conditions, prior to sampling, and intermittently during rad survey walkover	> 5 mR/hr	Notify ESH-1 of elevated readings. Dedicated field team member trained in ESH-1 procedures to perform surveys (soil, core, personnel, etc.)	Standard levels set by ESH-1

Spill Containment and Emergency Response

No spills expected - no liquids onsite; however any spills will be handled by LANL Emergency Management and Response (EM&R). Emergency contact list and route to ESH-2/LAMC attached.

First-Aid/CPR Provider: Each ESH-19 field team member shall be 1st-aid and CPR certified

Communications: Two-Way Radio and/or cellular phone to be kept readily accessible and operable by field team personnel at all times

Incident Response Equipment: First-aid kit with contents approved by ESH-2 will be kept readily available in a "clean" zone nearby

Fire Extinguishing Equipment: NA

Medical Surveillance

Refer to HASP Appendix F - Hazardous Waste Operations - compliance with 29 CFR 1926.65(f)

Bloodborne Pathogens (Or Potentially Infectious Materials) - compliance with 29 CFR 1910.1030(f)

Training Requirements

Refer to Table 3 (attached).

TABLE 3
ESH-19 FIELD TEAM TRAINING REQUIREMENTS

Personnel shall be trained in accordance with Section 10 of the HASP and as specified below. Personnel performing roles indicated below shall have completed and have current documentation of the training specified. Onsite leaders shall verify that personnel have met the training requirements prior to authorizing individuals to enter controlled zones of the work site.

(R = Read training; C = Classroom training; Cert. = Current certification required; F = Field training; AN = As needed per the HASP or applicable regulatory requirement depending on the intended duties of the personnel role; ER = Employer required; TBD = To be determined by the Subcontractor)

Training Requirement	Personnel Role				
	FTL/ Alt. FTL	SSO	RCT, RSP, Smplr(s)	Hvy Equip. Operator	Recordkeeper
HASP *[per HASP Section 1.2]*	R	R	R	R	R
SSHASP [per HASP Section 1.2)	R	R	R	R	R
Pre- Job Start HS Briefing *[per HASP Section 10.1.3]*	F or C	F or C	F or C	F or C	F or C
Daily HS Tailgate Mtgs *[per HASP Section 10.1.4]*	F	F	F	F	F
General Employee Training (GET) - LANL provided only *[per HASP Section 10.4.1)*	C	C	C	C	C
TA/Facility-Specific Training	R or C-AN	R or C-AN	R or C-AN	R or C-AN	R or C-AN
Employer's Hazard Communication Program [29 CFR 1926.59(e)]	F or C	F or C	F or C	F or C	F or C
Conduct of Operations/Occurrence Reporting	R	R	R	R	R
OSHA Rights & Responsibilities	R	R	R	R	R
Health Physics Checklist Indoctrination *[per HASP Section 10.4.3)*	C	C	C	C	C
Rad. Worker II *[per HASP Section 10.4.4)*	Cert	Cert	Cert	Cert	AN
Radiological Surveillance Authorization Agreement (RSAA) issued by ESH-1			Cert		
1st Aid/CPR *[per HASP Section 10.2)*	Cert	Cert	Cert	AN	AN
Bloodborne Pathogens *[29 CFR 1910.1030]*	Cert	Cert	Cert	AN	AN
PPE (HASP Section 7.1, ER Project Health and Safety Activities Manual Section 10)	F or C	F or C	F or C	F or C	AN
Respiratory Protection [Per HASP Section 7.1 and 29 CFR 1910.134(b)(1) and (e)(2)]	C-AN	C-AN	C-AN	C-AN	C-AN
40 hr. HAZWOPER Course and 24 hr. Supervised Fieldwork (OJT) *(HASP Section 10.1.1.1)*	C and F Cert.	C and F Cert.	C and F Cert.-AN	C and F Cert.-AN	C and F Cert.-AN or
24 hr. HAZWOPER Course and 8 hr. supervised fieldwork (OJT)*(HASP Sec 10.1.1.2)*					C and F Cert.-AN
8 hr. Annual Refresher *(HASP Section 10.1.1.4)*	Cert. AN	Cert. AN	Cert. AN	Cert. AN	Cert. AN
8 hr. HAZWOPER Supervisor *(HASP Section 10.1.1.3)*	Cert.				
Sanitation *[29 CFR 1926.51]*	R, F, or C	R, F, or C			
Motor Vehicles, Mechanized Equip., Mat'l Handling Equip.*[Subparts O, W 29 CFR 1926]*				R, F, or C	
Signs, Signals, Barricades *[29 CFR 1926.200]*					

EMERGENCY CONTACTS AND PHONE NUMBERS

(post on-site in Support Zone)

HAZARDOUS RELEASE/SPILL:

LANL HAZMAT Team (EM&R).....**667-6211**

MEDICAL EMERGENCY/FIRE:

Los Alamos Fire Dept.....LANL phone: **911** Cellular phone: **667-7080**

LANL Occupational Medicine Clinic (ESH-2).....**667-0660**
Los Alamos Medical Center Hospital.....**662-4201**
Security OS/Pro Force.....**667-6534**
Los Alamos Police.....**662-8224**
LANL Health and Safety - ESH-5.....**665-7221**
LANL Health Physics Operations - ESH-1.....**667-8366**

LANL Project Management Contacts:

FPL: *[Don Krier]*.....**665-7834**
FTM: *[Bill Kopp]*.....**665-6081**
FTL (ESH-19 Field Team): *[Albert Dye]*.....**667-4715**
ER/HS Rep. for MDA-P: *[Ann Rundle]*.....**661-5215 / pager: 104-6980**
ESH-1 Oversight RCT: *[Clarita Trujillo]*.....**667-3999 / pager: 104-6663**

Facility Management Contacts:

Facility Manager: *[Ronald Brodd]*.....**667-4657**
ESH Facility Rep.: *[_Trung Nguyen _____]*.....**667-7905/pager : 104- 6650**

Subcontractor Management Contacts:

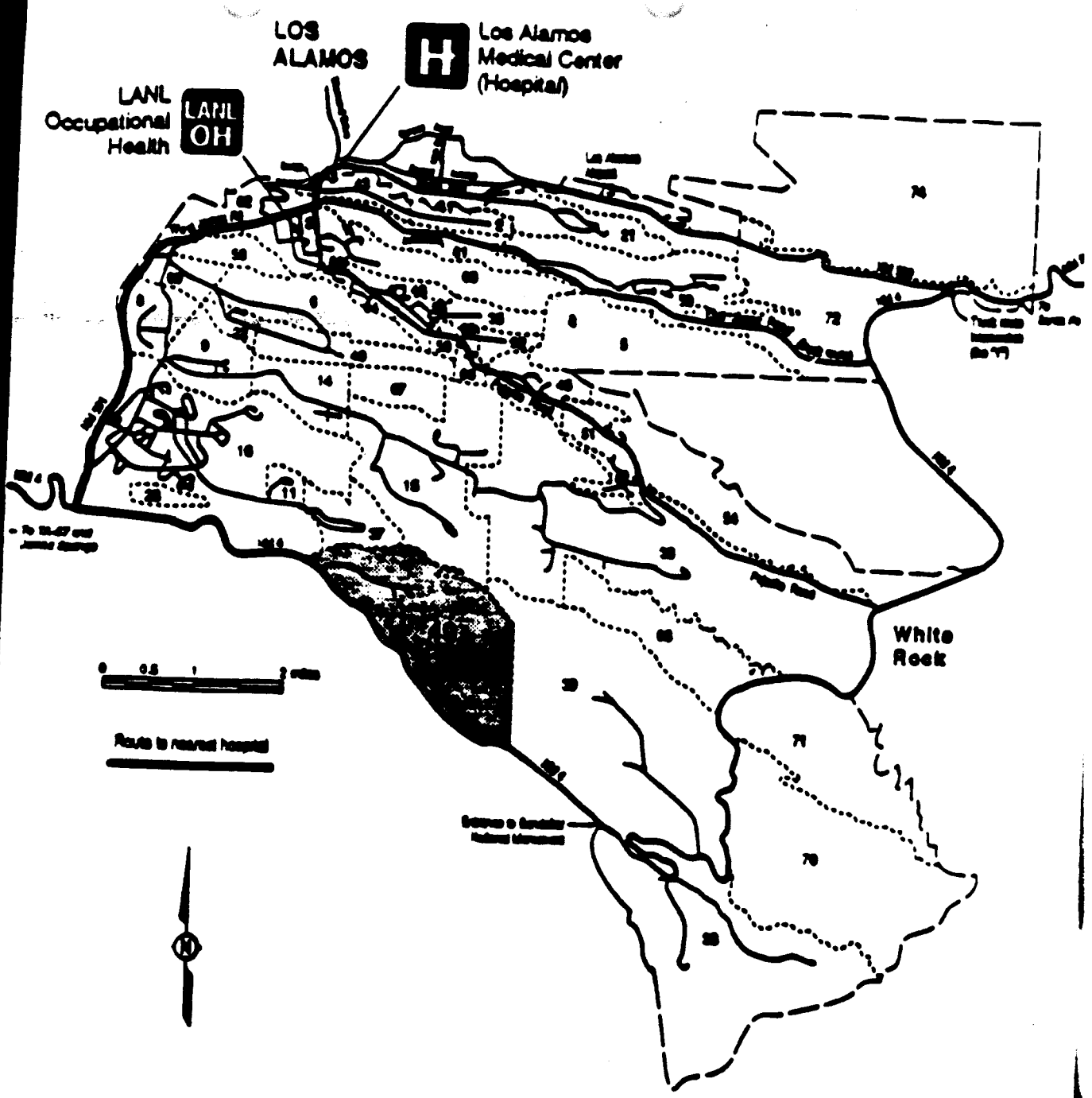
None

EMERGENCY REPORTING INFORMATION:

When calling for emergency services, have the following information available to report:

- Site name/location/phone #
- Caller ID
- Nature of emergency
- Number of personnel involved
- Name and condition of affected employees
- Actions taken and assistance required

Figure 2



Emergency Local Area Contact	Frank Pierce	EMO	667-6211
	Name	Organization	Pager no. / Phone no.

Los Alamos Medical Center
3417 West Road
Los Alamos, NM
9-911 or (505)662-4201

LANL Occupational Health Group HS-2 (505)667-7251

Emergency Management (EMO) (505) 667-6211

Poison Center (800)432-6866

Los Alamos
NATIONAL LABORATORY

Attachment B

Waste Management Check List

WASTE CHARACTERIZATION STRATETY FORM

OU Number/FU	PRS/SWMU Number	Title
1144 / 5	49-008(d)	Area 12 Bottle House
All Waste Types or Wastestreams:		

Completed By: Albert Dye	Date: 11/15/96
FPL: Don Krier	WMC: Elmer Velasquez
Type of Activity (site investigation, EC, etc.): VCA	

Description of the Activity (e.g., drilling, surface sampling, excavation and recontouring, soil washing, etc.) VCA at TA-49. Removal of surface soil - contaminated with uranium-238. Removal to a max. depth of 1 foot over 50 · 100 ft² area.

Acceptable Knowledge

Site Description, Site History, and Historical Waste Generating Processes or Activities: (Include dates for site history): The main historic activities at the TA-49, Area 12 Bottle House were confinement experiments in 1960 and 1961 that were related to the TA-49 hydronuclear program. These experiments consisted of HE detonations in sealed metal bottles placed in a 10 ft diameter by 30 ft deep shaft. Some of the experiments involved the use of U-238. The shaft was surrounded by a concrete structure called the Bottle House which still stands at Area 12. At the conclusion of the experiments, the shaft was back filled with crushed tuff.

Previous Investigation Analytical Results: (Report the analytical methods and results above background levels) RFI sampling was conducted at Area 12 in 1995. A FIDLER survey was conducted on the surface soil at Area 12. Soil samples were collected from inside the Bottle House and from outside the Bottle House. Six sample points outside the Bottle House were background levels for uranium. Two locations were above the SAL. The max. level reported was 685 pCi/g U-238

WASTE CHARACTERIZATION STRATETY FORM

OU Number/FU	PRS/SWMU Number	Title
1144/05	49-008(d)	Area 12 Bottle House
Specific Waste Type: Soil, PPE		

Waste Description

Description of Waste Type, Potential Contaminants, Volume Estimate, and Waste Packaging:

Estimated maximum of 50 cu. ft. of uranium contaminated soil, 1 cu. ft of PPE. Seven to eight 55 gallon drums

Characterization Strategy

Description of Strategy:

Site has already been characterized by Phase I RFI soil sampling. Soils were analyzed for Gamma spec Isotopic U and Pu, total metals, SVOCs. After soil removal, 2 soil samples will be submitted for Isotopic Uranium analysis for clean-up confirmation purposes.

Waste Sampling*: (If sampling will be used, indicate how many grab or composite samples will be collected per container or volume of waste and whether the waste is considered homogeneous or heterogeneous.)

None, soils have already been adequately characterized.

* Grab sampling is appropriate for wastes that are fairly homogeneous, such as liquid wastes.
Composite sampling is appropriate for wastes that are heterogeneous, such as soil, sediment, and debris.

Analytical Strategy

Analyte Category	Analytical Method	May be Present (yes, no, unknown)	Direct Sampling of Containerized Waste	Acceptable Knowledge Existing Information	Acceptable Knowledge Data from Proposed Site Characterization
Volatile Organic Constituents		No		✓	
Semivolatile Constituents		No		✓	
Organic Pesticides		No		✓	
Organic Herbicides		No		✓	
Pesticides and PCBs		No		✓	
PCBs		No		✓	

WASTE CHARACTERIZATION STRATETY FORM

OU Number/FU	PRS/SWMU Number	Title
1144/05	49-008(d)	Area 12 Bottle House
Specific Waste Type: Soil, PPE		

Analytical Strategy (Continued)

Analyte Category	Analytical Method	May be Present (yes, no, unknown)	Direct Sampling of Containerized Waste	Acceptable Knowledge Existing Information	Acceptable Knowledge Data from Proposed Site Characterization
Total Metals		No		✓	
Total Cyanide		No		✓	
Other Inorganic Constituents (specify)		No		✓	
High Explosive Constituents		No		✓	
Asbestos		No		✓	
TPH		No		✓	
TCLP Metals		No		✓	
TCLP Organics		No		✓	
TCLP Pesticides and Herbicides		No		✓	
Gross Alpha		No		✓	
Gross Beta		Yes		✓	
Gross Gamma		Yes		✓	
Tritium[1]		No		✓	
Gamma Spectroscopy		Yes		✓	
Isotopic Plutonium		No		✓	
Total Plutonium		No		✓	
Isotopic Uranium		Yes		✓	
Total Uranium		Yes		✓	
Strontium-90		No		✓	
Americium-241		No		✓	

[1] If tritium is not expected, attach a statement signed by the FPL stating that, based on a review of the available information and professional judgment, it is not necessary to sample for tritium at this site.

WASTE CHARACTERIZATION STRATETY FORM

OU Number/PU	PRS/SWMU Number	Title
1144 / 5	49-008(d)	Area 12 Bottle House

Specific Waste Type: Soil, PPE

Preliminary RCRA Determination

Based on available information, indicate the waste and whether it could potentially be any of the wastes as defined in 40 CRF 261. List the F-, D-, K-, P-, or U- category and number.

Soil - PPE - Non RCRA

Preliminary RCRA Status

X Non-RCRA: (No 90-Day Storage Requirement)
Describe how waste will be stored/handled:

___ RCRA: (90-Day Storage Requirement)
Waste will be stored/handled in accordance with 20 NMAC Generator Requirements

Preliminary Determination for Radioactivity

Based on available information, indicated the amount and type of radiation contamination expected in the waste.

U-238 685 pCi/g

Preliminary Radioactivity Status

___ Material is not radioactive
Describe how waste will be stored/handled

✓ Material is radioactive
Describe the controlled area, labeling, and protection against inadvertent contamination

WASTE CHARACTERIZATION STRATETY FORM

OU Number/FU	PRS/SWMU Number	Title
1144 / 5	49-008(d)	Area 12 Bottle House
Waste Types or Wastestreams:		

Signatures:

Field Team Leader Albert Dye

Field Team Waste Management Coordinator [illegible]

Waste Management Representative [illegible] 12/11/96

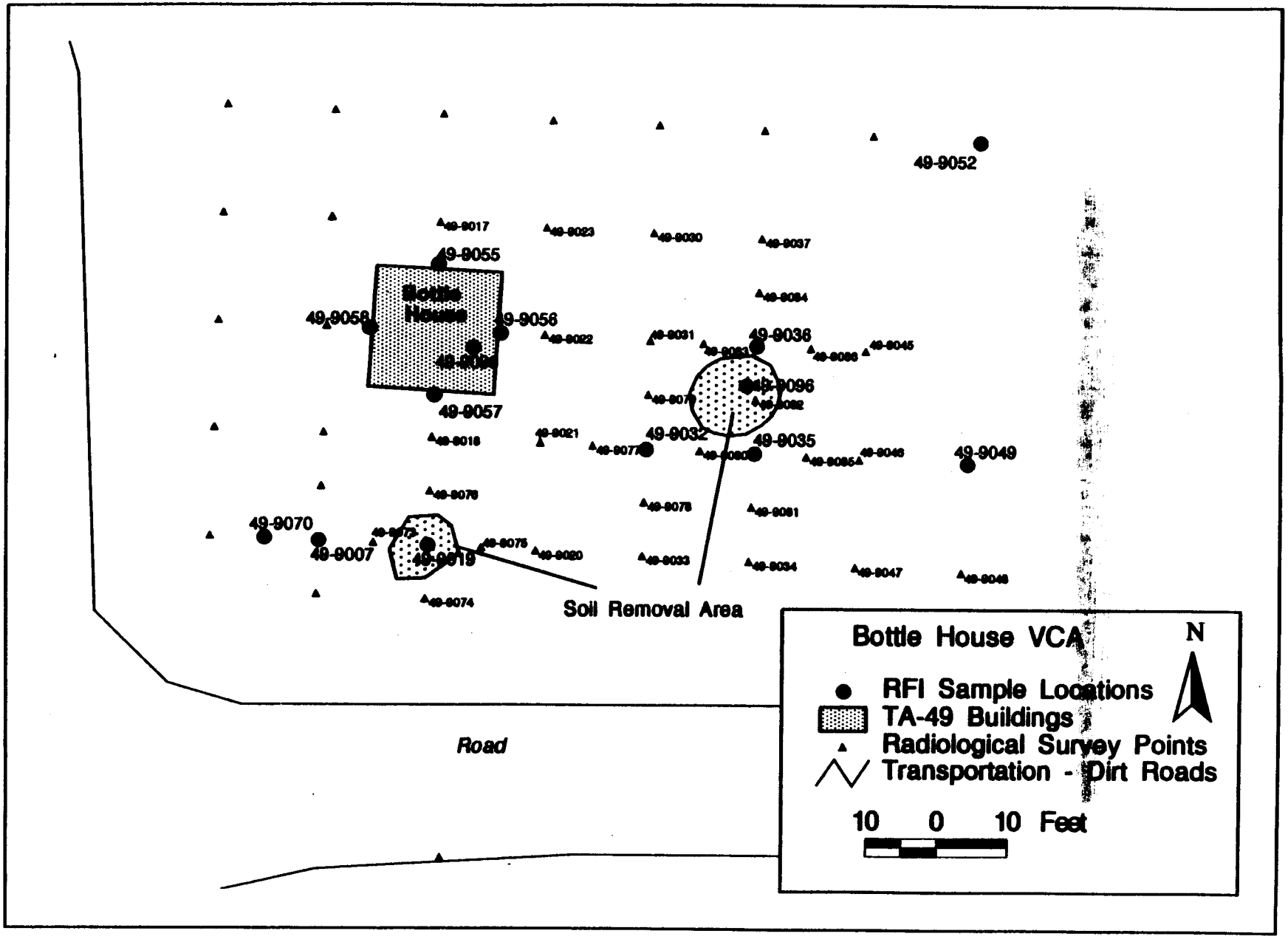


Figure 2 **Bottle House Soil Removal Area**

Attachment C

VCA Checklist and Field Work Authorization Form

Voluntary Corrective Action (VCA)
Checklist and Field Work Authorization Form

PRS No. 49-008(d) **HSWA or AOC**

- ✓ COPC(s) defined.
- ✓ Nature and extent defined or field screening method available to guide where not defined.
- ✓ Remedy is obvious.
- ✓ Time for removal is less than 6 months.
- ✓ Remedy is final.
- ✓ Land use assumptions straightforward.
- ✓ Treatment, Storage, Disposal Facilities are available for waste type and volume.
- ✓ Cleanup cost is reasonable for the planned action, and meets accelerated decision logic criterion for decision to proceed with VCA.

Explain criteria not checked above. _____

Through reviewing the above criteria associated with this site, I believe that a VCA is the appropriate Accelerated Cleanup approach.

FPL Donathon Kyrier Date 4/24/97

FPC [signature] Date 5/9/97

The undersigned have reviewed the final plan and believe that it fully satisfies the appropriate Accelerated Cleanup approach.

FPL Donathon Kyrier Date 4/24/97

FPC [signature] Date 5/9/97

Through reviewing the VCA Plan, for site(s) _____, and believing that the above criteria have been met, I authorize the fieldwork to proceed.

DOE ER Program Manager [signature] Date 5/14/97