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Voluntary Corrective Action Completion Report for

Potential Release Site
18-006
Uranium Solution Pipe

Field Unit 2

Environmental
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VOLUNTARY CORRECTIVE ACTION COMPLETION REPORT FOR POTENTIAL RELEASE SITE 18-006 - URANIUM SOLUTION PIPE

1.0 INTRODUCTION

Potential Release Site (PRS) 18-006 is described in Section 6.2 of the Operable Unit (OU) 1093 Resource Conservation and Recovery Act Facility Investigation (RFI) Work Plan (LANL 1993, 1085). It is identified as a 100-ft long buried stainless-steel pipe used to store an enriched uranium solution for a liquid-fuel reactor formerly located in Building TA-18-168 at TA-18. This PRS has not been identified as a solid waste management unit and is described as an Area of Concern in the Work Plan. Investigation of this PRS was recommended for deferral in the Work Plan because the operating group at TA-18 desired at that time to retain the option of using the pipe in the future. Prior to this Voluntary Corrective Action (VCA), this particular PRS had not been the subject of any RFI activities. Soil and alluvial groundwater data were collected in 1990, and subsequent groundwater data were collected in 1994 in the vicinity of Building TA-18-168 in support of a safety analysis report. These data are described in Section 2.0.

As discussed in the VCA Plan for PRS 18-006 (ER Project 1997, ER ID No. 56355) this PRS is located within Pajarito Canyon, approximately 60 ft north of the present stream channel. The location of the PRS is shown in Appendix F. The 100-ft pipe functioned as a storage vessel for uranyl sulfate solutions and had a capacity of 560 liters. The pipe had a diameter of 6 in. and was constructed of 0.5-in. thick, schedule 40 stainless steel. It had a vent line, fuel level probe, and port for pressurizing with helium gas on its western end, and piping for filling or removing fluid and carrying fluid to the reactor vessel on its eastern end. As part of the design criteria, the pipe was pressure-tested for integrity prior to use.

The pipe was buried in a sloping trench at a depth of between 3 and 5 ft below ground surface, with the greater depth being nearer Building TA-18-168. The thickness of alluvium in the area is approximately 35 ft. The pipe was in use as late as 1974, at which time the reactor it served was decommissioned. Following decommissioning, the uranium fuel was removed and the pipe flushed twice with water before it was abandoned in place.

2.0 SITE CHARACTERIZATION PRIOR TO REMOVAL

Two existing data sets are relevant to the VCA at PRS 18-006. The first data set includes soil and alluvial groundwater data collected in 1990, when four monitoring wells were drilled surrounding Building TA-18-168 to establish baseline levels of radionuclides and assess the potential for transport of radionuclides in the alluvium. These activities are described in "Assessment of Potential Shallow Groundwater Transport of Radionuclides at Critical Experimental Facility TA-18, Los Alamos National Laboratory" (LATA 1991, ER ID No. 12464). Additionally, groundwater samples were collected from these same wells in 1994 during sampling for an RFI report for former OU 1093 PRSs (ER Project 1995, 1283). These data can be used to determine the types of contaminants previously observed in the area of PRS 18-006, and assist in determining whether a comparison of data from upgradient and downgradient locations indicates a possible release from Building TA-18-168 or possibly PRS 18-006.

The second relevant data set consists of the analysis of the residual liquid discovered in the pipe during the initial site survey activities prior to completing the work described in the VCA Plan. These data provide information on the types of contaminants that could have potentially been released from the PRS and thereby guide the selection of analytical suites for sampling environmental media.

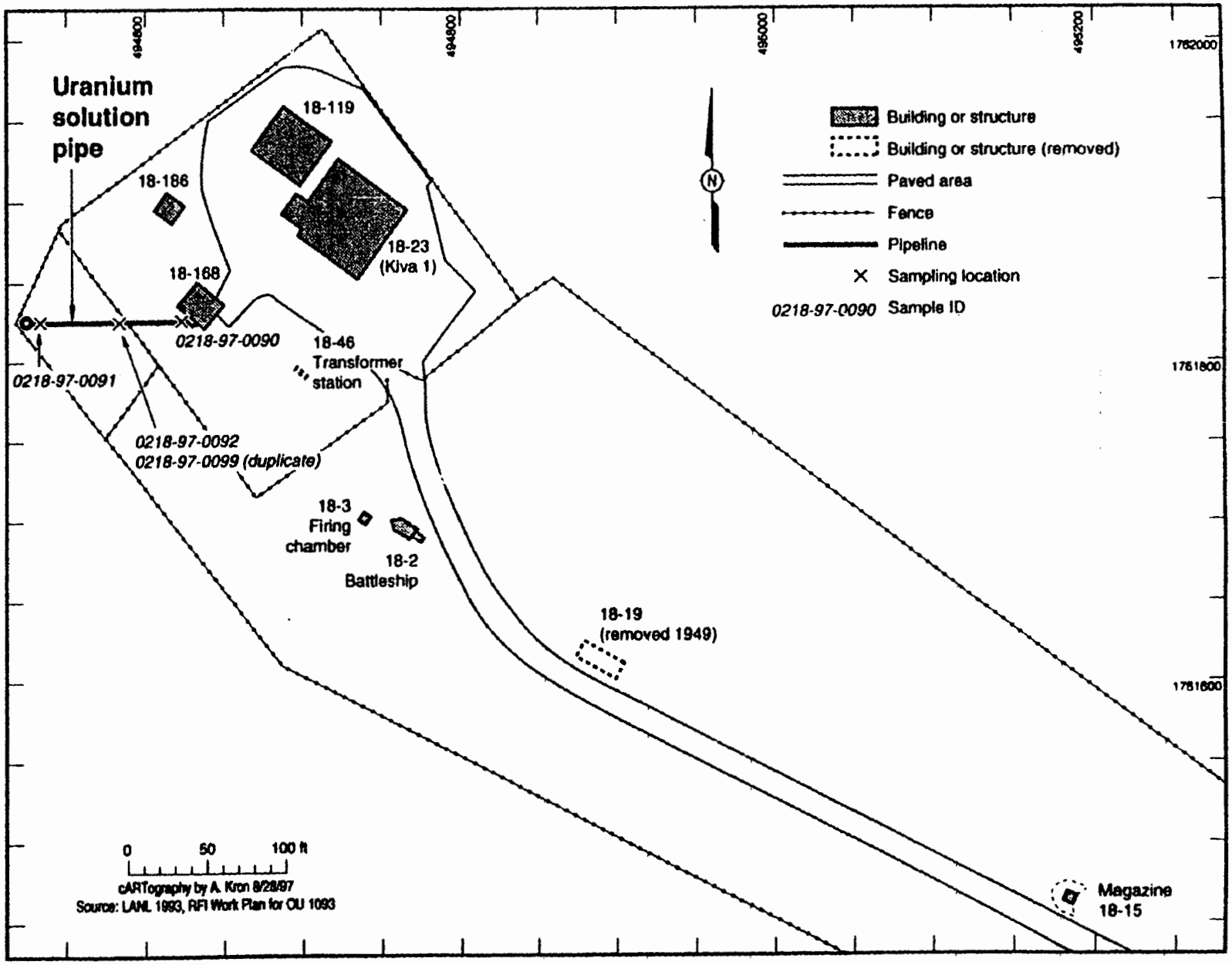

Figure 1-1. PRS 18-006.

2.1 Results of Soil and Alluvial Groundwater Sampling Near Building TA-18-168

Four wells were drilled to a depth of 25 ft in the alluvium surrounding Building TA-18-168, as described in a previous report (LATA 1991, ER ID No. 12464). Soil samples were collected from the boreholes every 5 ft during drilling. These samples were analyzed for tritium, isotopic uranium, cesium, and strontium. No differences in concentrations between the single upgradient and the three downgradient wells were identified. The concentrations were not observed to be significantly different from off-site soil and alluvial groundwater data collected as representative of area background (LANL 1993,1085).

The results of RFI groundwater sampling around Building TA-18-168 are presented in Section 4.7.2 of the RFI Report for PRSs at former OU 1093 (ER Project 1995, 1283). Samples were collected from the wells installed in 1990. Analyses were conducted for inorganic chemicals, and for organic chemicals including VOCs, semivolatile organic compounds (SVOCs), and high explosives (HE). No radionuclide analyses were performed. HMX and m-nitrotoluene, both high explosives, as well as polyaromatic hydrocarbons (PAHs), hexachlorobenzene, and pentachlorophenol, were detected in both the upgradient well and one or more downgradient wells. Additionally, the high explosive RDX, 1,2-dichloroethane, carbon disulfide, bis(2-chloroethyl)ether, and 2,4- and 2,6-dinitrotoluene, were identified in one or more samples. Among inorganic chemicals, barium, nickel, mercury, and zinc were identified in one or more samples at concentrations above the maximum observed concentrations in alluvial groundwater data collected as representative of area background (LANL 1993, 1085).

The data collected from these wells indicate that organic chemicals have been released to the alluvial aquifer in the area of Building TA-18-168. Existing background data are not adequate to confirm a release of inorganic chemicals because the background data set is too small to allow one to establish a reasonable estimate of the concentration upper tolerance limits (UTLs) for the inorganic species. However, the four inorganic analytes listed above were measured in one or more samples at concentrations exceeding the maximum observed concentration in the background wells.

The well upgradient of Building TA-18-168 is also upgradient of PRS 18-006. Because contaminants do not generally flow upgradient, this leads to the conclusion that the chemicals identified at that location are likely associated with another source. Because high explosives and PAHs were observed in both the upgradient and downgradient wells, and because uranium contamination was not observed in any well, a source other than PRS 18-006 is suspected as the origin of those contaminants. The source, nature, and extent of contamination in this area are addressed by a sampling plan proposed as part of the "Response to the Notice of Deficiency for the RFI Report for PRSs in TAs 18 and 27" (ER Project 1997, ER ID No. 56356).

2.2 Results of Residual Liquid Sampling in the Uranium Solution Pipe

The results of the analyses of the residual liquid in the uranium solution pipe have been in the VCA Plan. A single sample was collected and submitted for Toxicity Characteristic Leaching Procedure (TCLP) analysis of metals, and for analysis of isotopic uranium and VOCs. Five inorganic chemicals (arsenic, barium, chromium, mercury, and selenium) were detected at concentrations less than RCRA waste toxicity levels. The measured relative abundance of the U-234, U-235, and U-238 uranium isotopes was approximately 200:6:1, respectively. This reveals that the residual uranium was enriched, as suspected based on the historical use of the uranium solution pipe. Among the VOCs, only acetone and 2-butanone were detected. The pH of the residual liquid was 12.8, which may not corroborate the historical information that the pipe was rinsed with water only prior to being abandoned. However, the high pH may simply indicate that basic precipitates were not completely flushed from the pipe during rinsing. Further analysis of the residual liquid was not possible due to a lack of sampling material.

2.3 Nature and Extent

The contamination associated with this PRS is residual radioactive contamination, with the most significant emitter being U-233/234. Based on the discussion provided above, visual observation of the excavation, and field screening of both the outer surface of the pipe and the excavated trench, the extent of contamination was confined to the interior of the pipe.

2.4 Risk Calculations and/or Cleanup Level Derivations

Cleanup levels for U-234 and U-235 were presented in the VCA Plan for this PRS and are presented in Table 2.4-1 below. The cleanup levels were calculated using Version 5.70 of the RESRAD computer code with assumptions of a 50 m^2 circular contaminated zone and a depth of contamination of 1 ft beginning from ground surface. The annual dose limit employed in the calculations was 30 mrem and the exposure parameters were chosen to be consistent with an industrial land use scenario. The time period allowed for in growth of progeny radionuclides was 1,000 years. A copy of the RESRAD summary report for the cleanup level calculations is provided as Annex 7.1 of the VCA Plan (LANL 1997, XXXX).

TABLE 2.4-1

SITE-SPECIFIC PRGs FOR PRS 18-006

COPCs	Sample Values	PRGs	Rationale
Uranium-234	109 pCi/L	793 pCi/g	Radionuclide (based on a dose of 15 mrem/yr)
Uranium-235	3.0 pCi/L	25 pCi/g	Radionuclide (based on a dose of 15 mrem/yr)

As discussed in Section 3.3 of this report, the confirmatory samples collected at PRS 18-006 did not reveal isotopic uranium concentrations in excess of LANL background values for soil. Because no evidence of a release was observed, the application of the cleanup levels at this PRS proved to be unnecessary.

3.0 REMEDIAL ACTIVITIES AND RESULTS OF CONFIRMATORY SAMPLING

3.1 Remedial Implementation

Remedial activities to remove the uranium solution pipe began on August 12 and concluded on August 18, 1997. Figure 1-1 shows the approximate location of the uranium solution pipe and the location of the confirmatory soil samples described in Section 3.2 of this report.

Prior to beginning the remedial action, the site was screened for surface radioactivity using a Ludlum Model 12 beta-gamma survey meter with a Model 44-9 pancake probe and a Model 4390 alpha scintillator. This field screening indicated radiation levels at or near background levels. Excavation then began at the west end of the pipe and continued eastward until the entire length of the pipe was exposed. Field screening, as described above, was repeated for the exposed spoils piles and along the length of the exposed pipe. There were no elevated radiological readings along the surface of the pipe or in the spoils piles.

The first cut into the pipe was in a section just inside the inner security fence (see Figure 1-1), approximately 30 ft west of Building TA-18-168. A glovebag enclosure was constructed around this section of the pipe and the cut was made using a sawsall within the glovebag. Secondary containment was put in place prior to the cut to capture any free liquids if present. There were no residual liquids encountered during the entire excavation and subsequent size reduction of the pipe.

After one cut through the pipe was completed, the interior of the pipe was smeared for radioactivity and both sides of the cut were plugged. The smear data were read using a Berthold Model LB770 analyzer. The results of this screening indicated 120,122 counts per minute (cpm) alpha and 13,907 cpm beta-gamma contamination inside the surface of the pipe. These readings were sufficiently high to warrant the continued use of respiratory protection during all size reduction tasks.

Rigging was then attached to the west portion of the pipe and this portion was lifted from the trench and placed in a staging area for visual inspection and size reduction. This procedure was repeated for the east section of the pipe. The excavation was then screened for radioactivity although no evidence of pipe failure or spills was noted during the entire field event.

The trench was backfilled prior to the size reduction task. The addition of fill material was not necessary, as all field screening conducted on both the spoils pile and the trench showed there had been no leakage. The pipe was cut into 6-ft sections as described in the VCA Plan, with both ends of each section capped prior to placement in the B-25 container.

3.2 Confirmatory Sampling

Four confirmatory soil samples, including one field duplicate, were collected at PRS18-006. The locations of the samples are shown in Figure 1-1. The preliminary data are provided in Appendix D to this report. In addition to uranium isotopes, inorganic chemicals, SVOCs, and VOCs were analyzed for in the confirmatory samples. In addition, tritium analyses were requested for the confirmation samples for waste management purposes. The field duplicate was collected to provide an estimate of combined analyte concentration variability at the site and laboratory analysis variability.

The samples were collected from the bottom of the pipe trench following removal of the pipe. Sample ID No. 0218-97-0091 on the west end of the pipe trench was collected from an approximate depth of 3 ft below the pre-existing ground surface. Sample ID No. 0218-97-0090 on the east end of the pipe trench was collected from an approximate depth of 5 ft below the pre-existing ground surface. The discrepancy in sampling depths is because the pipe trench sloped towards Building TA-18-168, as described in Section 1.0 of this report. The sample collected in the middle of the trench (Sample ID No. 0218-97-0092) was collected at an approximate depth of 4 ft below the pre-existing ground surface. The duplicate sample (Sample ID No. 0218-97-0099) was collected at the location of Sample ID No. 0218-97-0092. The sample matrices consisted of native alluvial materials as well as sand of unknown origin that was placed as fill at the base of the pipe trench when the pipe was laid.

The locations of the two confirmatory samples near the ends of the pipe trench were chosen to address possible liquid handling spills, as well as leaks from welds and joints at these critical points. The third sampling location was selected at approximately the midpoint of the pipe trench. As described in Section 3.1 of this report, no evidence of leakage was observed by the field team during excavation and removal of the pipe, and no elevated readings were observed during field screening. Therefore, sampling locations did not need to be biased by field observation.

3.2.1 Data Quality Assessment

The chemical analyses performed by the external subcontractor laboratories used methods specified in the ER Sample Management Office analytical subcontracts (LANL 1995, 1278). The allowed methods are current EPA SW-846 and Contract Laboratory Program (CLP) methods or equivalent for inorganic chemicals, VOCs, and SVOCs. Prior to analysis for inorganic chemicals, solid samples were digested according to EPA SW-846 method 3050 or equivalent. The analytical subcontracts specify LANL-approved methods for radiochemical analyses according to the technologies identified in the subcontract. Analytical method selection is described in Appendix IV of *ER Project Quality Assurance Project Plan Requirements for Sampling and Analysis* (QAPP) (LANL 1996, ER ID No. 53450).

All data available at the time of preparation of this report are preliminary data received from the analytical laboratory. These data include only the summary data sheets indicating preliminary results and, in the case of organic results, the percent recoveries of surrogate compounds. The data have not been validated by ER project validation chemists because most of the supporting quality control (QC) data are not yet available. Hence it is not known whether validation qualifiers should be assigned to any of the data. If data are qualified when the QC data become available, the validation reports will be used to direct focused validations, as necessary, to support the evaluation of data adequacy for site decisions, and an addendum to this report will be prepared as necessary. In the interim, the surrogate data have been evaluated for the organic analytes, where available.

For uranium isotopes, the sample results summary sheet received from the laboratory includes the results and the total propagated uncertainty at one standard deviation. The minimal detectable activity is also reported. No QA/QC data for the uranium isotopes were available. The laboratory comments on the preliminary data indicate that the samples must be reanalyzed due to the failure of a laboratory control sample (apparently a mis-spiked quality control sample). Subsequent conversations with the laboratory chemist indicated the problem is specific to the laboratory quality control sample and the reanalysis will not affect the reported preliminary results.

For tritium, the sample results summary sheet received from the laboratory includes the results and the total propagated uncertainty at two standard deviations. The minimal detectable activity is also reported. No QA/QC data for tritium were available. The laboratory comments on the preliminary data indicate that the laboratory experienced problems with the quality control samples. The nature of the problems was not specified.

The usability of the data for determining the presence or absence of contamination at PRS 18-006 is addressed in the following sections of this report.

3.2.2 Evaluation of Inorganic Chemicals

Background comparisons were performed for inorganic chemicals for which ER Project UTL values are available by comparing the maximum observed value for each chemical to its respective UTL value. ER Project UTL values are derived from LANL-wide soil, sediment, and tuff background data, and details on the calculation of these values are presented in Longmire et al. (ER ID No. 52227). Soil samples were not collected from identifiable soil horizons at PRS 18-006; therefore, the all-soils UTL values are used for background comparisons of inorganic chemicals.

Four soil samples from three locations, including one duplicate, were analyzed for target analyte list (TAL) metals. The values in bold font indicate inorganic chemicals that were detected in soil at concentrations greater than or equal to their respective UTL values. The sample locations are shown in Figure 1-1.

The inorganic data are summarized below and in Table 3.2.2-1.

- Thallium was detected above its UTL of 1 mg/kg in one sample at a concentration of 1.8 mg/kg.
- Zinc was detected above its UTL of 50.8 mg/kg in one sample at a concentration of 51.4 mg/kg.
- All other inorganics were either undetected or detected below background UTLs and are not evaluated further.

TABLE 3.2.2-1

INORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN BACKGROUND UTLs FOR PRS 18-006

Sample ID	Location ID	Depth (ft)	Tl (mg/kg)	Zn (mg/kg)
SAL	N/A	N/A	5.4	23,000
All-soils UTL	N/A	N/A	1	50.8
0218-97-0090	18-10036	5	**1.8**	23.3
0218-97-0091	18-10037	3	0.57	**51.4**
0218-97-0092	18-10038	4	0.85	12.9
0218-97-0099*	18-10038	4	0.46 U	15.1

Note: Values in bold are detected above background.
*Field duplicate of 0218-97-0092

The elevated values of thallium and zinc were observed at sampling locations on opposite ends of the uranium solution pipe. It is unlikely that they are associated with a release event because in such a case they would be expected to be collocated. The UTL values are derived from mesa-top soil samples and may be expected to have somewhat different elemental abundances than the alluvial materials and sand fill that comprise the sample matrix at PRS 18-006. It may be concluded, therefore, that the inorganic chemical data reflect natural heterogeneity in elemental concentrations and do not indicate a release of contaminants.

Sample ID No. 0218-97-0099 is a duplicate of Sample ID No. 0218-97-0092. The relative percent difference (RPD) between measured concentrations was performed for each analyte. The RPD values ranged from 0.0 for nickel to greater than 60% for thallium. However, the duplicate thallium value was reported as < 0.46 and the RPD value for thallium was computed by substituting a value of 0.46 for the "less than" value. The second highest RPD, where both samples contained positively detected values, was 16% for zinc. With the exception of thallium, these data indicate that laboratory precision is within the range generally considered to be acceptable based on the professional judgment of the authors (i.e., within =35% RPD for LANL soils, based on historical observations). The RPD calculated for thallium indicates that the analytical results for thallium may be suspect, which could affect the interpretation of the maximum value of 1.8 mg/kg shown in Table 3.3.2-1. It is common to find RPD values exceeding normal acceptance limits near the detection limit of the analytical method. Hence, the thallium RPD value of 60% is acceptable.

3.2.3 Evaluation of Organic Chemicals

The organic chemicals analyzed for at PRS 18-006 included VOCs and SVOCs. Four soil samples from three locations, including one field duplicate, were analyzed for VOCs and SVOCs using SW-846 GC/MS methods. The organic data are summarized below and in Table 3.2.3-1. The sample locations are shown in Figure 3.2-1.

- Acetone was detected in all four samples at a maximum concentration of 0.02 (J) mg/kg.
- Methylene chloride was detected in all four samples at a maximum concentration of 0.006 mg/kg.
- Toluene was detected in all four samples at a maximum concentration of 0.02 mg/kg.
- Trichlorofluoromethane was detected in one sample at a concentration of 0.006 mg/kg.

TABLE 3.2.3-1

DETECTED ORGANIC CHEMICAL CONCENTRATIONS
FOR PRS 18-006

Sample ID	Location ID	Depth (ft)	Acetone (mg/kg)	Methylene Chloride (mg/kg)	Toluene (mg/kg)	Trichlorofluoro-methane (mg/kg)
SAL	N/A	N/A	2,100	7.8	790	380
0218-97-0090		5	0.01(J)	0.006	0.007	0.006 (U)
0218-97-0091	18-10036	3	0.009 (J)	0.006	0.02	0.006
0218-97-0092	18-10037	4	0.02 (J)	0.005	0.01	0.005 (U)
0218-97-0099*	18-10038	4	0.01(J)	0.003 (J)	0.002 (J)	0.005 (U)

*Field duplicate of 0218-97-0092
(J) Estimated value

The preliminary organic chemical data are somewhat difficult to interpret with regard to detection status. With the exception of toluene at Sample ID Nos. 0218-97-0091 and -0092, the detected values are all at or below the respective reporting limits on the preliminary data sheets. Additionally, no laboratory blank data are available at this time, and acetone, methylene chloride, toluene, and trichlorofluoromethane are all common laboratory chemicals. It is possible that, following data validation, some or all of the detected analytes may be qualified as nondetected due to contamination identified in laboratory blank samples.

3.2.4 Evaluation of Radionuclides

Isotopic uranium and tritium data were collected at PRS 18-006. ER Project UTL values for uranium and tritium, and guidance for their application, are provided in Ryti et al., 1997 (ER ID No. 56186). Because background concentrations of tritium in surface soil are associated with global fallout from nuclear testing, these values are not applied for screening tritium concentrations observed at the 3- to 5-ft depths from which site samples were collected. Background comparisons were performed for uranium by comparing the maximum observed value for each isotope to their respective UTL values.

Four soil samples from three locations, including one field duplicate, were analyzed for isotopic uranium and tritium. According to the preliminary data sheet, the tritium analyses were performed using modified method 906.0. All reported values were below the minimum detectable activities calculated at two standard deviations. As mentioned in Section 2.2 of this report, the tritium analyses were selected primarily to support any necessary waste management activities for soils.

The ER Project UTL values for U-234, U-235, and U-238 are 2.39, 0.16, and 2.29 pCi/g, respectively. No measured values from any sample exceeded these UTL values for the respective radionuclides.

As discussed in Section 3.2.1 of this report, the preliminary data report from the analytical laboratory indicates that reanalysis of these samples will be performed due to a failure of the laboratory control sample to satisfy acceptance criteria. It is unlikely that this reanalysis will greatly alter the preliminary results of the samples given the low levels of uranium detected in these samples.

3.2.5 Conclusions

No evidence of a release from PRS 18-006 was observed in the preliminary data for inorganics, isotopic uranium, tritium, VOCs, and SVOCs. This statement is based to a large extent on the argument that, were a site-specific release responsible for the organic chemicals observed in the soil samples, elevated uranium would also have been measured in the same samples. Information supporting this argument includes the fact that enriched uranium was measured in the residual liquid present in the pipe in the

same samples where trace organic chemicals were detected. The historical knowledge of site activities also supports the conclusion that uranium isotopes must be a major component of any residual contamination associated with this PRS. Finally, the soil and alluvial groundwater data summarized in Section 2.1 of this report indicated that organic contamination was present in the area from activities not associated with this PRS, although the specific chemicals detected at this PRS were not among those identified.

The data available at the time this report was written are preliminary data that have not been validated. Section 3.2.1 of this report summarizes the data quality information available at this time. It is reasonable to assume that, if relatively high levels of contamination were present, the preliminary data would reflect this condition. However, it is not possible to state at this time whether the preliminary data may be revised following reanalysis (uranium) and data validation. This report may be revised after data validation for all analytes has been performed, if significant differences affecting report conclusions are identified.

4.0 WASTE MANAGEMENT

4.1 Waste Types, Volumes, and Disposition

There were no deviations from the remediation methodology presented in the draft VCA plan for PRS 18-006 that affected projected waste volumes. Table 4.1-1 presents a summary of waste types, volumes, and disposition.

TABLE 4.1-1

WASTE TYPES AND VOLUME

Item	Waste Type	Actual Volume	Anticipated Volume
Sampling Waste/PPE	Solid — potential hazardous	4 55-gal. drums	< 10 55-gal. drums
Contaminated Soils	Solid — hazardous	None	<12 55-gal. drums
Solution Pipe (cut sections)	Solid — low-level radioactive	1 B-25 container (3 cu. yd.)	1 B-25 container (3 cu. yd.)
Pipe Insulation	Solid — nonhazardous	Included in B-25 container	< 5 55-gal. drums
Pipe Sludge	Solid — hazardous	None	< 5 gal. container
Solution Pipe Contents	Liquid — hazardous	None	< 1 gal. container
Decontamination Wastes	Liquid — potential hazardous	None	< 8 55-gal. drums

The volume of sampling wastes and visually contaminated PPE was reduced through packaging. These wastes were packaged (to the extent possible) with the cut pipe sections to fill the voids in the B-25 box. Waste acceptance criteria require B-25 boxes to be 90% full prior to disposal. This ultimately resulted in a smaller number of drums containing radioactively contaminated PPE and sampling wastes.

Based on visual observation and field screening of both the external surface of the pipe and the excavated trench, soil beneath the pipe was determined to be uncontaminated by the pipe's contents. Anticipated waste volumes made allowances for the potential of leakage and resulting soil contamination. These projections were not realized.

Pipe contaminated with uranium was put in one B-25 container. It will be managed as non-RCRA, low-level radioactive waste until a final determination is made and the B-25 is ultimately disposed. Visibly

contaminated PPE and sampling equipment was packaged with the pipe to fill voids in the B-25. Pipe insulation was field screened for radioactivity and determined to be non-radioactive and non-hazardous. This insulation was left in place on the pipe to help fill voids in the B-25 container.

As anticipated from the characterization sampling, no residual sludge or liquid were encountered

Initial waste projections included the potential for contaminated soils and the decontamination liquids required for equipment decontamination. Because there was no evidence of containment failure and contaminated soil removal was not necessary, liquid wastes were not generated. Very small amounts of hand-wash liquids were generated. These liquids tended to evaporate over the course of the day.

4.2 Method of Management and Disposal

Waste will be stored/handled in accordance with 20 New Mexico Administrative Code (NMAC) Generator Requirements and/or DOE Order 5820.2A (Radioactive Waste Management) requirements. Waste is currently stored at the PRS as non-RCRA waste in the B-25 container. The B-25 container is labeled with a completed Radioactive Materials Tag and the storage area is roped off and labeled as a radioactive materials storage area. Disposal will be in accordance with appropriate requirements. A Waste Profile Form (WPF) has been submitted to LANL groups EM/SWO and ESH-19. The WPF describes the collected wastes, the initial waste determination, and the basis for that determination.

The collected wastes have been labeled as low-level radioactive waste and placed in a satellite storage area, and will ultimately (within 30 days) be disposed at TA-54.

4.3 Waste Characterization Data

Waste characterization was accomplished through knowledge of process due to the difficulty of sampling stainless steel and PPE.

5.0 REFERENCES

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Ryti, R., P. Longmire, and E, McDonald, June 30, 1997. "Application of LANL Background Data to ER Project Decision-Making, Part II: Radionuclides in Soils, Sediments, and Tuff" (draft), Los Alamos National Laboratory Report, Los Alamos, New Mexico. (Ryti et al. 1997, ER ID No. 56186)

APPENDIX A

QA/QC DATA

The available QA/QC data are summarized in Section 3.1.1 of this report. Because the laboratory data packages were unavailable at the time this report was written, some QA/QC data (such as laboratory duplicates and blanks) that may been provided in the data package have not be examined.

APPENDIX B

RFI CHARACTERIZATION DATA

The RFI data for soil and alluvial groundwater in the vicinity of Building TA-18-168, discussed in Section 2.1 of this report, will be available electronically via the Facility for Information Management and Display (FIMAD). The data obtained from sampling of the residual liquid in the uranium solution pipe are available in Annex 7.2 of the VCA Plan. The preliminary data for the confirmatory samples discussed in this report are provided in Appendix D of this report.

APPENDIX C

ESTIMATED AND ACTUAL COST COMPARISON

The estimated costs of this VCA are compared with the actual costs in Table C-1. Differences between estimated and actual costs are discussed in the following sections.

TABLE C-1

ESTIMATED VERSUS ACTUAL COST FOR VCA AT PRS 18-006

Activity	Estimated Cost	Actual Cost
Plan Development	$ 22,000	$ 18,000
Mobilization	18,000	15,000
Cleanup	115,000	90,000
Verification Sampling	5,000	13,800
Waste Management	19,000	2,800
Waste Disposal	1,500	6,000
Demobilization	10,000	9,000
Reporting	3,400	3,000
Total	$193,900	$157,600

C.1 Plan Development

The actual cost for plan development was lower than originally estimated because the difficulties associated with health and safety characterization were less than expected.

C.2 Mobilization

Costs for mobilization were reduced due to a reduction in the personnel monitoring required during the remediation effort. These costs were developed assuming a worst-case basis.

C.3 Cleanup

Costs for cleanup were reduced due to the project completion schedule. In the original analysis, projected field work was scheduled for 10 days, as opposed to the 5 days for actual project completion.

C.4 Verification Sampling

Verification costs were actually less than projected; however, because of a more restrictive turnaround time, these costs were similar to estimated costs.

C.5 Waste Management

These costs were similar to the original estimate.

C.6 Waste Disposal

These costs were similar to the original estimate. These wastes have not yet reached final disposition.

C.7 Demobilization

Costs for demobilization were reduced because of a reduction in the personnel monitoring required during the remediation effort. These costs were developed assuming a worst-case basis.

C.8 Reporting

Estimated reporting costs were very similar to those incurred.

C.9 Total Cost

Because the VCA proceeded without any problems, health and safety characterization was straightforward, and the project experienced few weather delays, the cost to complete this VCA was less than anticipated.

APPENDIX D

RESULTS OF CONFIRMATORY SAMPLING

The data provided in this section are preliminary data. As such, these data have neither been validated or entered into the FIMAD database. While the values presented here are not expected to change, these data will be re-evaluated upon receipt of the validated data. Once the data have been edited and loaded into the FIMAD database, a printout will be provided and inserted into the report in place of this preliminary data.

APPENDIX E

CERTIFICATION OF COMPLETION

I certify that all the work pertaining to the voluntary corrective action PRS 18-006 has been completed in accordance with the Department of Energy approved VCA plan entitled VCA Plan for Potential Release Site 18-006, Uranium Solution Pipe. Based on my personal involvement or inquiry of the person or persons who managed this cleanup, a review of all data gathered and a visit to the site, to the best of my knowledge and belief, all criteria of the plan have been met or exceeded. I believe that the completion of this VCA is protective of both human health and the environment. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

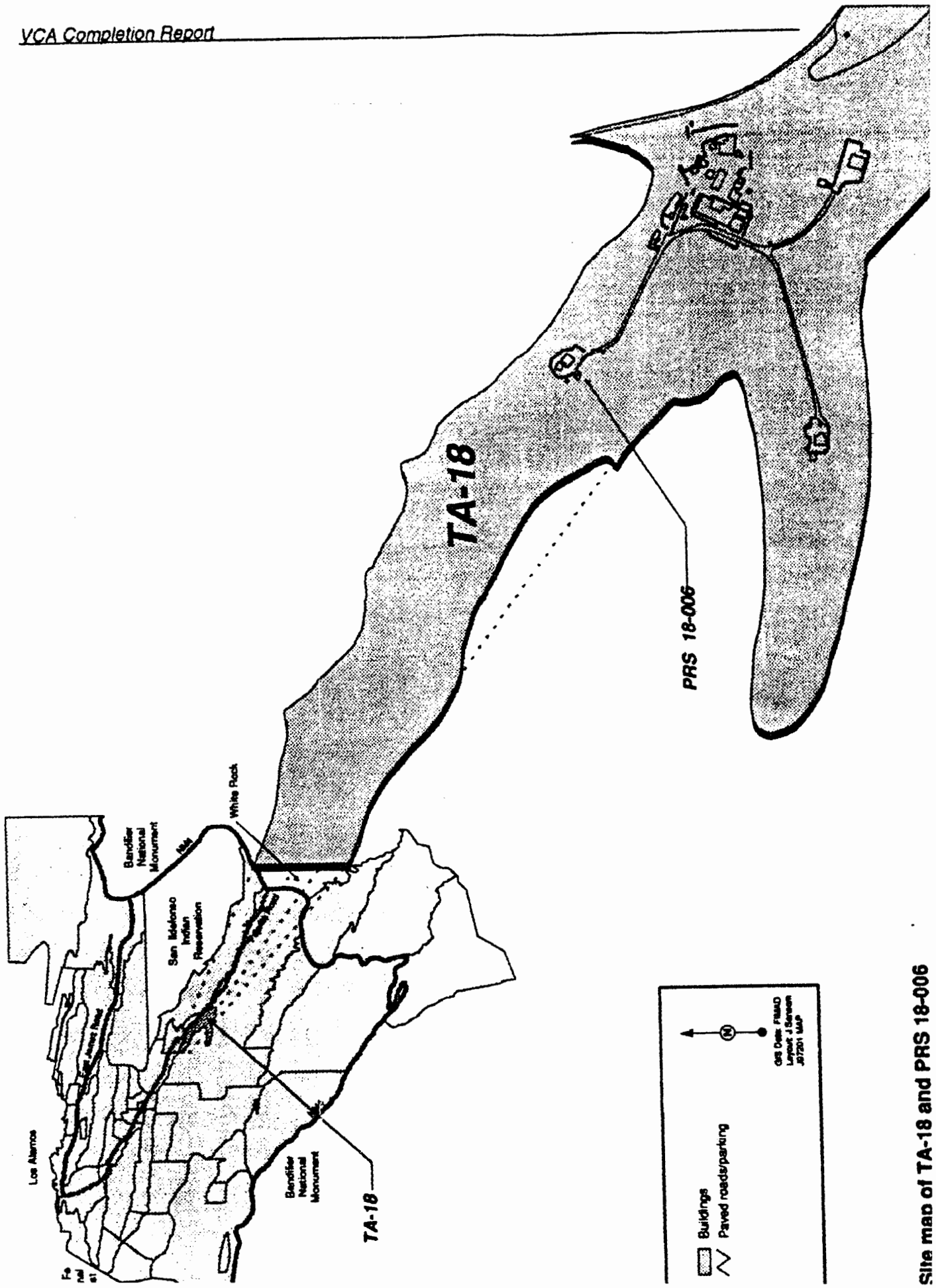
_____ _____

Field Unit 2, Field Project Leader
Environmental Restoration Project
Los Alamos National Laboratory

Date Signed

APPENDIX F

SITE MAP



Site map of TA-18 and PRS 18-006