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: June 3, 1996
Refer to: EM/ER:96-323

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

SUBJECT: FINAL VOLUNTARY CORRECTIVE ACTION (VCA) PLAN FOR ACTIVITIES AT TECHNICAL AREA (TA) 12, POTENTIAL RELEASE SITE (PRS) 12-001(a)

Dear Ted:

Enclosed for your records please find a copy of the final VCA Plan for activities in TA-12, PRS 12-001(a). This activity is planned for completion in Fiscal Year 1996.

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

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

If you have any questions, please call Gene Gould at (505) 667-0402 or Everett Trollinger at (505) 667-5801. Thank you for your cooperation in this matter.

Sincerely,

for Jorg Jansen
Program Manager

JJ/bp

Enclosures: Final VCA Plan for TA-12, PRS 12-001(a)
VCA Checklist and Field Work Authorization Form

3813

Voluntary Corrective Action Plan for

Potential Release Site
12-001(a)
Inactive Firing Site

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Field Unit 2

Environmental Restoration Project

May 1996

Los Alamos
NATIONAL LABORATORY

LA-UR-96-1874

Los Alamos National Laboratory

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VCA Checklist and Field Work Authorization Form

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VOLUNTARY CORRECTIVE ACTION PLAN FOR POTENTIAL RELEASE SITE 12-001(a), INACTIVE FIRING SITE

1.0 INTRODUCTION

The potential release site (PRS) at Los Alamos National Laboratory (the Laboratory) addressed in this voluntary corrective action plan (VCA) is located within LANL's (former) TA-12 (now TA-67), known as L-Site. TA-67 was established in 1989 when the Laboratory redefined technical area boundaries. The site is considered a buffer zone and has not been used for any Laboratory operations. It contains no SWMUs except for those in the former TA-12.

1.1 Site Type and Description of PRS 12-001(a)

Former TA-12 was constructed in 1945 for the Explosives (X) Division. The site had several buildings associated with firing sites. The principal structure was a below-ground, steel-lined, firing pit (TA-12-4) used from 1945 to the mid 1950s. PRS 12-001(a) (TA-12-4) is this steel-lined inactive firing pit located approximately 3200 ft east of the TA-12 entrance. The pit is hexagonal in shape, measuring 10.5 ft on each side and is 11.5 ft deep. A steel cover 20 ft by 22 ft by 5 ft filled with soil covers the top. The cover has a 5 ft by 5 ft hole in the middle that was used to lower explosives into the firing area. There is currently a small amount of soil in the bottom of the pit.

1.1.1 Operational History

PRS-12-001(a) is discussed in detail in Section 5.1 of the RFI Work Plan (RFI Work Plan for OU-1085, 1994, 1156). At PRS-12-001(a), recovery shots, which also involved uranium, were done in the pit. The site was abandoned in 1953, but the firing pit remains intact (LANL 1993, 21-0077). The small amount of soil now present in the pit is probably from natural wind-blown dust/soil deposition.

1.1.2 COPCs and Rationale for Proposed Remedial Action

Two samples were collected from the bottom of the pit in the summer of 1995. Three samples of surface soil were collected from the surrounding area. The results indicated that arsenic was present in one soil sample from the bottom of the pit at a concentration above screening action level (SAL). A multiple chemical evaluation (MCE) on metals from that same soil sample indicated that barium, chromium, copper, nickel, thallium, and total uranium are chemicals of potential concern (COPCs). Based upon these results, and the fact that this site may be preserved as a historical site (Memo from Carrie Gonzales, ESH-3 to Victor Hesh, ESA-DE 1995), a cleanup for the small amounts of soil in this steel-lined pit is necessary.

2.0 SITE CHARACTERIZATION

Based upon the results obtained from the two soil samples selected in the pit (12-001 and 12-002), the contamination is conservatively estimated to encompass the entire volume of soil in the bottom of the pit. The estimated soil thickness ranges from less than 0.25 in to 1 in. For estimation purposes, an average thickness of 0.5 in yields an approximate volume of 5 cu ft. The extent of contamination is contained inside the steel-lined firing pit.

2.1 RFI Information/Other Decision Data

During a screening radiation survey performed on April 23, 1993, the pit [PRS 21-001(a)] was not entered, but no results above background were found using remote survey techniques from

outside the structure. However, results of an internal survey of the pit on June 14, 1993, indicated the presence of beta-gamma emitting radionuclides (Martell 1993, 21-0079). This survey result suggested uranium contamination, the beta-gamma emission being mostly from uranium decay products.

On June 24, 1993, field spot-test kits were used to survey for explosives at the pit. Swipes from the outer walls, metal pieces on the ground near the opening of the pit, and soil around the pit were all negative. Swipes taken from the interior of the pit, including the white residue on the walls and soil from the bottom (taken earlier during the radiation survey on June 14, 1993), were also negative.

The Phase I RCRA Facility Investigation (RFI) was conducted in July 1995. The objective of the sampling was to determine if contamination existed. At PRS 12-001(a) a total of two soil surface samples were collected from the interior of the pit at the bottom, while three samples were collected from the surrounding soil. All samples were collected using the approved spade and scoop technique (see Annex 7.4). Annex 7.3 shows all sample locations at this PRS and the area of suspected contamination.

Both of the soil samples collected at PRS 12-001(a) were submitted to an off-site laboratory for analysis in accordance with the RFI Work Plan. Analysis was requested for gamma spectroscopy and for uranium, HE, and target analyte list (TAL) metals for both samples. Per chain-of-custody records, the samples were submitted and analyzed within the prescribed holding times.

2.1.1 Data Quality Evaluation

The quality assurance/quality control (QA/QC) data associated with the investigation at PRS 12-001(a) (inorganics, high explosives, and radionuclides) indicated that a majority of the sample analytical data (≈95%) were acceptable and defensible (Table 2.1.1-1). The QA/QC mechanisms were generally effective in ensuring the reliability of measured data within expected limits of sampling and analytical error. Of the approximately 250 pieces of analytical data, ≈27% were qualified as either undetected estimated (UJ) or estimated (J). Of the J qualified data, approximately one-fifth were not used in the screening assessment due to QA/QC problems.

Inorganics Several inorganic analytes were J qualified and reported as detected although the sample values were between the respective estimated quantitation limits (EQLs) and the method detection limits (MDLs). In this investigation, the analytes associated with these estimated values are considered to be undetected because the results cannot be accurately distinguished from instrument "noise" levels. Therefore, the usability of these data is affected and the data are not used in the screening assessment. The analytes affected in this manner include antimony, cadmium, mercury, and thallium.

Some inorganic analytes had laboratory control samples (LCS) or matrix spike/matrix spike duplicates that were not within the acceptable limits for these QC samples. The data associated with the QC samples were qualified as J because of the bias. However, the data usability for these data was not affected and the data are considered valid. In addition, several inorganic analytes were found to be present in the laboratory blank. The sample values for these analytes were not greater than 5X the blank values, and were therefore not qualified and are considered to be valid.

Organics The high explosive data for two samples were extracted after the recommended 14-day holding time. The samples exceeded the recommended holding time by four days and were considered valid estimated values (i.e., qualified UJ or J) and their data usability was unaffected. These same two samples also had an LCS that was outside of the acceptable limits for several high explosive analytes. These data were biased and qualified as UJ, but their usability was unaffected.

Radionuclides The laboratory blanks for five radionuclide samples had detected concentrations of uranium-238. The samples values for this analyte in three of these samples were less than 5X the blank values, indicating that the presence of uranium-238 in these samples is due to contamination. The data usability for these samples is affected and the data are not used in the screening assessment. However, the sample values in the other two samples were greater than 5X the blank values. As a result, the uranium-238 data for these samples are considered to be valid and the data usability unaffected.

Similarly, the laboratory blanks for three radionuclide samples had detected concentrations of uranium-235. The samples values for this analyte in these samples were less than 5X the blank values, indicating that the presence of uranium-235 in these samples is due to contamination.

The data usability for these samples is affected, and the data are not used in the screening assessment.

2.1.2 Sampling Results

Annex 7.2 presents all of the analytical data collected at PRS 12-001(a) as part of the RFI. The reported values for both detected and undetected chemicals are compared against the respective background UTLs and SALs. A data comparison table of detected concentrations greater than background UTLs and SALs is also provided in this Annex. Based upon a review of the sampling data, the results are summarized as follows:

- Eleven inorganics were detected above background UTLs. These inorganics included antimony, arsenic, barium, chromium, copper, lead, nickel, selenium, thallium, total uranium (nonradionuclide), and zinc (Table 7.2-2).

- Nine inorganics – antimony, barium, copper, lead, nickel, selenium, thallium, total uranium, and zinc – had concentrations below their respective SALs and were submitted to an MCE for noncarcinogenic effects (Table 7.2-3). Chromium, a carcinogen, was detected above its background UTL, but it was not eligible for inclusion to the MCE and was eliminated as a COPC because it was below its SAL. The sum of the maximum normalized concentration was 1.8265, which is greater than the target value of one indicating adverse health effects from exposure would be likely. Therefore, barium, copper, nickel, thallium, and total uranium (as an inorganic) were retained as COPCs.

- Arsenic was found to be greater than its background UTL and SAL of 0.38 mg/kg and was retained as a COPC.

- The radionuclides – total uranium (depleted), uranium-235, and uranium-238 – were detected above their background UTLs (Table 7.2-4), but were below their respective SALs. The two detected isotopes of uranium are progeny products of total uranium; therefore, the detected concentration of total uranium was used in place of the two isotopes, a more conservative approach. As a single analyte, total uranium was not eligible for inclusion to the MCE. All radionuclides were eliminated as COPCs.

- One high explosive organic compound, HMX, was detected in the pit and in surface soil at concentrations below its SAL, and was included in the MCE for noncarcinogenic effects (Table 7.2-3). This compound was eliminated as a COPC because it was below SAL, and was not a significant contributor to the MCE.

The results of the analysis of soil from the bottom of the steel-lined pit showed concentrations of barium, chromium, copper, nickel, thallium, and total uranium which were retained as COPCs based upon the MCE. Of the six COPCs, copper and thallium are the primary COPCs. Arsenic was detected in pit soil at a concentration greater than both the background UTL and its SAL; therefore, it was retained as a COPC. All of these analytes are contained within the pit area, and could pose an unacceptable human health risk.

Concentrations of total uranium (depleted), uranium-235, and uranium-238 above background UTL were observed, however, they were eliminated as COPCs based upon the MCE. No radionuclide health risk is indicated at this PRS.

COPC SUMMARY:

Inorganic COPC: arsenic, barium, copper, nickel, thallium, total uranium (nonradionuclide).

Organics: None.

HE: None.

Radionuclides: None.

2.2 Nature and Extent of Contamination

The contaminated soil is contained within the pit, which is lined with steel. No contamination exists outside the steel pit. Therefore, the extent of the sand was determined by visual inspection during the Phase I sampling in 1995.

3.0 PROPOSED REMEDY FOR PRS 12-001(a), INACTIVE FIRING SITE

3.1 Description of the Proposed Remedial Action

This remedial action consists of removing less than one inch of soil from the floor of this PRS. The soil is fully contained by the structure. The pit may be considered a confined space by the Laboratory, and if it is, the appropriate procedures will be followed for the entry and removal of the soil.

After appropriate health and safety screening and confined space entry procedures are followed, (See Annex 7.6), the soil in the bottom of the pit will be removed by hand-scooping using plastic tools. One person will enter the pit to remove the soil. The removed soil will be placed in 5-gallon plastic buckets to be raised up out of the pit by support personnel. Once at the surface, representative portions of the soil will be placed in a plastic bowl so that, after all the soil is deposited in a 55-gallon drum, a representative composite sample of the contents of the drum will exist in the bowl. The contents of the bowl will be homogenized by hand with a plastic spoon to reduce the possibility of sparking, and then placed in appropriate containers for waste characterization sampling, as detailed in Section 4.0. This procedure will continue until all visible soil is removed from the pit. After the removal of soil is completed, a dustpan and whiskbroom will be used to remove the remaining particles, and such particles will also be placed in the 55-gallon drum as waste.

Although the spot test for HE performed during the Phase I work in the pit did not reveal any positive HE, the soil removal activity in the pit will proceed as if HE were present. Thus, any visible pieces of HE will be collected in a separate container and managed as hazardous waste. Similarly, the Phase I activities did not reveal any radiation above background in the pit, nor was any

evidence of depleted uranium (DU) seen. If DU chunks are seen, they will be collected in a separate container and managed as low-level radioactive waste.

During the soil removal, dust suppression will be performed using hand-held water sprayers. Application of water will be limited and will not result in runoff, or in the generation of a dual phase (water and soil) waste. The application of water will also serve as an additional safety factor to reduce problems with any HE.

Upon completion of the soil removal, tools and equipment will be decontaminated, and the decon fluid stored in bung-top 55-gallon drums, sampled for waste characterization, and disposed of accordingly. Personnel protective equipment (PPE) will be cleaned, or uncleanable portions will be cut out and disposed of as waste. All drums will be stored on-site on pallets in a less-than-90-day storage area until the results of the waste characterization are received. At that time the final disposition of the drums will be determined.

If applicable, the LANL Spill or Site-Specific Prevention, Control and Countermeasures (SPCC) Plan, the Stormwater Plan, and Air Pollution Control Procedures will be followed.

3.2 Basis for Cleanup Levels

PRS 12-001(a) lies within DOE-owned land and is removed from public access roads. The anticipated future land use is expected to be exclusively for Laboratory operations (i.e., industrial land use only).

For those COPCs retained from the human health screening assessment, site-specific cleanup goals or preliminary remediation goal (PRGs) were calculated based on the expected land use at the site. Site-specific PRGs have been calculated using the modified U.S. Environmental Protection Agency (EPA) equations and Los Alamos National Laboratory site-specific input parameters presented in Annex 7.1. The derivation of human health risk-based cleanup levels for this VCA is based on a nonintrusive industrial exposure scenario using Laboratory-specific default parameters for a generic worker. These default exposure parameters assume an exposure frequency of 250 days per year and a duration of 25 years. Exposure routes considered in the calculations of the PRGs include incidental ingestion and inhalation of contaminated soil.

Site-specific PRGs for the COPCs retained at this site are presented in Table 3.2-1. Typically, the Laboratory derives PRGs assuming an acceptable level of risk of 1E-06 for carcinogens, and a hazard index of one for noncarcinogens. This conservative approach is adopted to account for the presence of multiple constituents. With this approach, the residual risk remaining at the site following remediation will be within the acceptable risk range of 1E-04 to 1E-06 for carcinogens and less than or equal to a hazard index of one for noncarcinogens. The equations and assumptions used in the calculation are presented in Annex 7.1. The derivation of the PRG for total uranium was done using residual radioactive material (RESRAD) version 5.6.1 and is based on an exposure of 15 mrem/yr.

Comparison of the detected values of the inorganics with their nonintrusive industrial site-specific PRGs indicates that all the analytes, except for arsenic, are below the individual cleanup levels.

TABLE 3.2-1
SITE-SPECIFIC PRGs FOR PRS 12-001(a)

COPC	Sample Value (mg/kg)	PRG[1] (mg/kg)	Rationale
Arsenic	11.3	2.15	Carcinogen; based on 1E-06 acceptable risk. Risk level of 1E-06 creates a cleanup level lower than background of 7.82 mg/kg.
Barium	872	7680	Noncarcinogen; based on hazard index of 1.
Copper	722	81800	Noncarcinogen; based on hazard index of 1.
Nickel	411	40900	Noncarcinogen; based on hazard index of 1.
Thallium	4.59	184	Noncarcinogen; based on hazard index of 1.
Total Uranium	35.5	378	Radionuclide; based on a dose of 15 mrem/yr.

[1] Based on nonintrusive industrial soil ingestion scenario.
Shaded areas and bolding indicates chemical exceeded PRG.

In addition, a multiple chemical PRG risk analysis is conducted for exposure to the following effects categories where applicable to the site – residual radioactivity, carcinogen risk, and noncarcinogenic health hazard – when two or more confirmatory chemical concentrations are at or below their respective PRGs within one or more of the aforementioned classes/categories (Annex 7.1). The cumulative hazard index for the four noncarcinogenic COPCs (barium, copper, nickel, and thallium) was determined by adding together the fractional contribution (i.e., the maximum site concentration/PRG) for each chemical and comparing it against the target hazard index of one. The multiple chemical PRG hazard index level at this site is 0.1572, which is below the target index of 1. Based on this additional analysis, these inorganics are eliminated as COPCs.

Total uranium, as an inorganic, was not considered for the multiple chemical PRG risk analysis for noncarcinogens because its PRG is based on dose and not on a risk/hazard index. The PRG for total uranium is 378 mg/kg based on RESRAD.

Arsenic, the only carcinogen, is the driver for cleanup at this site, and a multiple chemical PRG risk analysis is not applicable because it is a single chemical.

3.3 Site Restoration

Because this site consists of soil inside an existing structure, site restoration is not applicable.

4.0 WASTE MANAGEMENT

4.1 Estimated Types and Volumes of Waste

Wastes expected to be generated during the VCA work at this PRS include the following:

Item	Waste Type	Anticipated Volume
Sampling waste/PPE	solid - potential hazards	Less than 1 55-gal. drum
Contaminated soils	solid - hazardous	1 55-gal. drum
Decon waste	liquid - potential hazards	Less than 20 gallons

A Characterization Strategy Form (CSF) has been approved by the Laboratory's CST-5 and ESH-19. This CSF describes the waste characterization/strategy requirements and all the uncertainties in the determination of the waste types and volumes summarized below.

The waste is expected to consist of soil contaminated with chromium above the toxicity characteristic (TC) screening level and uranium above its background UTL. The TC screening level is determined by Table 2, "Maximum Concentration Levels for Determining ER Project Waste Toxicity Characteristic" (EPA 1995, 0092). It is anticipated that a maximum of one 55-gallon drum will be filled with this soil. It will be managed as potential Resource Conservation Recovery Act (RCRA) mixed waste. The drum will be sealed and stored at this PRS until the laboratory analyses are completed. A final RCRA determination will be made after soil sample results are evaluated. After characterization, the drum will be disposed of as appropriate for RCRA, mixed, radioactive, or non-hazardous waste.

A composite sample of the soil in the drum will be analyzed for Toxicity Characteristic Leaching Procedure(TCLP) metals, isotopic and total uranium, COCs, SVOCs, and HE using EPA-approved methods. In the field, alpha, beta, and gamma radiation will be measured by hand-held instruments, and HE will be screened using a field spot test.

Initially, visibly contaminated PPE and sampling equipment will be considered potential RCRA mixed waste. Visibly uncontaminated items will be considered non-hazardous or radioactive waste, depending on the field screening results. The volume generated is expected to be less than one 55-gallon drum. PPE/sampling equipment will be placed in sealed plastic bags, then placed inside a 55-gallon drum; it will not be directly sampled.

Decontamination liquids consist of Liquinox® detergent, tap water, and distilled water. It is anticipated that a total volume of less than 20 gallons will be generated. The decontamination liquids will be classified as RCRA, mixed, radioactive, or non-hazardous waste, based on the analytical results of a liquid grab sample. This sample will be analyzed for TCLP metals, HE, VOCs, SVOCs, and isotopic and total uranium using EPA-approved methods.

4.2 Method of Management and Disposal

Waste soil 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. Wastes will be stored at this PRS in a less-than-90-day storage area or permitted storage facility until chemical analyses are completed. A final RCRA determination will be made after the soil sample results are evaluated. This waste will then be disposed of as RCRA, mixed waste, radioactive waste, or non-hazardous waste.

Visibly contaminated PPE and sampling equipment will be segregated and managed as RCRA mixed waste. The total volume expected is less than one 55-gallon drum. The PPE/sampling equipment will be placed in sealed plastic bags inside the 55-gallon drum. This waste will be disposed of in a manner similar to that which is used for the drum of waste soil containing RCRA, mixed, or radioactive wastes because of the difficulties of sampling PPE.

Decontamination liquids will be managed as potential RCRA mixed waste. They will be stored in a less-than-90-day storage area. The liquids will be segregated, labeled with the PRS number, and placed inside a 55-gallon drum. The analytical results of the grab liquid sample will be used to determine the final hazard classification and disposal location of the liquid.

Laboratory CST-5 and ESH-19 personnel will aid in the determination of the final disposal location for the waste and verify the availability of treatment, storage, or disposal (TSD) space, if it is

needed. Off-site disposal of mixed waste will require further analyses to meet the waste acceptance criteria of Envirocare, a Utah mixed-waste disposal facility. These additional analyses will be performed after the mixed waste status of soil in the drum is verified by the fixed laboratory results.

5.0 DESCRIPTION OF CONFIRMATORY/VERIFICATION SAMPLING

The proposed remedial action for this PRS is to remove all of the soil and other loose media from the pit. This will be accomplished by hand-scooping and sweeping the surface to ensure that all loose material is removed. The endpoint of this remedial action will be when no remaining visually discernible soil is in the bottom of the pit. Since there will be no loose media remaining, confirmatory sampling of a physical nature is not possible, nor is it necessary. Verification of the successful attainment of the remediation goals will be achieved by a visual inspection of the site to ensure that no soil remains in the pit.

6.0 ESTIMATED TIME TO COMPLETE THE ACTION AND UNCERTAINTIES

The estimated time required to complete the VCA is three days. This estimate is based upon a one-day mobilization, one day to complete the removal, and one day to complete demobilization and sample shipping, etc. The analytical results from the waste characterization are expected to be received within 30 days, and waste removal is expected within another 30 days. The total estimated time frame, from mobilization to removal of waste, is about 60 days.

There are few uncertainties associated with this cleanup. The amount of waste is easily identifiable. The only heavy equipment necessary is a drum loader. For the less than a few 55-gallon drum total waste estimate, adequate TSD capacity should exist. If, during the course of the removal, the waste volume exceeds 200% of the two drum estimate, the effort will be stopped and re-evaluated.

7.0 ANNEXES

ANNEX 7.1
RISK-BASED CLEANUP LEVEL ASSUMPTIONS AND CALCULATIONS

Equation 1: Direct Exposures to Carcinogenic Constituents in Industrial Soil

$$C(\text{mg/kg}) = \frac{TR \times BW_a \times AT_c \times 365 \text{ d/y}}{EF_o \times ED_o \left[\frac{IRS_o \times CSF_o}{10^6 \text{ mg/kg}} + IRA_a \times CSF_i \times (\frac{1}{VF_s} + \frac{1}{PEF}) \right]}$$

Where:

C (mg/kg) (mg/kg) = Preliminary remedial goal for soil based on exposure to carcinogenic constituents

TR = Target cancer risk (unitless)
Considered to be 1×10^{-4}

BW_a = Body weight, adult (kg)
Considered to be 70 kg (EPA 1991b)

AT_c = Averaging Time - cancer (years)
Considered to be 70 years (EPA 1991b)

EF_o = Exposure Frequency - occupational (d/y)
Considered to be 250 d/y (EPA 1991a)

ED_o = Exposure duration - occupational (years)
Considered to be 25 years (EPA 1991b)

IRS_o = Soil ingestion - occupational (mg/day)
Considered to be 50 mg/day (EPA 1991b)

CSF = Cancer slope factor-oral $(\text{mg/kg-d})^{-1}$ (IRIS, HEAST, or ECAO)

IRA_a = Inhalation rate - adult (mg/day)
Considered to be 20 m^3/day (EPA 1991b)

CSF_i = Cancer slope factor-inhalation $(\text{mg/kg-d})^{-1}$ (IRIS, HEAST, or ECAO)

VF_s = Volatilization factor for soil (mg/kg)
Considered to be zero for chemicals with MW> 200 g/mole and Henry's Law Constant $<10^{-5}$ atm-m^3/mole

PEF = Particulate emission factor (mg/kg)
Considered to be $1.11 \times 10^{+7}$ (m^3/kg) (LANL 1993)

Equation 2: Direct Exposures to Noncarcinogenic Constituents in Industrial Soil

$$C(\text{mg/kg}) = \frac{THQ \times BW_a \times ED_o \times 365 \text{ d/y}}{EF_o \times ED_o \left[\frac{1}{RfD_o} \times \frac{IRS_o}{10^6 \text{ mg/kg}} + \frac{1}{RfD_i} + \left(\frac{IRA_a}{VF_s} + \frac{IRA_a}{PEF}\right) \right]}$$

Where:

C(mg/kg) = Preliminary remedial goal for soil based on exposure to noncarcinogenic constituents (mg/kg)

THQ = Target hazard quotient (unitless)
Considered to be 1

BW_a = Body weight, adult (kg)
Considered to be 70 kg (EPA 1991b)

ED_o = Exposure duration - occupational (years)
Considered to be 25 years (EPA 1991b)

EF_o = Exposure Frequency - occupational (d/y)
Considered to be 250 d/y (EPA 1991a)

RfD_o = Reference dose-oral (mg/kg-d) (IRIS, HEAST, or ECAO)

IRS_o = Soil ingestion - occupational (mg/day)
Considered to be 50 mg/day (EPA 1991b)

RfD_i = Reference dose inhalation (mg/kg-d) (IRIS, HEAST, or ECAO)

IRA_a = Inhalation rate - adult (mg/day)
Considered to be 20 m^3/day (EPA 1991b)

VF_s = Volatilization factor for soil (mg/kg)
Considered to be zero for chemicals with MW> 200 g/mole and Henry's Law Constant $<10^{-5}$ atm-m^3/mole

PEF = Particulate emission factor (mg/kg)
Considered to be 1.11 x 10^{+7} (m^3/kg) (LANL 1993)

TABLE 7.1-1

SPREADSHEET FOR CALCULATING PRGs FOR COMMERCIAL/INDUSTRIAL SOIL EXPOSURE

Chemical	Oral Reference Dose (RfD) (mg/kg/day)	Oral Absorption Factor	Oral Slope Factor $(mg/kg/day)^{-1}$	Inhalation RfD (mg/kg/day)	Inhalation Slope Factor $(mg/kg/day)^{-1}$
Arsenic	3E-04	0.95	1.8E+00	NA	1.51E+01
Barium	7E-02	0.05	NA	1.43E-04	NA
Copper	4E-02	0.97	NA	NA	NA
Nickel	2E-02	0.1	NA	NA	NA
Thallium	9E-05	1	NA	NA	NA
Total Uranium	Calculated using RESRAD				

NA = Not Available

Chemical	Nonintrusive Industrial Soil Scenario (mg/kg)		
	Noncancer PRG	Cancer PRG	PRG (Lower of Two)
Arsenic	6.13E+02	2.15E+00	2.15E+00
Barium	7.68E+03	NA	7.68E+03
Copper	8.18E+04	NA	8.18E+04
Nickel	4.09E+04	NA	4.09E+04
Thallium	1.84E+02	NA	1.84E+02
Total Uranium	378 mg/kg (RESRAD; 15 mrem/yr)		

NA = Not Available

Multiple Chemical PRG Analysis

Following cleanup operations, confirmatory sampling and analysis will be conducted for specific COCs (when identified) or suspected suites of chemicals, when indicator PRGs are used. For sites where analytical data are not available, cleanup will be based on indicator PRG levels. Site-specific indicator chemical PRGs are used when analytical data are not available for a site. Existing information on site activities is used to identify suspected chemicals of concern. Indicator PRGs are the most health conservative predictor of single-contaminant risk for each suite of chemicals (e.g., inorganics, organic high explosives, polycyclic aromatic hydrocarbons, semivolatiles, and volatiles).

If confirmatory sample concentrations are below their indicator PRG levels for all chemicals within a suite, the site will be considered to meet cleanup criteria. If confirmatory sample concentrations within a suite of chemicals are above the indicator PRG level for that suite, sample concentrations will be compared to background upper tolerance levels (UTLs). If sample concentrations are below their respective background UTLs, the site will be considered to meet cleanup criteria. Should sample concentrations exceed their respective background UTLs, chemical-specific PRGs will be developed for those chemicals.

A multiple chemical PRG risk analysis will be conducted for exposure to residual radioactivity, carcinogenic risk, and noncarcinogenic health hazard when two or more confirmatory chemical concentrations are at or below their respective PRGs within one or more or the aforementioned groups. Non-radioactive chemicals with both carcinogenic and noncarcinogenic toxicity criteria will be included in both the carcinogen and noncarcinogen groups. The multiple chemical PRG risk analysis will be estimated by summing the fractional contribution (i.e., site-specific concentration/PRG) of each chemical. The site-specific concentration will be based on the maximum or 95% upper confidence level (UCL) of the arithmetic mean. For exposure to residual radioactivity, the fractional contribution of each will be summed and multiplied by the 15 mrem/yr target exposure level:

$$\textit{Multiple PRG Exposure Level} = [(conc_x/PRG_x) + (conc_y/PRG_y) + (conc_z/PRG_z)] \times 15 \text{ mrem/yr}$$

If the multiple PRG risk is at or below the target exposure level of 15 mrem/yr, then the site will be considered to meet cleanup criteria for exposure to residual radioactivity.

For cancer risk estimates, the fractional contribution of each will be summed and multiplied by 10^{-6} target cancer risk:

$$\textit{Multiple PRG Risk} = [(conc_x/PRG_x) + (conc_y/PRG_y) + (conc_z/PRG_z)] \times 10^{-6}$$

If the multiple PRG risk is at or below the target value of 10^{-4}, then the site will be considered to meet cleanup criteria for carcinogenic risk.

For noncancer hazard estimates, the fractional contribution of each will be summed and compared with a target hazard index of one:

$$\textit{PRG Hazard Index} = [(conc_x/PRG_x) + (conc_y/PRG_y) + (conc_z/PRG_z)]$$

If the PRG hazard index is at or below the target hazard index of one, then the site will be considered to meet cleanup criteria for noncarcinogenic risk.

If the multiple PRG risk analysis for radionuclides, non-radioactive carcinogens, or noncarcinogens exceeds target values, further cleanup or characterization of the site may be warranted.

The Concentration Term

The maximum detected concentration will be used in the initial PRG risk analysis and multiple PRG risk analysis. Use of the maximum detected concentration provides the worst case analysis and is not considered to be representative of actual exposure concentrations. If maximum concentrations are at or below their respective PRG levels and multiple PRG risk analysis target levels are not exceeded, the site will be considered to meet cleanup criteria. If, however, use of maximum concentrations results in exceeding the target levels, a 95% UCL of the arithmetic mean will be calculated and used in the PRG analysis and multiple PRG risk analysis. The 95% UCL of the mean provides a conservative estimate of the mean concentration and accounts for uncertainties due to limited sampling. If possible, the 95% UCL of the mean will be calculated using sample concentration data gathered over the entire exposure unit for the industrial site. For exposure areas with limited data or extreme variability in the measured data, the 95% UCL of the mean may be greater than the maximum concentration. If this occurs, the maximum concentration will be used as the concentration term.

REFERENCES

EPA (US Environmental Protection Agency), December 1991a. "Risk Assessment Guidance for Superfund, Volume I—Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals)," Interim, EPA/540/R-92/003, Publication 9285.7-01B, Office of Research and Development, Washington, DC. (EPA 1991, 0302)

EPA (US Environmental Protection Agency), March 25, 1991b. 'Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors," Interim Final,' OSWER Directive 9285.6-03, Office of Emergency and Remedial Response, Toxics Integration Branch, Washington, DC. (EPA 1991, 0746)

LANL 1993: Los Alamos National Laboratory, November 1993. "Installation Work Plan for Environmental Restoration," Revision 3, Los Alamos National Laboratory Report LA-UR-93-3987, Los Alamos, New Mexico (LANL 1993).

ANNEX 7.2
RFI ANALYTICAL RESULTS

TABLE 7.2-1
DATA QUALITY EVALUATION FOR PRS 12-001(a) SAMPLES

SUITE	BATCH NUMBER	COMMENTS
Inorganics	69029 (two samples)[1]	Cadmium (two samples)[2] was J qualified and reported as detected although the reported sample value was between the estimated quantitation limit (EQL) and the method detection limit (MDL). The analyte is considered to be undetected because the result cannot be accurately distinguished from instrument "noise" levels. As a result, the data usability for the analyte is affected and the value is not used in the screening assessment.
	69029 (two samples)	Mercury (one sample); same as above.
	69591 (three samples)	Cadmium (three samples), antimony (two samples), and thallium (one sample); same as above.
	70012 (three samples)	Mercury (two samples); same as above.
	69591 (three samples)	Antimony, arsenic, beryllium, cadmium, chromium, thallium, and vanadium (three samples) had laboratory control samples outside of acceptable limits. Data are UJ or J qualified, but data usability not affected; data are valid.
	69029 (two samples)	Antimony, arsenic, beryllium, chromium, cobalt, lead, selenium, silver, thallium, and vanadium (one sample) had matrix spike/matrix spike duplicates outside of acceptable limits. Data are UJ or J qualified, but data usability not affected; all data are valid.
		Antimony, barium, cadmium, chromium, manganese, and vanadium (two samples) were detected in the laboratory blank. Sample values were greater than 5X the blank values and were considered to be valid and data usability unaffected.
	69591 (three samples)	Barium, beryllium, cadmium, chromium, cobalt, manganese, nickel, and zinc (three samples); same as above.
	70012 (three samples)	Mercury (three samples); same as above.
HE	68962 (two samples)	All high explosive analyses (two samples) were extracted after the recommended 14-day holding time. The samples exceeded the recommended holding time by 2 to 7 days and were considered valid estimated values (i.e., qualified UJ or J) and their data usability was unaffected.
		4-Amino-2,6-dinitrotoluene; m-,o-,p-nitrotoluenes, and nitrobenzene (two samples) has laboratory control sample outside of acceptable limits. Data are qualified as UJ, but data usability is unaffected; data are valid.
Radionuclides	69743 (five samples)	Uranium-235 and uranium-238 (three samples) were detected in the laboratory blank. Sample concentrations were less than 5X the blank value, indicating presence is due to contamination. Data usability affected and data are not used in the screening assessment.
	68714 (two samples)	Uranium-238 values in both samples were greater than 5X the blank values. As a result, the uranium-238 data for these samples are considered to be valid and the data usability unaffected.

[1] Number in parenthesis is the total number of samples in each batch for this PRS.
[2] Number in parenthesis is the number of samples per analyte and batch that had a QC problem.

TABLE 7.2-2
INORGANICS WITH CONCENTRATIONS GREATER THAN BACKGROUND UTL FOR PRS 12-001(a)

SAMPLE ID	DEPTH (in.)	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)
LANL UTL	N/A	1.0	7.82	315	19.3	30.7	23.3
SAL	N/A	31	0.38	5300	210	2800	400
0212-95-0001	0-1	0.78	5.66	618	34.2	722	22.1
0212-95-0002	0-0.75	1.85	11.3	872	165	991	23.3
0212-95-0003	0-6	ND	2.28	233	8.15	7.03	14.8
0212-95-0004	0-6	ND	2.57	208	7.56	6.39	14.6
0212-95-0005	0-5	ND	3.15	214	10.2	9.56	17.3

SAMPLE ID	DEPTH (in.)	Nickel (mg/kg)	Selenium (mg/kg)	Thallium (mg/kg)	Total Uranium (mg/kg)	Zinc (mg/kg)
LANL UTL	N/A	15.2	1.7	1.0	5.45	50.8
SAL	N/A	1500	380	6.1	230	23000
0212-95-0001	0-1	89.5	0.9	1.95	24.4	69.3
0212-95-0002	0-0.75	411	1.81	4.59	35.5	105
0212-95-0003	0-6	7.1	0.77	0.97	5.47	24.9
0212-95-0004	0-6	6.53	ND	ND	4.51	22.9
0212-95-0005	0-5	8.59	0.48	0.95	12.3	26.9

TABLE 7.2-3
MULTIPLE CHEMICAL EVALUATION - PRS 12-001(a)

ANALYTE	MAXIMUM NORMALIZED CONCETRATIONS Sample# 0212-95-0002
SOIL - NONCARCINOGENIC	
Antimony	0.0597
Barium[1]	0.1645
Chromium	0.7857
Copper	0.3539
HMX	0.0005
Lead	0.0582
Nickel	0.2740
Selenium	0.0048
Thallium	0.7525
Total Uranium	0.1543
Zinc	0.0046
Total	2.6322

[1] Analytes set in bold typeface are those that are identified as COPCs.

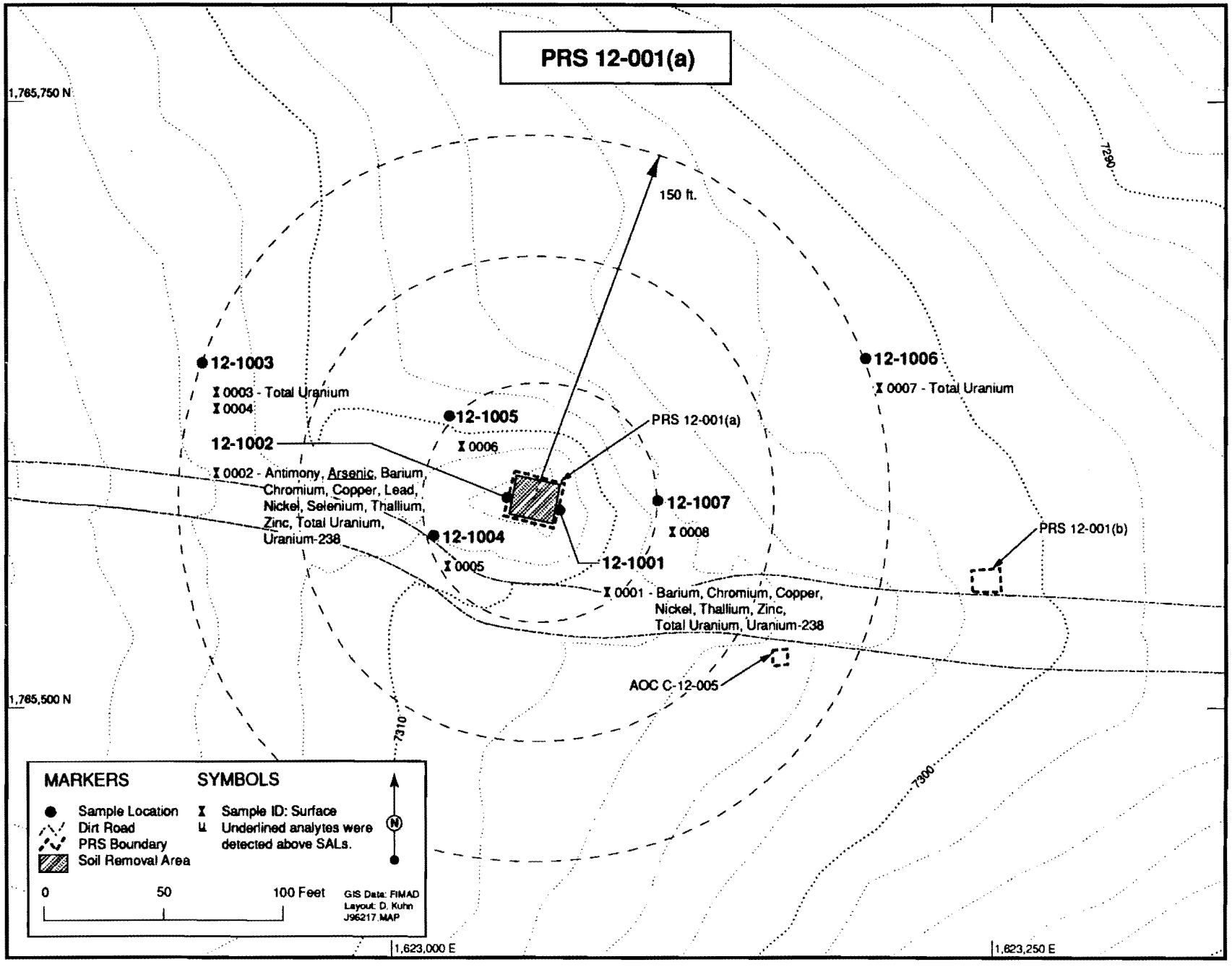
TABLE 7.2-4
RADIONUCLIDES WITH CONCENTRATIONS GREATER THAN BACKGROUND UTLs FOR PRS 12-001(a)

SAMPLE ID	DEPTH (in.)	Total Uranium (mg/kg)	Uranium-235 (pCi/g)	Uranium-238 (pCi/g)
LANL UTL	N/A	5.45	0.08	1.82
SAL	N/A	130	10	67
0212-95-001	0-1 s	24.4	ND	7.66
0212-95-002	0-0.75	35.5	0.698	9.2
0212-95-003	0-6	5.47	ND	ND
0214-95-004	0-6	4.51	ND	ND
0212-95-005	0-6	12.3	ND	ND

N/A = Not Applicable

ND = Not Detected

ANNEX 7.3
SITE MAP


PRS 12-001(a)
1,765,750 N
1,765,500 N
1,623,000 E
1,623,250 E
150 ft.
7290
7310
7300
12-1003
0003 - Total Uranium
0004
12-1002
0002 - Antimony, Arsenic, Barium, Chromium, Copper, Lead, Nickel, Selenium, Thallium, Zinc, Total Uranium, Uranium-238
12-1005
0006
12-1004
0005
12-1001
0001 - Barium, Chromium, Copper, Nickel, Thallium, Zinc, Total Uranium, Uranium-238
12-1007
0008
12-1006
0007 - Total Uranium
PRS 12-001(a)
PRS 12-001(b)
AOC C-12-005
MARKERS
Sample Location
Dirt Road
PRS Boundary
Soil Removal Area
SYMBOLS
Sample ID: Surface
Underlined analytes were detected above SALs.
N
0
50
100 Feet
GIS Data: FIMAD
Layout: D. Kuhn
J96217.MAP

ANNEX 7.4
IMPLEMENTATION SOPS

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

ANNEX 7.5
QUALITY ASSURANCE PLAN

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

ANNEX 7.6
SITE-SPECIFIC HEALTH AND SAFETY PLAN

Prior to initiation of any work, a completed Site-Specific Health and Safety Plan (SSHASP) will be approved by Laboratory representatives.

The SSHASP will be developed for the Environmental Restoration (ER) Project at the Laboratory to comply with applicable federal and state occupational health and safety (HS) requirements, including those of the US Department of Energy (DOE). The DOE requires the Laboratory to comply with the federal Occupational Safety and Health Administration (OSHA) requirements, even though operations at the Laboratory are not subject to the jurisdiction of OSHA. The ER Project has developed a generic Health and Safety Plan, the ER Project HASP, which establishes HS information and requirements applicable to ER field operations project wide. The SSHASP establishes site-specific HS information and requirements applicable to the scope of work described in Section 2.

ER participants are responsible for conducting work in accordance with applicable regulations. The term "ER participants" refers to anyone performing ER work, including Laboratory personnel, subcontractors to the Laboratory and their lower-tier contractors, consultants, and agents. In some cases within this document, the Laboratory has chosen to invoke OSHA and Laboratory requirements that ordinarily may not apply to ER field operations (e.g., OSHA's general industry standards in Part 1910 of Title 29 of the Code of Federal Regulations [29 CFR 1910]). These choices were made on a case-by-case basis to maintain consistency with the Laboratory's as low as reasonably achievable (ALARA) policy and to clarify the Laboratory's expectations with regard to interpretable requirements of the multiple agencies governing ER work. Where there is concern that implementation of work orders or HS requirements would conflict with contract terms, or that they could unreasonably compromise the safety or health of an individual or the environment, such concerns should immediately be brought to the attention of the Contract Administrator and the Field Unit HS Representative. Failure to comply with terms of HS plans may constitute cause to stop an activity or to issue a stop work order, as specified in Section 3.4.2 of the HASP, without cost or penalty to the Laboratory.

This SSHASP shall be reviewed and approved in accordance with Section 1.2 of the HASP. When this SSHASP has been approved, revisions will be tracked using a SSHASP modification form (Appendix B of the HASP) per Section 1.3 of the HASP. Modifications to this SSHASP may result in a change to the terms or scope of a subcontract. Completion of an SSHASP modification form is <u>not</u> the means for modifying the scope or terms of the project contract. To modify a contract, the Subcontractor shall notify the Contract Administrator and Field Unit HS Representative under the changes clause and shall not make the change until a change order has been mutually agreed upon by all parties, or unless unilateral direction is given by the Contract Administrator.

The SSHASP will be presented in a format similar to this example:

1.0 Introduction

2.0 Background Information

Table 2-1 Site Description(s)
Table 2-2 Scope of Work

3.0 Organization, Responsibilities and Authority

4.0 Hazard Analysis
4.1 Personnel by Task
4.2 Hazard Substances of Occupational Health Concern
4.3 Hazard Assessment and Administrative/Engineering Controls

5.0 Site Controls

6.0 Exposure Monitoring and Corresponding Actions
6.1 Direct-Reading Monitoring
6.2 Personal Dosimetry
6.3 Area Sampling

7.0 Personal Protective Equipment

8.0 Decontamination

9.0 Emergency/Incident Action Plan

10.0 Training

11.0 Medical Surveillance

12.0 Quality Control and Quality Assurance (QC/QA)

13.0 Recordkeeping

Appendixes

A Map(s) of Site Locations and Site Control Zones/Facilities

B Hazardous Substance - Hazard Assessment

C Chemical, Physical, and Toxicological Properties of Hazardous Chemical Substances

D Emergency Contacts and Route(s) to Medical Services

ANNEX 7.7
WASTE MANAGEMENT CHECKLIST

Los Alamos
NATIONAL
LABORATORY
memorandum

Engineering Sciences and Applications
ESA-EPE, Energy and Process Engineering

To/MS: Memo To The File
From/MS: T. E. Gene Gould, ESA-EPE, G787
Phone/FAX: 7-0402/5-1976
Date: April 17, 1996

SUBJECT: CHARACTERIZATION STRATEGY FORM

Based on my review of available information and my professional judgment, it is not necessary to sample for tritium because it is not a potential contaminant at PRS 12-001(a).

TEG/nr

CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
1085/FU2	12-001(a)	Steel pit, firing site
All Waste Types or Wastestreams: Soil, sampling waste/PPE, and decon. waste (liquids)		

Completed By: J. W. Heyser	Date: May 6, 1996
FPL: T. E. Gene Gould	WMC: Bob Catherwood, ESA-EPE
Type of Activity (site investigation, EC, etc.): VCA	

Description of the Activity (e.g., drilling, surface sampling, excavation and recontouring, soil washing, etc.)

A small amount of soil will be removed by hand sweeping the pit floor and then putting it in a 55-gal. drum. Field screening for alpha, beta, and gamma radiation will be performed with hand held instruments and HE will be detected by a spot field test.

Acceptable Knowledge

Site Description, Site History, and Historical Waste Generating Processes or Activities: (Include dates for site history):

PRS 12-001(a) is a steel-lined firing pit located approximately 3,200 ft. east of the TA-12 entrance. The pit is hexagonal shaped and measures 10.5 ft. on each side and 11.5 ft. deep. A steel cover (20 ft. x 22 ft. by 5 ft.) is filled with soil and covers the top of the pit. The cover has a 5 ft. by 5 ft. hole in the middle, which was used to lower explosives into the firing area. Recovery shots, which also involved uranium, were performed in the pit.

Studies conducted at this PRS involved the development and performance testing of explosives and the study of detonation physics. Explosives were detonated in close proximity with steel plates or spheres. HE calorimetry experiments were also performed. The pit was abandoned in 1953 and a small-scale cleanup of dispersed HE was undertaken in 1962 (RFI Work Plan for OU 1085, May 1994).

Previous Investigation Analytical Results: (Attach copy of analytical methods and results above background levels)

The soil in the firing site was sampled on June 30, 1995 during the Phase I investigation. Two samples were taken inside the pit and sent to the analytical laboratory, and analyzed by gamma scan, and for HE, total and isotopic U, and TAL metals. Arsenic, barium, lead, and selenium were at or above background UTL levels. Chromium exceeded the TC screening level in one sample. HMX (1.6 mg/kg) was present in one sample. Total U was above its background UTL in both samples (36 mg/kg maximum). U-235 (0.7 pCi/gm) was above its background UTL in one sample and U-238 was above its background UTL in both samples (9.2 pCi/gm maximum).

CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
1085/FU2	12-001(a)	Steel pit, firing site
Specific Waste Type: Soil		

Waste Description

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

Waste Type Description: Soil
Potential Regulatory Status: RCRA mixed waste
Volume Estimate: One 55-gal. drum
Waste Packaging: 55-gal. drum

Characterization Strategy

Description of Strategy:

One representative composite sample will be taken from the 55-gal. drum of soil. The soil will be analyzed for TCLP metals, isotopic and total uranium, VOCs, SVOCs, and HE. Visible pieces of HE and DU will be segregated and disposed of as hazardous or radioactive waste, respectively. Field screening will be used to monitor for alpha, beta and gamma radiation using hand-held instruments and HE will be detected by a field spot test.

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.)

One composite sample will be collected from the 55-gal. drum of waste. One composite sample is considered to be representative because the waste is fairly homogenous based on field observation. The composite sample will consist of at least three but no more than ten subsamples. Each drum of soil, should more than one be generated, will be analyzed for TCLP metals, isotopic and total uranium, SVOCs, and HE.

- 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. A composite sample should consist of no more than 10 subsamples.
- A sample of homogeneous or heterogeneous waste collected for VOC analysis should consist of a grab sample rather than a composite sample.

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	SW 846 8260	Unk	X		
Semi-Volatile Constituents	SW 846 8270	Yes	X		
Organic Pesticides		No		X	
Organic Herbicides		No		X	
Pesticides & PCBs		No		X	
PCBs		No		X	

CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
1085/FU2	12-001(a)	Steel pit, firing pit
Specific Waste Type: Soil		

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		Yes		X	
Total Cyanide		No		X	
Other Inorganic Constituents (specify)		No		X	
High Explosive Constituents	SW 846 8330	Yes	X		
Asbestos		No		X	
TPH		No		X	
TCLP Metals	SW 846 1311, 6010, 7470	Yes	X		
TCLP Organics		No		X	
TCLP Pesticides and herbicides		No		X	
Gross Alpha	Field screen	Yes	X		
Gross Beta	"	Yes	X		
Gross Gamma	"	Yes	X		
Tritium[1]		No		X	
Gamma Spectroscopy		Yes		X	
Isotopic Plutonium		No		X	
Total Plutonium		No		X	
Isotopic Uranium	HASL 300	Yes	X		
Total Uranium	KPA	Yes	X		
Strontium-90		No		X	
Americium-241		No		X	

[1] If tritium is not expected to be in the waste and the waste will not be sampled for tritium, attach a tritium 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 because there is no potential for the waste to contain added tritium due to DOE operations.

CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
1085/FU2	12-001(a)	Steel pit, firing site

Specific Waste Type: Soil

Preliminary RCRA Determination

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

During Phase I sampling, only listed TC waste (metals) were detected. Soil waste will be sampled for VOCs, SVOCs, isotopic and total uranium and HE in addition to TCLP metals. A final RCRA determination will be made after the soil sample results are evaluated.

Preliminary RCRA Status

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

__X__ RCRA: (90-Day Storage Requirement)
Waste will be stored/handled in accordance with 20 NMAC Generator Requirements. Soil wastes will be stored in a less-than-90-day storage area. A final RCRA determination will be made after the soil sample results are evaluated.

Preliminary Determination for Radioactivity

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

John Mann, a certified health physicist, reviewed the site history and the Phase I data to identify radionuclides that could be present in the waste. Based on his review, U-235 and U-238 are expected to be present in the waste at levels above the background UTLs. Therefore, the waste would be initially classified as radioactive waste until a final determination is made.

Preliminary Radioactivity Status

__X__ Material is not radioactive
Describe how waste will be stored. A final determination as to its radioactive status and final disposal site will be made after the soil results are evaluated.

__X__ Material is radioactive
Describe the controlled area, labeling, and protection against inadvertent contamination. Material will be managed as radioactive waste and stored in a less-than-90-day storage area. A final determination as to its radioactive status and final disposal site will be made after the soil results are evaluated.

CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
1085/FU2	12-001(a)	Steel pit, firing site
Specific Waste Type: PPE and sampling equipment		

Waste Description

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

Waste Type Description: PPE & sampling equipment

Potential Regulatory Status: Visibly contaminated items will be considered RCRA, mixed, radioactive, or non-hazardous waste (depending on the radiological field screening results of the soil removed). Visibly uncontaminated items will be considered non-hazardous or radioactive waste (depending on the radiological field screening results).

Volume Estimate: The volume generated will be less than one 55-gal. drum.

Waste Packaging: The PPE will be placed in sealed plastic bags labeled with the PRS number, and then placed inside the 55-gal. drum.

Characterization Strategy

Description of Strategy:

If possible, the PPE/sampling equipment will be decontaminated prior to disposal. After decontamination the PPE/sampling equipment will be field screened for gross alpha, gross beta and gross gamma radiation in accordance with LANL-ER-SOP-10.07, "Field Monitoring for Surface and Volume Radioactivity Levels." Gross alpha radiation will be screened using an alpha probe, gross beta radiation will be screened using a beta/gamma probe, and gross gamma radiation will be screened using a Ludlum Model 2221 Scaler/Ratemeter with a Ludlum Model 44-10 2" x 2" Gamma Scintillator (SPA-3), which is equivalent to micro-R. The waste will be inspected to determine if there is any visible contamination. If it is not visibly contaminated and does not have readings above background radioactivity, it will be placed in plastic bags, segregated by PRS, and disposed of as non-hazardous waste.

If the PPE/sampling equipment is not decontaminated or if decontamination is not effective, the contaminated piece(s) will be placed in separate plastic bags, segregated by PRS. Each plastic bag will be labeled with the PRS number. The RCRA and radioactivity status of the contaminated items will be based on the analytical results of soil samples associated with this PRS (See Analyte Suite section of this form). The PPE/sampling equipment will be assumed to have a similar level of contamination as the highest level reported in a single soil sample at this PRS.

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.)

The PPE/sampling equipment will not be directly sampled, but will be characterized as described above.

- 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. A composite sample should consist of no more than 10 subsamples.
- A sample of homogeneous or heterogeneous waste collected for VOC analysis should consist of a grab sample rather than a composite sample.

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		X	
Semi-Volatile Constituents		Yes		X	
Organic Pesticides		No		X	
Organic Herbicides		No		X	
Pesticides & PCBs		No		X	
PCBs		No		X	

CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
1085/FU2	12-001(a)	Steel pit, firing site
Specific Waste Type: PPE and sampling equipment		

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		Yes		X	
Total Cyanide		No		X	
Other Inorganic Constituents (specify)		No		X	
High Explosive Constituents		Yes		X	
Asbestos		No		X	
TPH		No		X	
TCLP Metals		Yes		X	
TCLP Organics		No		X	
TCLP Pesticides and herbicides		No		X	
Gross Alpha	Field screen	Yes	X		
Gross Beta	"	Yes	X		
Gross Gamma	"	Yes	X		
Tritium[2]		No		X	
Gamma Spectroscopy		Yes		X	
Isotopic Plutonium		No		X	
Total Plutonium		No		X	
Isotopic Uranium		Yes		X	
Total Uranium		Yes		X	
Strontium-90		No		X	
Americium-241		No		X	

[2] If tritium is not expected to be in the waste and the waste will not be sampled for tritium, attach a tritium 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 because there is no potential for the waste to contain added tritium due to DOE operations.

CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
1085/FU2	12-001(a)	Steel pit, firing site

Specific Waste Type: PPE and sampling equipment

Preliminary RCRA Determination

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

During Phase I sampling, only TC waste (metals) were detected in the soil. Soil wastes will be sampled for VOCs, SVOCs, isotopic and total uranium and HE in addition to TCLP metals. A final RCRA determination for the PPE and sampling equipment will be based on an evaluation of the soil sample results.

Preliminary RCRA Status

__X__ Non-RCRA: (No 90-Day Storage Requirement)
Describe how waste will be stored/handled: Visibly uncontaminated items will be segregated and managed as non-RCRA waste.

__X__ RCRA: (90-Day Storage Requirement)
Waste will be stored/handled in accordance with 20 NMAC Generator Requirements. Visibly contaminated items will be segregated, managed as RCRA waste, and stored in a less-than-90-day storage area. A final RCRA determination will be made after the soil sample results are evaluated.

Preliminary Determination for Radioactivity

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

Visibly uncontaminated PPE and sampling equipment is expected to be non-radioactive. Visibly contaminated PPE and sampling equipment may contain U-235 and U-238 at levels above the soil background. Therefore, visibly contaminated PPE will be initially classified as radioactive waste.

Preliminary Radioactivity Status

___X__ Material is not radioactive
Describe how waste will be stored.

___X__ Material is radioactive
Describe the controlled area, labeling, and protection against inadvertent contamination. This material will be stored in a less-than-90 day storage area. Its final disposal will be based on an evaluation of the radioactive status of the waste soil samples.

CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
1085/FU2	12-001(a)	Steel pit, firing site
Specific Waste Type: Decontamination wastes (liquids)		

Waste Description

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

Waste Type Description: Decontamination liquids consist of Liquinox(R) detergent, tap water and distilled water.
Potential Regulatory Status: RCRA mixed waste.
Volume Estimate: A total volume of less than 20 gallons.
Waste Packaging: The liquid will be placed inside a 55-gallon drum and kept in a less-than 90 storage area.

Characterization Strategy

Description of Strategy:

The decontamination liquids will be characterized for RCRA based on the results of an analysis of a grab liquid sample. The decontamination liquids from this PRS will be segregated, placed in a separate drum and labeled with the PRS number.

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.)

One grab sample of the decontamination liquids will be analyzed for TCLP metals, HE, VOCs, SVOCs, and isotopic and total uranium. A grab sample was selected because the waste is expected to be homogeneous. One sample per waste stream was considered sufficient because of the small volume of the waste stream (less than 20 gallons).

- 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. A composite sample should consist of no more than 10 subsamples.
- A sample of homogeneous or heterogeneous waste collected for VOC analysis should consist of a grab sample rather than a composite sample.

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	SW 846 8260	Unk	X		
Semi-Volatile Constituents	SW 846 8270	Yes	X		
Organic Pesticides		No		X	
Organic Herbicides		No		X	
Pesticides & PCBs		No		X	
PCBs		No		X	

OU Number/FU	PRS/SWMU Number	Title
1085/FU2	12-001(a)	Steel pit, firing site
Specific Waste Type: Decon. wastes (liquids)		

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		Yes		X	
Total Cyanide		No		X	
Other Inorganic Constituents (specify)		No		X	
High Explosive Constituents	SW 846 8330	Yes	X		
Asbestos		No		X	
TPH		No		X	
TCLP Metals	SW 846 1311, 6010, 7470	Yes	X		
TCLP Organics		No		X	
TCLP Pesticides and herbicides		No		X	
Gross Alpha	Field screen	Yes	X		
Gross Beta	"	Yes	X		
Gross Gamma	"	Yes	X		
Tritium[3]		No		X	
Gamma Spectroscopy		Yes		X	
Isotopic Plutonium		No		X	
Total Plutonium		No		X	
Isotopic Uranium	HASL 300	Yes	X		
Total Uranium	KPA	Yes	X		
Strontium-90		No		X	
Americium-241		No		X	

[3] If tritium is not expected to be in the waste and the waste will not be sampled for tritium, attach a tritium 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 because there is no potential for the waste to contain added tritium due to DOE operations.

CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
1085/FU2	12-001(a)	Steel pit, firing site

Specific Waste Type: Decon. wastes (liquids)

Preliminary RCRA Determination

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

During Phase I sampling, only TC waste (metals) were detected in soil samples. Decon. liquid will be sampled for VOCs, SVOCs, isotopic and total uranium and HE in addition to TCLP metals. A final RCRA determination will be made after the liquid sample results are evaluated.

Preliminary RCRA Status

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

__X__ RCRA: (90-Day Storage Requirement)
Waste will be stored/handled in accordance with 20 NMAC Generator Requirements. Decon. liquid will be stored in a less-than-90-day storage area. A final RCRA determination will be made after the liquid sample results are evaluated.

Preliminary Determination for Radioactivity

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

John Mann, a certified health physicist, reviewed the site history and the Phase I data to identify radionuclides that could be present in the waste. Based on his review, U-235 and U-238 are expected to be present in the waste at levels above the soil background UTLs. Therefore, this waste will be initially classified as radioactive waste.

Preliminary Radioactivity Status

___X__ Material is not radioactive
Describe how waste will be stored A final determination as to its radioactive status and final disposal site will be made after the liquid sample results are known.

___X__ Material is radioactive
Describe the controlled area, labeling, and protection against inadvertent contamination. Material will be managed as radioactive waste and stored in a less-than-90-day storage area. A final determination as to its radioactive status and final disposal site will be made after the liquid sample results are known.

CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
1085/FU2	12-001(a)	Steel pit, firing site
Wastetypes or Wastestreams: Soil, sampling waste/PPE, and decon. waste (liquids)		

Signatures:

Field Team Leader _____ 5/9/96

Field Team Waste Management Coordinator _____

Waste Management Representative _____ 5/8/96

Sample ID	Batch	Analyte	Value	Units	MDL	Result Qual	Anal Qual	QC Type	Accuracy	Nom Conc	Recovery	Dilution	Fraction	Matrix	SAL	BKGD	BKGD Units	>_SAL
LB	68962	1,2-Dinitrobenzene	327	UG/KG				SURROGATE		375	87.2	1						
LB	68962	1,2-Dinitrobenzene	353	UG/KG				SURROGATE		375	94	1						
LB	68962	1,2-Dinitrobenzene	304	UG/KG				SURROGATE		375	81	1						
LB	69881	1,2-Dinitrobenzene	343	UG/KG				SURROGATE		375	91.4	1						
LB	69881	1,2-Dinitrobenzene	242	UG/KG				SURROGATE		375	64.4	1						
LB	69881	1,2-Dinitrobenzene	254	UG/KG				SURROGATE		375	67.8	1						
LB	68962	2,4,6-Trinitrotoluene	640	UG/KG	188			LCS		750	85.3	1						
LB	68962	2,4,6-Trinitrotoluene	639	UG/KG	188			LCS DUP		750	85.1	1						
LB	69881	2,4,6-Trinitrotoluene	678	UG/KG	188			LCS		750	90.4	1						
LB	69881	2,4,6-Trinitrotoluene	709	UG/KG	188			LCS DUP		750	94.5	1						
LB	68962	2,4-Dinitrotoluene	616	UG/KG	188			LCS		750	82.1	1						
LB	68962	2,4-Dinitrotoluene	642	UG/KG	188			LCS DUP		750	85.5	1						
LB	69881	2,4-Dinitrotoluene	706	UG/KG	188			LCS DUP		750	94.2	1						
LB	69881	2,4-Dinitrotoluene	685	UG/KG	188			LCS		750	91.3	1						
LB	68962	2,6-Dinitrotoluene	682	UG/KG	188			LCS DUP		750	90.9	1						
LB	68962	2,6-Dinitrotoluene	667	UG/KG	188			LCS		750	89	1						
LB	69881	2,6-Dinitrotoluene	767	UG/KG	188			LCS		750	102	1						
LB	69881	2,6-Dinitrotoluene	763	UG/KG	188			LCS DUP		750	102	1						
LB	68962	2-Amino-4,6-dinitrotoluene	604	UG/KG	188			LCS DUP		750	80.5	1						
LB	68962	2-Amino-4,6-dinitrotoluene	625	UG/KG	188			LCS		750	83.3	1						
LB	69881	2-Amino-4,6-dinitrotoluene	729	UG/KG	188			LCS DUP		750	97.2	1						
LB	69881	2-Amino-4,6-dinitrotoluene	698	UG/KG	188			LCS		750	93.1	1						
LB	68962	4-Amino-2,6-dinitrotoluene	561	UG/KG	188		C	LCS DUP		750	74.8	1						
LB	68962	4-Amino-2,6-dinitrotoluene	582	UG/KG	188			LCS		750	77.6	1						
LB	69881	4-Amino-2,6-dinitrotoluene	717	UG/KG	188			LCS		750	95.6	1						
LB	69881	4-Amino-2,6-dinitrotoluene	743	UG/KG	188			LCS DUP		750	99.1	1						
LB	69029	Aluminum	3430000	UG/KG	5000			LCS DUP		3420000	100	2						
LB	69029	Aluminum	3630000	UG/KG	5000			LCS		3420000	106	2						
LB	69591	Aluminum	43	UG/KG	50	J	EV	BLANK		0		1						
LB	69591	Aluminum	3350000	UG/KG	4950			LCS DUP		3420000	98.1	2						
LB	69591	Aluminum	3610000	UG/KG	4950			LCS		3420000	105	2						
LB	69029	Antimony	1.28	UG/KG	10	J	EV	BLANK		0		1						
LB	69029	Antimony	83500	UG/KG	1000			LCS		74300	112	2						
LB	69029	Antimony	76600	UG/KG	1000			LCS DUP		74300	103	2						
LB	69591	Antimony	92700	UG/KG	990		C	LCS DUP		74300	125	2						
LB	69591	Antimony	83100	UG/KG	990			LCS		74300	112	2						
LB	69029	Arsenic	70700	UG/KG	1000			LCS		62600	113	2						
LB	69029	Arsenic	69300	UG/KG	1000			LCS DUP		62600	111	2						
LB	69591	Arsenic	76900	UG/KG	990		C	LCS DUP		62600	123	2						
LB	69591	Arsenic	68700	UG/KG	990			LCS		62600	110	2						
LB	69029	Barium	0.107	UG/KG	10	J	EV	BLANK		0		1						
LB	69029	Barium	195000	UG/KG	1000			LCS DUP		197000	99.1	2						
LB	69029	Barium	203000	UG/KG	1000			LCS		197000	103	2						
LB	69591	Barium	0.194	UG/KG	10	J	EV	BLANK		0		1						
LB	69591	Barium	210000	UG/KG	990			LCS DUP		197000	107	2						
LB	69591	Barium	183000	UG/KG	990			LCS		197000	92.9	2						

Sample ID	Batch	Analyte	Value	Units	MDL	Result Qual	Anal Qual	QC Type	Accuracy	Nom Conc	Recovery	Dilution	Fraction	Matrix	SAL	BKGD	BKGD Units	> SAL
LB	69029	Beryllium	98300	UG/KG	500			LCS DUP		90900	108	2						
LB	69029	Beryllium	100000	UG/KG	500			LCS		90900	110	2						
LB	69591	Beryllium	0.123	UG/KG	5	J	EV	BLANK		0		1						
LB	69591	Beryllium	111000	UG/KG	495		C	LCS DUP		90900	122	2						
LB	69591	Beryllium	97200	UG/KG	495			LCS		90900	107	2						
LB	69029	Cadmium	0.12	UG/KG	5	J	EV	BLANK		0		1						
LB	69029	Cadmium	134000	UG/KG	500			LCS		123000	109	2						
LB	69029	Cadmium	131000	UG/KG	500			LCS DUP		123000	106	2						
LB	69591	Cadmium	0.167	UG/KG	5	J	EV	BLANK		0		1						
LB	69591	Cadmium	132000	UG/KG	495			LCS		123000	107	2						
LB	69591	Cadmium	150000	UG/KG	495		C	LCS DUP		123000	122	2						
LB	69029	Calcium	2590000	UG/KG	10000			LCS		2380000	109	2						
LB	69029	Calcium	2570000	UG/KG	10000			LCS DUP		2380000	108	2						
LB	69591	Calcium	122	UG/KG	100		V	BLANK		0		1						
LB	69591	Calcium	2640000	UG/KG	9900			LCS		2380000	111	2						
LB	69591	Calcium	2830000	UG/KG	9900			LCS DUP		2380000	119	2						
LB	68714	Cesium-137	28.7	PCI/G	0.212			LCS	0.396	24.9	115	1						
LB	69743	Cesium-137	27.9	PCI/G	0.146			LCS	0.278	24.9	112	1						
LB	69029	Chromium	0.754	UG/KG	10	J	EV	BLANK		0		1						
LB	69029	Chromium	85200	UG/KG	1000			LCS DUP		77700	110	2						
LB	69029	Chromium	87300	UG/KG	1000			LCS		77700	112	2						
LB	69591	Chromium	93700	UG/KG	990		C	LCS DUP		77700	121	2						
LB	69591	Chromium	87100	UG/KG	990			LCS		77700	112	2						
LB	69591	Chromium	11.7	UG/KG	10		V	BLANK		0		1						
LB	69029	Cobalt	152000	UG/KG	1000			LCS DUP		141000	108	2						
LB	69029	Cobalt	154000	UG/KG	1000			LCS		141000	109	2						
LB	69591	Cobalt	0.255	UG/KG	10	J	EV	BLANK		0		1						
LB	69591	Cobalt	164000	UG/KG	990			LCS DUP		141000	116	2						
LB	69591	Cobalt	149000	UG/KG	990			LCS		141000	105	2						
LB	69029	Copper	111000	UG/KG	1000			LCS		106000	105	2						
LB	69029	Copper	109000	UG/KG	1000			LCS DUP		106000	103	2						
LB	69591	Copper	116000	UG/KG	990			LCS DUP		106000	110	2						
LB	69591	Copper	105000	UG/KG	990			LCS		106000	98.8	2						
LB	68962	HMX	617	UG/KG	750	J	E	LCS DUP		750	82.2	1						
LB	68962	HMX	622	UG/KG	750	J	E	LCS		750	83	1						
LB	69881	HMX	696	UG/KG	750	J	E	LCS		750	92.8	1						
LB	69881	HMX	834	UG/KG	750			LCS DUP		750	111	1						
LB	69029	Iron	6810000	UG/KG	5000			LCS DUP		7530000	90.4	2						
LB	69029	Iron	7380000	UG/KG	5000			LCS		7530000	98.1	2						
LB	69591	Iron	74.3	UG/KG	50		V	BLANK		0		1						
LB	69591	Iron	7460000	UG/KG	4950			LCS		7530000	99	2						
LB	69591	Iron	6710000	UG/KG	4950			LCS DUP		7530000	89	2						
LB	69029	Lead	187000	UG/KG	300			LCS DUP		188000	99.2	2						
LB	69029	Lead	192000	UG/KG	300			LCS		188000	102	2						
LB	69591	Lead	210000	UG/KG	495			LCS DUP		188000	112	2						
LB	69591	Lead	186000	UG/KG	495			LCS		188000	98.9	2						

Sample ID	Batch	Analyte	Value	Units	MDL	Result Qual	Anal Qual	QC Type	Accuracy	Nom Conc	Recovery	Dilution	Fraction	Matrix	SAL	BKGD	BKGD Units	> SAL
LB	68962	m Dinitrobenzene	636	UG/KG	188			LCS DUP		750	84.9	1						
LB	68962	m Dinitrobenzene	610	UG/KG	188			LCS		750	81.4	1						
LB	69881	m Dinitrobenzene	698	UG/KG	188			LCS		750	93	1						
LB	69881	m-Dinitrobenzene	714	UG/KG	188			LCS DUP		750	95.1	1						
LB	68962	m-Nitrotoluene	562	UG/KG	188		C	LCS DUP		750	74.9	1						
LB	68962	m-Nitrotoluene	551	UG/KG	188		C	LCS		750	73.5	1						
LB	69881	m Nitrotoluene	671	UG/KG	188			LCS		750	89.5	1						
LB	69881	m-Nitrotoluene	687	UG/KG	188			LCS DUP		750	91.6	1						
LB	69029	Magnesium	2.95	UG/KG	10	J	EV	BLANK		0		1						
LB	69029	Magnesium	3370000	UG/KG	1000			LCS		3140000	107	2						
LB	69029	Magnesium	3280000	UG/KG	1000			LCS DUP		3140000	104	2						
LB	69591	Magnesium	4.23	UG/KG	10	J	EV	BLANK		0		1						
LB	69591	Magnesium	3330000	UG/KG	990			LCS		3140000	106	2						
LB	69591	Magnesium	3690000	UG/KG	990			LCS DUP		3140000	118	2						
LB	69029	Manganese	0.134	UG/KG	10	J	EV	BLANK		0		1						
LB	69029	Manganese	212000	UG/KG	1000			LCS		215000	98.5	2						
LB	69029	Manganese	210000	UG/KG	1000			LCS DUP		215000	97.7	2						
LB	69591	Manganese	0.958	UG/KG	10	J	EV	BLANK		0		1						
LB	69591	Manganese	209000	UG/KG	990			LCS		215000	97.2	2						
LB	69591	Manganese	227000	UG/KG	990			LCS DUP		215000	106	2						
LB	69092	Mercury	2230	UG/KG	61.1			LCS		2290	97.3	2						
LB	69092	Mercury	2460	UG/KG	56.5			LCS DUP		2290	107	2						
LB	70012	Mercury	0.081	UG/KG	0.2	J	EV	BLANK		0		1						
LB	70012	Mercury	2270	UG/KG	64.4			LCS		2290	99	2						
LB	70012	Mercury	1960	UG/KG	60.2			LCS DUP		2290	85.5	2						
LB	69029	Nickel	71800	UG/KG	1000			LCS DUP		70200	102	2						
LB	69029	Nickel	73000	UG/KG	1000			LCS		70200	104	2						
LB	69591	Nickel	6.94	UG/KG	10	J	EV	BLANK		0		1						
LB	69591	Nickel	76000	UG/KG	990			LCS		70200	108	2						
LB	69591	Nickel	82200	UG/KG	990			LCS DUP		70200	117	2						
LB	68962	Nitrobenzene	544	UG/KG	188		C	LCS DUP		750	72.5	1						
LB	68962	Nitrobenzene	537	UG/KG	188		C	LCS		750	71.6	1						
LB	69881	Nitrobenzene	655	UG/KG	188			LCS DUP		750	87.3	1						
LB	69881	Nitrobenzene	636	UG/KG	188			LCS		750	84.8	1						
LB	68962	o-Nitrotoluene	550	UG/KG	188		C	LCS		750	73.3	1						
LB	68962	o-Nitrotoluene	561	UG/KG	188		C	LCS DUP		750	74.8	1						
LB	69881	o-Nitrotoluene	685	UG/KG	188			LCS DUP		750	91.3	1						
LB	69881	o Nitrotoluene	665	UG/KG	188			LCS		750	88.7	1						
LB	68962	p-Nitrotoluene	535	UG/KG	188		C	LCS DUP		750	71.3	1						
LB	68962	p-Nitrotoluene	528	UG/KG	188		C	LCS		750	70.4	1						
LB	69881	p-Nitrotoluene	666	UG/KG	188			LCS		750	88.9	1						
LB	69881	p Nitrotoluene	691	UG/KG	188			LCS DUP		750	92.1	1						
LB	69029	Potassium	9.5	UG/KG	100	J	EV	BLANK		0		1						
LB	69029	Potassium	1890000	UG/KG	10000			LCS DUP		2140000	88.5	2						
LB	69029	Potassium	1950000	UG/KG	10000			LCS		2140000	91.3	2						
LB	69591	Potassium	9.46	UG/KG	100	J	EV	BLANK		0		1						

Sample ID	Batch	Analyte	Value	Units	MDL	Result Qual	Anal Qual	QC Type	Accuracy	Nom Conc	Recovery	Dilution	Fraction	Matrix	SAL	BKGD	BKGD Units	> SAL
LB	69591	Potassium	2010000	UG/KG	9900			LCS DUP		2140000	93.9	2						
LB	69591	Potassium	1930000	UG/KG	9900			LCS		2140000	90.1	2						
LB	68714	Protactinium-231	0.145	PCI/G	0.134		V	BLANK	0.0842	0		1						
LB	68962	RDX	618	UG/KG	750	J	E	LCS DUP		750	82.4	1						
LB	68962	RDX	616	UG/KG	750	J	E	LCS		750	82.1	1						
LB	69881	RDX	692	UG/KG	750	J	E	LCS		750	92.3	1						
LB	69881	RDX	721	UG/KG	750	J	E	LCS DUP		750	96.2	1						
LB	69029	Selenium	80600	UG/KG	500			LCS		86000	93.7	2						
LB	69029	Selenium	78400	UG/KG	500			LCS DUP		86000	91.2	2						
LB	69591	Selenium	88900	UG/KG	495			LCS DUP		86000	103	2						
LB	69591	Selenium	80200	UG/KG	495			LCS		86000	93.2	2						
LB	69029	Silver	134000	UG/KG	1000			LCS		117000	114	2						
LB	69029	Silver	129000	UG/KG	1000			LCS DUP		117000	110	2						
LB	69591	Silver	133000	UG/KG	990			LCS DUP		117000	113	2						
LB	69591	Silver	119000	UG/KG	990			LCS		117000	102	2						
LB	69029	Sodium	284000	UG/KG	10000			LCS DUP		313000	90.7	2						
LB	69029	Sodium	291000	UG/KG	10000			LCS		313000	92.8	2						
LB	69591	Sodium	52.1	UG/KG	100	J	EV	BLANK		0		1						
LB	69591	Sodium	312000	UG/KG	9900			LCS DUP		313000	99.7	2						
LB	69591	Sodium	286000	UG/KG	9900			LCS		313000	91.5	2						
LB	68962	sym-Trinitrobenzene	603	UG/KG	188			LCS		750	80.4	1						
LB	68962	sym-Trinitrobenzene	612	UG/KG	188			LCS DUP		750	81.7	1						
LB	69881	sym-Trinitrobenzene	728	UG/KG	188			LCS		750	97	1						
LB	69881	sym-Trinitrobenzene	762	UG/KG	188			LCS DUP		750	102	1						
LB	68962	TETRYL	775	UG/KG	375			LCS		750	103	1						
LB	68962	TETRYL	787	UG/KG	375			LCS DUP		750	105	1						
LB	69881	TETRYL	662	UG/KG	375			LCS		750	88.2	1						
LB	69881	TETRYL	733	UG/KG	375			LCS DUP		750	97.7	1						
LB	69029	Thallium	97800	UG/KG	1000			LCS DUP		87100	112	2						
LB	69029	Thallium	99400	UG/KG	1000			LCS		87100	114	2						
LB	69591	Thallium	105000	UG/KG	990		C	LCS DUP		87100	121	2						
LB	69591	Thallium	94500	UG/KG	990			LCS		87100	108	2						
LB	69743	Thorium-234	1.34	PCI/G	0.272		V	BLANK	0.134	0		1						
LB	68716	Total Uranium	1.07	UG/G	0.0118			LCS	0.0344	1	107	1						
LB	69761	Total Uranium	0.89	UG/G	0.0118			LCS	0.0296	1	89	1						
LB	69743	Uranium-235	0.166	PCI/G	0.13		V	BLANK	0.0572	0		1						
LB	68714	Uranium-238	1.43	PCI/G	0.766		V	BLANK	0.265	0		1						
LB	69743	Uranium-238	1.8	PCI/G	0.463		V	BLANK	0.237	0		1						
LB	69029	Vanadium	0.346	UG/KG	10	J	EV	BLANK		0		1						
LB	69029	Vanadium	206000	UG/KG	1000			LCS		183000	113	2						
LB	69029	Vanadium	201000	UG/KG	1000			LCS DUP		183000	110	2						
LB	69591	Vanadium	225000	UG/KG	990		C	LCS DUP		183000	123	2						
LB	69591	Vanadium	196000	UG/KG	990			LCS		183000	107	2						
LB	69029	Zinc	258000	UG/KG	2000			LCS DUP		265000	97.2	2						
LB	69029	Zinc	263000	UG/KG	2000			LCS		265000	99.4	2						
LB	69591	Zinc	17.5	UG/KG	20	J	EV	BLANK		0		1						

Sample ID	Batch	Analyte	Value	Units	MDL	Result Qual	Anal Qual	QC Type	Accuracy	Nom Conc	Recovery	Dilution	Fraction	Matrix	SAL	BKGD	BKGD Units	> SAL
LB	69591	Zinc	253000	UG/KG	1980			LCS		265000	95.5	2						
LB	69591	Zinc	279000	UG/KG	1980			LCS DUP		265000	105	2						
0212-95-0001	68962	1,2-Dinitrobenzene	241	UG/KG				SURROGATE		375	64.4	1	D	Soil				
0212-95-0001	68962	2,4,6-Trinitrotoluene	188	UG/KG	188	UJ	Q	NONE		0		1	D	Soil				
0212-95-0001	68962	2,4-Dinitrotoluene	0.188	MG/KG	0.188	UJ	Q	NONE		0		1	D	Soil	130			
0212-95-0001	68962	2,6-Dinitrotoluene	0.188	MG/KG	0.188	UJ	Q	NONE		0		1	D	Soil	65			
0212-95-0001	68962	2-Amino-4,6-dinitrotoluene	188	UG/KG	188	UJ	Q	NONE		0		1	D	Soil				
0212-95-0001	68962	4-Amino-2,6-dinitrotoluene	188	UG/KG	188	UJ	QC	NONE		0		1	D	Soil				
0212-95-0001	69029	Aluminum	9430000	UG/KG	5000	R	5	MSD		25000		2	D	Soil				
0212-95-0001	69029	Aluminum	7170000	UG/KG	5000	R	5	MS		25000		2	D	Soil				
0212-95-0001	69029	Aluminum	8150	MG/KG	2.5			NONE		0		1	D	Soil	77000	38700	MG/KG	
0212-95-0001	69029	Antimony	0.782	MG/KG	0.5	J	VI	NONE		0		1	D	Soil	31	1	MG/KG	
0212-95-0001	69029	Antimony	17400	UG/KG	1000			MS		25000	66.6	2	D	Soil				
0212-95-0001	69029	Antimony	18000	UG/KG	1000			MSD		25000	68.9	2	D	Soil				
0212-95-0001	69029	Arsenic	5.66	MG/KG	0.5	J	I	NONE		0		1	D	Soil		7.82	MG/KG	
0212-95-0001	69029	Arsenic	50400	UG/KG	1000			MS		25000	179	2	D	Soil				
0212-95-0001	69029	Arsenic	50900	UG/KG	1000			MSD		25000	181	2	D	Soil				
0212-95-0001	69029	Barium	533000	UG/KG	1000	R	5	MS		25000		2	D	Soil				
0212-95-0001	69029	Barium	551000	UG/KG	1000	R	5	MSD		25000		2	D	Soil				
0212-95-0001	69029	Barium	618	MG/KG	0.5		V	NONE		0		1	D	Soil	5300	315	MG/KG	
0212-95-0001	69029	Beryllium	0.562	MG/KG	0.25	J	I	NONE		0		1	D	Soil		1.95	MG/KG	
0212-95-0001	69029	Beryllium	48400	UG/KG	500			MSD		25000	192	2	D	Soil				
0212-95-0001	69029	Beryllium	48700	UG/KG	500			MS		25000	193	2	D	Soil				
0212-95-0001	69029	Cadmium	0.178	MG/KG	0.25	J	EV	NONE		0		1	D	Soil	38	2.7	MG/KG	
0212-95-0001	69029	Cadmium	46500	UG/KG	500			MS		25000	185	2	D	Soil				
0212-95-0001	69029	Cadmium	46000	UG/KG	500			MSD		25000	183	2	D	Soil				
0212-95-0001	69029	Calcium	1790000	UG/KG	10000	R	5	MS		125000		2	D	Soil				
0212-95-0001	69029	Calcium	1680000	UG/KG	10000	R	5	MSD		125000		2	D	Soil				
0212-95-0001	69029	Calcium	1500	MG/KG	5			NONE		0		1	D	Soil		6120	MG/KG	
0212-95-0001	69029	Chromium	34.2	MG/KG	0.5	J	VI	NONE		0		1	D	Soil	30	19.3	MG/KG	X
0212-95-0001	69029	Chromium	88100	UG/KG	1000			MSD		25000	215	2	D	Soil				
0212-95-0001	69029	Chromium	76700	UG/KG	1000			MS		25000	170	2	D	Soil				
0212-95-0001	69029	Cobalt	7.56	MG/KG	0.5	J	I	NONE		0		1	D	Soil	4600	19.2	MG/KG	
0212-95-0001	69029	Cobalt	52800	UG/KG	1000			MSD		25000	181	2	D	Soil				
0212-95-0001	69029	Cobalt	52900	UG/KG	1000			MS		25000	181	2	D	Soil				
0212-95-0001	69029	Copper	485000	UG/KG	1000	R	5	MSD		25000		2	D	Soil				
0212-95-0001	69029	Copper	971000	UG/KG	1000	R	5	MS		25000		2	D	Soil				
0212-95-0001	69029	Copper	722	MG/KG	0.5			NONE		0		1	D	Soil	2800	30.7	MG/KG	
0212-95-0001	68962	HMX	750	UG/KG	750	UJ	Q	NONE		0		1	D	Soil				
0212-95-0001	69029	Iron	38500000	UG/KG	5000	R	5	MSD		25000		2	D	Soil				
0212-95-0001	69029	Iron	34400000	UG/KG	5000	R	5	MS		25000		2	D	Soil				
0212-95-0001	69029	Iron	42600	MG/KG	5			NONE		0		2	D	Soil		21300	MG/KG	
0212-95-0001	69029	Lead	22.1	MG/KG	0.25	J	I	NONE		0		1	D	Soil	400	23.3	MG/KG	
0212-95-0001	69029	Lead	62500	UG/KG	500			MSD		25000	161	2	D	Soil				
0212-95-0001	69029	Lead	64700	UG/KG	500			MS		25000	170	2	D	Soil				
0212-95-0001	68962	m-Dinitrobenzene	0.188	MG/KG	0.188	UJ	Q	NONE		0		1	D	Soil	6.5			

Sample ID	Batch	Analyte	Value	Units	MDL	Result Qual	Anal Qual	QC Type	Accuracy	Nom Conc	Recovery	Dilution	Fraction	Matrix	SAL	BKGD	BKGD Units	> SAL
0212-95-0001	68962	m-Nitrotoluene	188	UG/KG	188	UJ	QC	NONE		0		1	D	Soil				
0212-95-0001	69029	Magnesium	1180000	UG/KG	1000	R	5	MS		25000		2	D	Soil				
0212-95-0001	69029	Magnesium	1320000	UG/KG	1000	R	5	MSD		25000		2	D	Soil				
0212-95-0001	69029	Magnesium	1110	MG/KG	0.5		V	NONE		0		1	D	Soil		4610	MG/KG	
0212-95-0001	69029	Manganese	512000	UG/KG	1000	R	5	MS		25000		2	D	Soil				
0212-95-0001	69029	Manganese	461000	UG/KG	1000	R	5	MSD		25000		2	D	Soil				
0212-95-0001	69029	Manganese	665	MG/KG	1		V	NONE		0		2	D	Soil		714	MG/KG	
0212-95-0001	69092	Mercury	0.0301	MG/KG	0.0299			NONE		0		1	D	Soil	23	0.1	MG/KG	
0212-95-0001	69029	Nickel	139000	UG/KG	1000	R	5	MSD		25000		2	D	Soil				
0212-95-0001	69029	Nickel	134000	UG/KG	1000	R	5	MS		25000		2	D	Soil				
0212-95-0001	69029	Nickel	89.5	MG/KG	0.5			NONE		0		1	D	Soil	1500	15.2	MG/KG	
0212-95-0001	68962	Nitrobenzene	0.188	MG/KG	0.188	UJ	QC	NONE		0		1	D	Soil	33			
0212-95-0001	68962	o-Nitrotoluene	188	UG/KG	188	UJ	QC	NONE		0		1	D	Soil				
0212-95-0001	68962	p-Nitrotoluene	0.188	MG/KG	0.188	UJ	QC	NONE		0		1	D	Soil	650			
0212-95-0001	69029	Potassium	1340000	UG/KG	10000	R	5	MS		125000		2	D	Soil				
0212-95-0001	69029	Potassium	1510000	UG/KG	10000	R	5	MSD		125000		2	D	Soil				
0212-95-0001	69029	Potassium	1100	MG/KG	5		V	NONE		0		1	D	Soil		3410	MG/KG	
0212-95-0001	68962	RDX	750	UG/KG	750	UJ	Q	NONE		0		1	D	Soil				
0212-95-0001	69029	Selenium	0.898	MG/KG	0.25	J	I	NONE		0		1	D	Soil	380	1.7	MG/KG	
0212-95-0001	69029	Selenium	44300	UG/KG	500			MS		25000	174	2	D	Soil				
0212-95-0001	69029	Selenium	44300	UG/KG	500			MSD		25000	174	2	D	Soil				
0212-95-0001	69029	Silver	0.5	MG/KG	0.5	UJ	I	NONE		0		1	D	Soil		1.61	MG/KG	
0212-95-0001	69029	Silver	47000	UG/KG	1000			MSD		25000	188	2	D	Soil				
0212-95-0001	69029	Silver	47900	UG/KG	1000			MS		25000	192	2	D	Soil				
0212-95-0001	69029	Sodium	65.1	MG/KG	5	J	I	NONE		0		1	D	Soil		915	MG/KG	
0212-95-0001	69029	Sodium	476000	UG/KG	10000			MSD		203000	203	2	D	Soil				
0212-95-0001	69029	Sodium	473000	UG/KG	10000			MS		203000	201	2	D	Soil				
0212-95-0001	68962	sym-Trinitrobenzene	0.188	MG/KG	0.188	UJ	Q	NONE		0		1	D	Soil	3.3			
0212-95-0001	68962	TETRYL	375	UG/KG	375	UJ	Q	NONE		0		1	D	Soil				
0212-95-0001	69029	Thallium	1.95	MG/KG	0.5	J	I	NONE		0		1	D	Soil		1	MG/KG	
0212-95-0001	69029	Thallium	48500	UG/KG	1000			MS		25000	186	2	D	Soil				
0212-95-0001	69029	Thallium	48500	UG/KG	1000			MSD		25000	186	2	D	Soil				
0212-95-0001	68714	Thorium-230	1.27	PCI/G	0.1			NONE	0.0933	0		1	D	Soil	0.18			X
0212-95-0001	68714	Thorium-231	0.901	PCI/G	0.241			NONE	0.247	0		1	D	Soil				
0212-95-0001	68714	Thorium-234	6.02	PCI/G	0.653			NONE	0.457	0		1	D	Soil				
0212-95-0001	68716	Total Uranium		MG/KG				NONE	0.321	0		1	D	Soil	230	5.45	MG/KG	
0212-95-0001	68714	Uranium-234	1.15	PCI/G	0.19			NONE	0.141	0		1	D	Soil	13	1.94	PCI/G	
0212-95-0001	68714	Uranium-235	0.714	PCI/G	0.279			NONE	0.236	0		1	D	Soil	10	0.084	PCI/G	
0212-95-0001	68714	Uranium-238	7.66	PCI/G	1.71		V	NONE	1.31	0		1	D	Soil	67	1.82	PCI/G	
0212-95-0001	69029	Vanadium	11.8	MG/KG	0.5	J	VI	NONE		0		1	D	Soil	540	41.9	MG/KG	
0212-95-0001	69029	Vanadium	59700	UG/KG	1000			MSD		25000	192	2	D	Soil				
0212-95-0001	69029	Vanadium	57500	UG/KG	1000			MS		25000	183	2	D	Soil				
0212-95-0001	69029	Zinc	104000	UG/KG	2000	R	5	MSD		25000		2	D	Soil				
0212-95-0001	69029	Zinc	110000	UG/KG	2000	R	5	MS		25000		2	D	Soil				
0212-95-0001	69029	Zinc	69.3	MG/KG	1			NONE		0		1	D	Soil	23000	50.8	MG/KG	
0212-95-0002	68962	1,2-Dinitrobenzene	295	UG/KG				SURROGATE		375	78.7	1	D	Soil				

Sample ID	Batch	Analyte	Value	Units	MDL	Result Qual	Anal Qual	QC Type	Accuracy	Nom Conc	Recovery	Dilution	Fraction	Matrix	SAL	BKGD	BKGD Units	> SAL
0212-95-0002	68962	2,4,6-Trinitrotoluene	188	UG/KG	188	UJ	Q	NONE		0		1	D	Soil				
0212-95-0002	68962	2,4-Dinitrotoluene	0.188	MG/KG	0.188	UJ	Q	NONE		0		1	D	Soil	130			
0212-95-0002	68962	2,6-Dinitrotoluene	0.188	MG/KG	0.188	UJ	Q	NONE		0		1	D	Soil	65			
0212-95-0002	68962	2-Amino-4,6-dinitrotoluene	188	UG/KG	188	UJ	Q	NONE		0		1	D	Soil				
0212-95-0002	68962	4-Amino-2,6-dinitrotoluene	188	UG/KG	188	UJ	QC	NONE		0		1	D	Soil				
0212-95-0002	69029	Aluminum	7780	MG/KG	2.5			NONE		0		1	D	Soil	77000	38700	MG/KG	
0212-95-0002	69029	Antimony	1.85	MG/KG	0.5		V	NONE		0		1	D	Soil	31	1	MG/KG	
0212-95-0002	69029	Arsenic	11.3	MG/KG	0.5			NONE		0		1	D	Soil		7.82	MG/KG	
0212-95-0002	69029	Barium	872	MG/KG	0.5		V	NONE		0		1	D	Soil	5300	315	MG/KG	
0212-95-0002	69029	Beryllium	0.472	MG/KG	0.25			NONE		0		1	D	Soil		1.95	MG/KG	
0212-95-0002	69029	Cadmium	0.0501	MG/KG	0.25	J	EV	NONE		0		1	D	Soil	38	2.7	MG/KG	
0212-95-0002	69029	Calcium	1250	MG/KG	5			NONE		0		1	D	Soil		6120	MG/KG	
0212-95-0002	68714	Cesium-137	2.18	PCI/G	0.0422			DUP	0.0744	0		1	D	Soil	5.1	1.4	PCI/G	
0212-95-0002	69029	Chromium	165	MG/KG	0.5		V	NONE		0		1	D	Soil	30	19.3	MG/KG	X
0212-95-0002	69029	Cobalt	10.4	MG/KG	0.5			NONE		0		1	D	Soil	4600	19.2	MG/KG	
0212-95-0002	69029	Copper	991	MG/KG	0.5			NONE		0		1	D	Soil	2800	30.7	MG/KG	
0212-95-0002	68962	HMX	1590	UG/KG	750	J	Q	NONE		0		1	D	Soil				
0212-95-0002	69029	Iron	98300	MG/KG	25			NONE		0		10	D	Soil		21300	MG/KG	
0212-95-0002	69029	Lead	23.3	MG/KG	0.25			NONE		0		1	D	Soil	400	23.3	MG/KG	
0212-95-0002	68962	m-Dinitrobenzene	0.188	MG/KG	0.188	UJ	Q	NONE		0		1	D	Soil	6.5			
0212-95-0002	68962	m-Nitrotoluene	188	UG/KG	188	UJ	QC	NONE		0		1	D	Soil				
0212-95-0002	69029	Magnesium	1060	MG/KG	0.5		V	NONE		0		1	D	Soil		4610	MG/KG	
0212-95-0002	69029	Manganese	659	MG/KG	5		V	NONE		0		10	D	Soil		714	MG/KG	
0212-95-0002	69092	Mercury	0.0268	MG/KG	0.0269	J	E	NONE		0		1	D	Soil	23	0.1	MG/KG	
0212-95-0002	69029	Nickel	411	MG/KG	0.5			NONE		0		1	D	Soil	1500	15.2	MG/KG	
0212-95-0002	68962	Nitrobenzene	0.188	MG/KG	0.188	UJ	QC	NONE		0		1	D	Soil	33			
0212-95-0002	68962	o-Nitrotoluene	188	UG/KG	188	UJ	QC	NONE		0		1	D	Soil				
0212-95-0002	68962	p-Nitrotoluene	0.188	MG/KG	0.188	UJ	QC	NONE		0		1	D	Soil	650			
0212-95-0002	69029	Potassium	1000	MG/KG	5		V	NONE		0		1	D	Soil		3410	MG/KG	
0212-95-0002	68714	Protactinium-231	4.85	PCI/G	0.289		V	DUP	0.229	0		1	D	Soil				
0212-95-0002	68714	Protactinium-231	4.85	PCI/G	0.297		V	NONE	0.248	0		1	D	Soil				
0212-95-0002	68714	Protactinium-234M	13	PCI/G	7.61			DUP	5.16	0		1	D	Soil				
0212-95-0002	68962	RDX	750	UG/KG	750	UJ	Q	NONE		0		1	D	Soil				
0212-95-0002	69029	Selenium	1.81	MG/KG	0.25			NONE		0		1	D	Soil	380	1.7	MG/KG	
0212-95-0002	69029	Sodium	83	MG/KG	5			NONE		0		1	D	Soil		915	MG/KG	
0212-95-0002	68962	sym-Trinitrobenzene	0.188	MG/KG	0.188	UJ	Q	NONE		0		1	D	Soil	3.3			
0212-95-0002	68962	TETRYL	375	UG/KG	375	UJ	Q	NONE		0		1	D	Soil				
0212-95-0002	69029	Thallium	4.59	MG/KG	0.5			NONE		0		1	D	Soil		1	MG/KG	
0212-95-0002	68714	Thorium-230	0.917	PCI/G	0.107			NONE	0.094	0		1	D	Soil	0.18			X
0212-95-0002	68714	Thorium-230	1.03	PCI/G	0.0944			DUP	0.0835	0		1	D	Soil	0.18			X
0212-95-0002	68714	Thorium-231	0.459	PCI/G	0.237			DUP	0.194	0		1	D	Soil				
0212-95-0002	68714	Thorium-234	8.58	PCI/G	0.752			DUP	0.555	0		1	D	Soil				
0212-95-0002	68714	Thorium-234	8.44	PCI/G	0.601			NONE	0.48	0		1	D	Soil				
0212-95-0002	68716	Total Uranium		MG/KG				DUP	0.793	0		1	D	Soil	230	5.45	MG/KG	
0212-95-0002	68716	Total Uranium		MG/KG				NONE	0.591	0		1	D	Soil	230	5.45	MG/KG	
0212-95-0002	68716	Total Uranium	51.7	UG/G	0.586			MS	1.7	14.9	109	1	D	Soil				

Sample ID	Batch	Analyte	Value	Units	MDL	Result Qual	Anal Qual	QC Type	Accuracy	Nom Conc	Recovery	Dilution	Fraction	Matrix	SAL	BKGD	BKGD Units	> SAL
0212-95-0002	68714	Uranium-234	1.01	PCI/G	0.184			DUP	0.145	0		1	D	Soil	13	1.94	PCI/G	
0212-95-0002	68714	Uranium-234	1.03	PCI/G	0.185			NONE	0.147	0		1	D	Soil	13	1.94	PCI/G	
0212-95-0002	68714	Uranium-235	0.698	PCI/G	0.265			NONE	0.194	0		1	D	Soil	10	0.084	PCI/G	
0212-95-0002	68714	Uranium-235	0.424	PCI/G	0.265			DUP	0.181	0		1	D	Soil	10	0.084	PCI/G	
0212-95-0002	68714	Uranium-238	7.75	PCI/G	1.77		V	DUP	1.26	0		1	D	Soil	67	1.82	PCI/G	
0212-95-0002	68714	Uranium-238	9.2	PCI/G	1.73		V	NONE	1.26	0		1	D	Soil	67	1.82	PCI/G	
0212-95-0002	69029	Vanadium	11	MG/KG	0.5		V	NONE		0		1	D	Soil	540	41.9	MG/KG	
0212-95-0002	69029	Zinc	105	MG/KG	1			NONE		0		1	D	Soil	23000	50.8	MG/KG	
0212-95-0003	69881	1,2-Dinitrobenzene	265	UG/KG				SURROGATE		375	70.6	1	D	Soil				
0212-95-0003	69591	Aluminum	13600	MG/KG	4.85		V	NONE		0		2	D	Soil	77000	38700	MG/KG	
0212-95-0003	69591	Antimony	0.971	MG/KG	0.971	UJ	C	NONE		0		2	D	Soil	31	1	MG/KG	
0212-95-0003	69591	Arsenic	2.28	MG/KG	0.971	J	C	NONE		0		2	D	Soil		7.82	MG/KG	
0212-95-0003	69591	Barium	233	MG/KG	0.971		V	NONE		0		2	D	Soil	5300	315	MG/KG	
0212-95-0003	69591	Beryllium	0.887	MG/KG	0.485	J	VC	NONE		0		2	D	Soil		1.95	MG/KG	
0212-95-0003	69591	Cadmium	0.107	MG/KG	0.485	J	EVC	NONE		0		2	D	Soil	38	2.7	MG/KG	
0212-95-0003	69591	Calcium	4080	MG/KG	9.71		V	NONE		0		2	D	Soil		6120	MG/KG	
0212-95-0003	69591	Chromium	8.15	MG/KG	0.971	J	VC	NONE		0		2	D	Soil	30	19.3	MG/KG	
0212-95-0003	69591	Cobalt	5.33	MG/KG	0.971		V	NONE		0		2	D	Soil	4600	19.2	MG/KG	
0212-95-0003	69591	Copper	7.03	MG/KG	0.971			NONE		0		2	D	Soil	2800	30.7	MG/KG	
0212-95-0003	69591	Iron	11100	MG/KG	4.85		V	NONE		0		2	D	Soil		21300	MG/KG	
0212-95-0003	69591	Lead	14.8	MG/KG	0.485			NONE		0		2	D	Soil	400	23.3	MG/KG	
0212-95-0003	69591	Magnesium	2040	MG/KG	0.971		V	NONE		0		2	D	Soil		4610	MG/KG	
0212-95-0003	69591	Manganese	589	MG/KG	0.971		V	NONE		0		2	D	Soil		714	MG/KG	
0212-95-0003	70012	Mercury	0.0138	MG/KG	0.0332	J	EV	NONE		0		1	D	Soil	23	0.1	MG/KG	
0212-95-0003	70012	Mercury	320	UG/KG	29.6			MS		296	103	1	D	Soil				
0212-95-0003	70012	Mercury	312	UG/KG	31			MSD		310	96.1	1	D	Soil				
0212-95-0003	69591	Nickel	7.08	MG/KG	0.971		V	NONE		0		2	D	Soil	1500	15.2	MG/KG	
0212-95-0003	69591	Potassium	2120	MG/KG	9.71		V	NONE		0		2	D	Soil		3410	MG/KG	
0212-95-0003	69591	Selenium	0.767	MG/KG	0.485			NONE		0		2	D	Soil	380	1.7	MG/KG	
0212-95-0003	69591	Sodium	75.2	MG/KG	9.71		V	NONE		0		2	D	Soil		915	MG/KG	
0212-95-0003	69591	Thallium	0.971	MG/KG	0.971	UJ	C	NONE		0		2	D	Soil		1	MG/KG	
0212-95-0003	69743	Thorium-230	1.62	PCI/G	0.146			NONE	0.123	0		1	D	Soil	0.18			X
0212-95-0003	69743	Thorium-234	4.17	PCI/G	0.904	V	V	NONE	0.465	0		1	D	Soil				
0212-95-0003	69761	Total Uranium		MG/KG				NONE	0.0622	0		1	D	Soil	230	5.45	MG/KG	
0212-95-0003	69743	Uranium-234	1.46	PCI/G	0.287			NONE	0.133	0		1	D	Soil	13	1.94	PCI/G	
0212-95-0003	69743	Uranium-235	0.478	PCI/G	0.427	V	V	NONE	0.162	0		1	D	Soil	10	0.084	PCI/G	
0212-95-0003	69591	Vanadium	17	MG/KG	0.971	J	C	NONE		0		2	D	Soil	540	41.9	MG/KG	
0212-95-0003	69591	Zinc	24.9	MG/KG	1.94		V	NONE		0		2	D	Soil	23000	50.8	MG/KG	
0212-95-0004	69881	1,2-Dinitrobenzene	272	UG/KG				SURROGATE		375	72.4	1	D	Soil				
0212-95-0004	69881	1,2-Dinitrobenzene	267	UG/KG				SURROGATE		375	71.2	1	D	Soil				
0212-95-0004	69881	2,4,6-Trinitrotoluene	703	UG/KG	188			MS		750	93.8	1	D	Soil				
0212-95-0004	69881	2,4-Dinitrotoluene	691	UG/KG	188			MS		750	92.2	1	D	Soil				
0212-95-0004	69881	2,6-Dinitrotoluene	765	UG/KG	188			MS		750	102	1	D	Soil				
0212-95-0004	69881	2-Amino-4,6-dinitrotoluene	697	UG/KG	188			MS		750	93	1	D	Soil				
0212-95-0004	69881	4-Amino-2,6-dinitrotoluene	662	UG/KG	188			MS		750	88.2	1	D	Soil				
0212-95-0004	69591	Aluminum	11200	MG/KG	4.81		V	NONE		0		2	D	Soil	77000	38700	MG/KG	

Sample ID	Batch	Analyte	Value	Units	MDL	Result Qual	Anal Qual	QC Type	Accuracy	Nom Conc	Recovery	Dilution	Fraction	Matrix	SAL	BKGD	BKGD Units	> SAL
0212-95-0004	69591	Antimony	0.255	MG/KG	0.962	J	EC	NONE		0		2	D	Soil	31	1	MG/KG	
0212-95-0004	69591	Arsenic	2.57	MG/KG	0.962	J	C	NONE		0		2	D	Soil		7.82	MG/KG	
0212-95-0004	69591	Barium	208	MG/KG	0.962		V	NONE		0		2	D	Soil	5300	315	MG/KG	
0212-95-0004	69591	Beryllium	0.812	MG/KG	0.481	J	VC	NONE		0		2	D	Soil		1.95	MG/KG	
0212-95-0004	69591	Cadmium	0.0926	MG/KG	0.481	J	EVC	NONE		0		2	D	Soil	38	2.7	MG/KG	
0212-95-0004	69591	Calcium	3620	MG/KG	9.62		V	NONE		0		2	D	Soil		6120	MG/KG	
0212-95-0004	69591	Chromium	7.56	MG/KG	0.962	J	VC	NONE		0		2	D	Soil	30	19.3	MG/KG	
0212-95-0004	69591	Cobalt	6.45	MG/KG	0.962		V	NONE		0		2	D	Soil	4600	19.2	MG/KG	
0212-95-0004	69591	Copper	6.39	MG/KG	0.962			NONE		0		2	D	Soil	2800	30.7	MG/KG	
0212-95-0004	69881	HMX	719	UG/KG	750	J	E	MS		750	95.9	1	D	Soil				
0212-95-0004	69591	Iron	10400	MG/KG	4.81		V	NONE		0		2	D	Soil		21300	MG/KG	
0212-95-0004	69591	Lead	14.6	MG/KG	0.481			NONE		0		2	D	Soil	400	23.3	MG/KG	
0212-95-0004	69881	m-Dinitrobenzene	706	UG/KG	188			MS		750	94.2	1	D	Soil				
0212-95-0004	69881	m-Nitrotoluene	655	UG/KG	188			MS		750	87.3	1	D	Soil				
0212-95-0004	69591	Magnesium	1810	MG/KG	0.962		V	NONE		0		2	D	Soil		4610	MG/KG	
0212-95-0004	69591	Manganese	624	MG/KG	0.962		V	NONE		0		2	D	Soil		714	MG/KG	
0212-95-0004	70012	Mercury	0.017	MG/KG	0.0326	J	EV	NONE		0		1	D	Soil	23	0.1	MG/KG	
0212-95-0004	69591	Nickel	6.53	MG/KG	0.962		V	NONE		0		2	D	Soil	1500	15.2	MG/KG	
0212-95-0004	69881	Nitrobenzene	644	UG/KG	188			MS		750	85.8	1	D	Soil				
0212-95-0004	69881	o-Nitrotoluene	658	UG/KG	188			MS		750	87.7	1	D	Soil				
0212-95-0004	69881	p-Nitrotoluene	660	UG/KG	188			MS		750	87.9	1	D	Soil				
0212-95-0004	69591	Potassium	1820	MG/KG	9.62		V	NONE		0		2	D	Soil		3410	MG/KG	
0212-95-0004	69881	RDX	711	UG/KG	750	J	E	MS		750	94.7	1	D	Soil				
0212-95-0004	69591	Sodium	54.1	MG/KG	9.62		V	NONE		0		2	D	Soil		915	MG/KG	
0212-95-0004	69881	sym-Trinitrobenzene	745	UG/KG	188			MS		750	99.3	1	D	Soil				
0212-95-0004	69881	TETRYL	720	UG/KG	375			MS		750	96	1	D	Soil				
0212-95-0004	69591	Thallium	0.203	MG/KG	0.962	J	EC	NONE		0		2	D	Soil		1	MG/KG	
0212-95-0004	69743	Thorium-230	1.48	PCI/G	0.154			NONE	0.102	0		1	D	Soil	0.18			X
0212-95-0004	69743	Thorium-234	3.77	PCI/G	0.898	V	V	NONE	0.424	0		1	D	Soil				
0212-95-0004	69761	Total Uranium		MG/KG				NONE	0.0537	0		1	D	Soil	230	5.45	MG/KG	
0212-95-0004	69743	Uranium-234	1.78	PCI/G	0.247			NONE	0.139	0		1	D	Soil	13	1.94	PCI/G	
0212-95-0004	69743	Uranium-238	2.92	PCI/G	2.72	V	V	NONE	1.21	0		1	D	Soil	87	1.82	PCI/G	
0212-95-0004	69591	Vanadium	17	MG/KG	0.962	J	C	NONE		0		2	D	Soil	540	41.9	MG/KG	
0212-95-0004	69591	Zinc	22.9	MG/KG	1.92		V	NONE		0		2	D	Soil	23000	50.8	MG/KG	
0212-95-0007	69881	1,2-Dinitrobenzene	302	UG/KG				SURROGATE		375	80.6	1	D	Soil				
0212-95-0007	69591	Aluminum	17100	MG/KG	4.76		V	NONE		0		2	D	Soil	77000	38700	MG/KG	
0212-95-0007	69591	Antimony	0.178	MG/KG	0.952	J	EC	NONE		0		2	D	Soil	31	1	MG/KG	
0212-95-0007	69591	Arsenic	3.15	MG/KG	0.952	J	C	NONE		0		2	D	Soil		7.82	MG/KG	
0212-95-0007	69591	Barium	214	MG/KG	0.952		V	NONE		0		2	D	Soil	5300	315	MG/KG	
0212-95-0007	69591	Beryllium	1.15	MG/KG	0.476	J	VC	NONE		0		2	D	Soil		1.95	MG/KG	
0212-95-0007	69591	Cadmium	0.127	MG/KG	0.476	J	EVC	NONE		0		2	D	Soil	38	2.7	MG/KG	
0212-95-0007	69591	Calcium	2320	MG/KG	9.52		V	NONE		0		2	D	Soil		6120	MG/KG	
0212-95-0007	69591	Chromium	10.2	MG/KG	0.952	J	VC	NONE		0		2	D	Soil	30	19.3	MG/KG	
0212-95-0007	69591	Cobalt	6.49	MG/KG	0.952		V	NONE		0		2	D	Soil	4600	19.2	MG/KG	
0212-95-0007	69591	Copper	9.56	MG/KG	0.952			NONE		0		2	D	Soil	2800	30.7	MG/KG	
0212-95-0007	69591	Iron	14000	MG/KG	4.76		V	NONE		0		2	D	Soil		21300	MG/KG	

Sample ID	Batch	Analyte	Value	Units	MDL	Result Qual	Anal Qual	QC Type	Accuracy	Nom Conc	Recovery	Dilution	Fraction	Matrix	SAL	BKGD	BKGD Units	> SAL
0212-95-0007	69591	Lead	17.3	MG/KG	0.476			NONE		0		2	D	Soil	400	23.3	MG/KG	
0212-95-0007	69591	Magnesium	2510	MG/KG	0.952		V	NONE		0		2	D	Soil		4610	MG/KG	
0212-95-0007	69591	Manganese	455	MG/KG	0.952		V	NONE		0		2	D	Soil		714	MG/KG	
0212-95-0007	70012	Mercury	0.0532	MG/KG	0.0325		V	NONE		0		1	D	Soil	23	0.1	MG/KG	
0212-95-0007	69591	Nickel	8.59	MG/KG	0.952		V	NONE		0		2	D	Soil	1500	15.2	MG/KG	
0212-95-0007	69591	Potassium	2060	MG/KG	9.52		V	NONE		0		2	D	Soil		3410	MG/KG	
0212-95-0007	69591	Sodium	82.8	MG/KG	9.52		V	NONE		0		2	D	Soil		915	MG/KG	
0212-95-0007	69591	Thallium	0.952	MG/KG	0.952	UJ	C	NONE		0		2	D	Soil		1	MG/KG	
0212-95-0007	69743	Thorium-230	1.75	PCI/G	0.162			NONE	0.122	0		1	D	Soil	0.18			X
0212-95-0007	69743	Thorium-234	4.86	PCI/G	0.996	V	V	NONE	0.481	0		1	D	Soil				
0212-95-0007	69761	Total Uranium		MG/KG				NONE	0.137	0		1	D	Soil	230	5.45	MG/KG	
0212-95-0007	69743	Uranium-234	1.33	PCI/G	0.301			NONE	0.159	0		1	D	Soil	13	1.94	PCI/G	
0212-95-0007	69743	Uranium-238	8.04	PCI/G	2.83	V	V	NONE	1.68	0		1	D	Soil	67	1.82	PCI/G	
0212-95-0007	69591	Vanadium	23	MG/KG	0.952	J	C	NONE		0		2	D	Soil	540	41.9	MG/KG	
0212-95-0007	69591	Zinc	26.9	MG/KG	1.9		V	NONE		0		2	D	Soil	23000	50.8	MG/KG	

ANNEX 7.8
VCA CHECKLIST AND FIELD WORK AUTHORIZATION FORM

Voluntary Corrective Action (VCA)
Checklist and Fieldwork Authorization Form

PRS No. 12-001(a) 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. Cost estimation should reflect a reduction of plan/report costs in future reports. LATO does not accept plan/report costs to be 50% of cleanup costs. S.A.T.

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

FPL _____ Date 5/1/96

FPC _____ Date 5-2-96

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

FPL _____ Date 5/23/96

FPC _____ Date 5-30-96

Through reviewing the VCA Plan, for site(s) 12-001(a) and believing that the above criteria have been met, I authorize the fieldwork to proceed.

DOE ER Program Manager _____ Date 5/30/96

ANNEX 7.9
COST ESTIMATE

The total cost for this VCA is projected to be $68,000. (A detailed cost breakdown will be provided in the final report.)

BUDGET

Activity	$ Amount
Plan Development	28,000
Mobilization	7,000
Cleanup	16,000
Verification Sampling	0
Waste Disposal	3,500
Field Screening	1,500
Demobilization/Restore Site	1,000
Reporting	11,000
Total Estimated Cost	68,000

8.0 REFERENCES

Gonzales, C., 1995. "Memorandum from Carrie Gonzalez, ESH-3, to Victor Hesh, ESA-DE "Project Summary Closure Letter ESH ID No. 95-0075," Los Alamos National Laboratory Memorandum to File, Los Alamos, New Mexico (Gonzales, 1995 ESA-DE)

EPA (US Environmental Protection Agency), July 1995. "Identification and Listing of Hazardous Waste," Code of Federal Regulations, Protection of Environment, Title 40, Part 261, Washington, DC (EPA 1995, 0092)

LANL (Los Alamos National Laboratory) May 1994. "RFI Work Plan of Operable Unit 1085," Los Alamos National Laboratory Report LA-UR-94-1033, Los Alamos, New Mexico (LANL 1994, 1156)

LANL (Los Alamos National Laboratory) 1993. "Description of Building Structures at TA-12 and TA-14, General Information."

Martel, C., June 14, 1993. "Radiation Survey of Steel Lined Firing Site at TA-12" Los Alamos National Laboratory Memorandum to file, Los Alamos, New Mexico (Martel 1993, 21-0079)