TA-73

Sampling and Analysis Plan for

Phase Ib RFI for
PRS 73-002
Solid Waste Management Group 73-2

Field Unit 1

Environmental
Restoration
Project

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A Department of Energy
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1.0 INTRODUCTION

Potential Release Site (PRS) 73-002, an incinerator/surface disposal area, is one of many PRSs composing Solid Waste Management Unit (SWMU) Group 73-2. According to the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan for Operable Unit (OU) 1071, the types of materials incinerated at this PRS are not known, and there are no known contaminants associated with the incinerator (LANL 1994, 0781). Phase I samples were collected at PRS 73-002 in 1996 using the methods described in the work plan. Analytical results from these samples indicate that elevated levels of metals and pesticides are present in the ash material on the hillside. The depth of the ash material and whether or not different layers of ash material are present is unknown. Based on the results of the sampling conducted to date, a Phase II investigation is planned to further characterize the nature and extent of contamination. However, additional information is needed before the Phase II sampling plan can be written. Therefore, the purpose of this Phase Ib sampling and analysis plan is to describe the methods that will be used to:

- develop a depth profile of the ash material on the hillside,
- characterize ash material concentrations at depth, and
- determine whether dioxins and/or furans are present in the ash material.

2.0 SAMPLING DESIGN

To estimate the depth of the ash material, the twelve locations previously surveyed on the main area of the hillside will be probed to the extent possible with a metal probe. This information should provide a profile of the depth of ash material on the hillside. In addition, samples will be collected from two locations on the hillside (73-02268 and 73-02260) (Fig. 1). One sample at each location will be collected from 0–12 in. to replicate the surface samples that have already been collected, and at least one sample at each location will be collected at depth. All soil samples will be field screened for gross alpha, beta, and gamma radiation and volatile organic vapors, and submitted to fixed laboratories. The samples collected at 0–12 in. will be analyzed for dioxins and furans, antimony (which was detected at elevated concentrations in the original samples possibly due to method interferences), and radionuclides (as determined by the field screening). The samples collected at depth will be analyzed for semivolatile organic compounds (SVOCs), target analyte list (TAL) metals, pesticides/polychlorinated biphenyls (PCBs), dioxins and furans, and

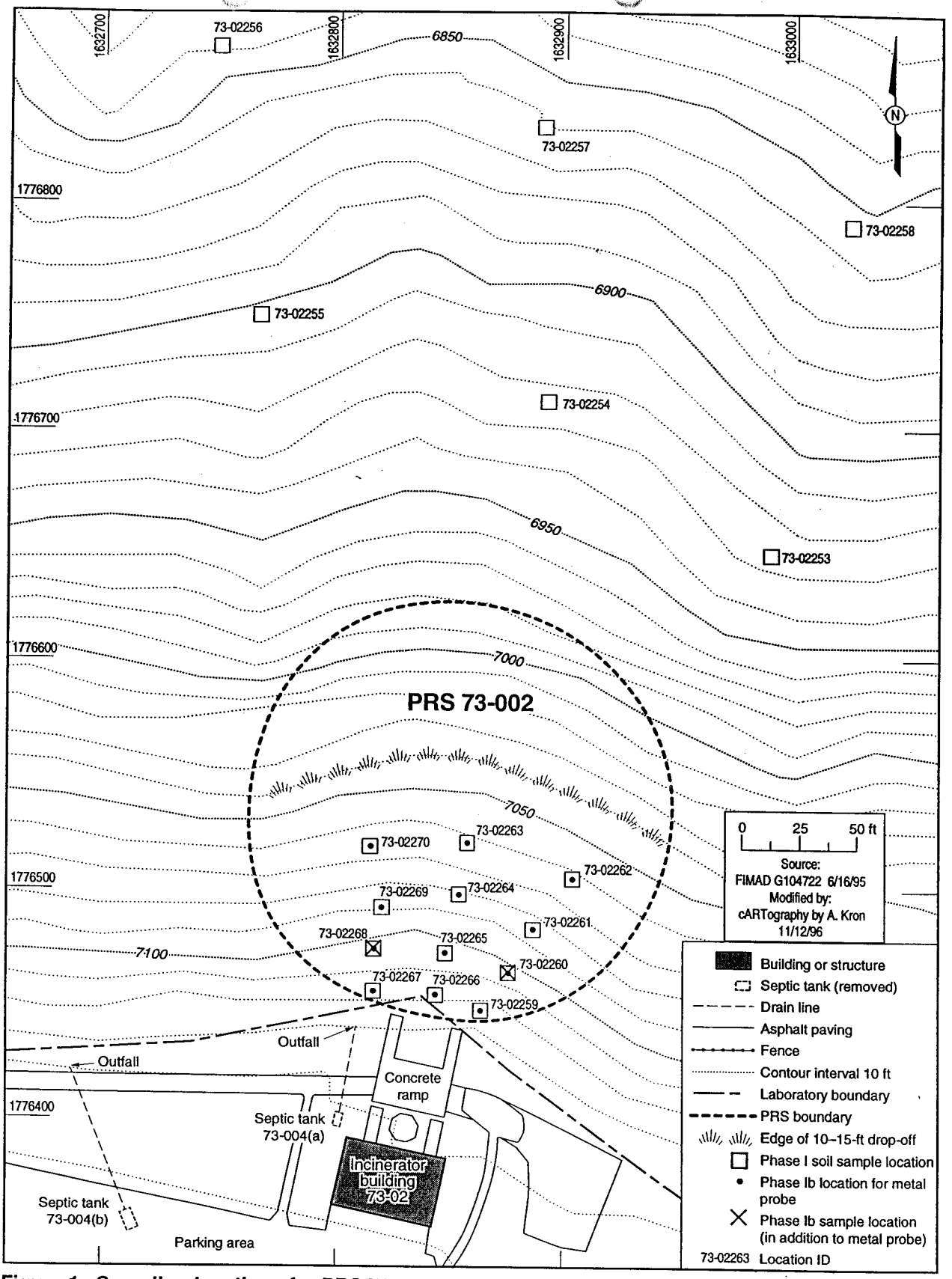

Figure 1. Sampling locations for PRS 73-002, south slope of Pueblo Canyon.

radionuclides (as determined by the field screening). The analytical data collected during the Phase I and Phase Ib investigations will be used in the development of a Phase II sampling plan.

2.1 Overview of Required Information

To support the decision making process for PRS 73-002, the information provided by this investigation must include the thickness of the ash material, field screening data, and laboratory analytical data. To obtain this information, the investigation will include the following.

- A metal probe will be used to estimate the depth of the ash material at each of the twelve surveyed locations on the hillside above the bench. At least three probings will be conducted at each location to avoid errors in depth measurement due to obstacles within the ash material. All probings will be perpendicular to the surface of the hillside. Information from each probing will be recorded.

- Each sample will be field screened for gross alpha, beta, and gamma radiation and volatile organic vapors. All field screening results and visual observations will be recorded for each sample location.

- Samples collected from the 0–12 in. layer will be submitted to a fixed laboratory for analysis for dioxins and furans and antimony.

- Samples collected from deeper layers will be submitted to a fixed laboratory for analysis for dioxins and furans, TAL metals, SVOCs, and pesticides/PCBs.

- Analyses for isotopic plutonium, isotopic uranium, americium-241, and strontium-90 will also be requested if elevated alpha/beta levels are indicated by radiological screening. Gamma spectroscopy will also be requested if elevated gamma levels are indicated by radiological screening.

- Polaroid photographs will be taken during sampling whenever possible. The photographs should provide useful information about the composition of the ash material at the site.

2.2 Data Use

The data collected during this investigation should indicate whether subsurface ash material results are consistent with surface ash material results. The data should also indicate whether

dioxins or furans are present at the site. In addition, the probing should provide a profile of the depth of ash material on the hillside. All of these results will be used in the development of a Phase II sampling plan.

2.3 Design Assumptions

The primary assumptions underlying this sampling design are the following.

- The surface ash material is exposed to weathering and other elements, while the subsurface ash material is not.
- Because chlorinated organics have been detected in the ash material, dioxins and furans may be present.
- Any volatiles that may have been present in the original material should have volatilized during incineration or disposal of the ash material.
- Detection limits of 3–4 mg/kg for antimony can be reported by inductively-coupled plasma emission spectroscopy (ICPES) by special request.

2.4 Data Quality Requirements

Data will be obtained using field screening and fixed-laboratory analyses. The validity of the field screening data will be confirmed using instrument calibration and background checks. These checks will be recorded in the field log. The fixed laboratories will follow standard Environmental Protection Agency (EPA) SW-846 protocols that include extensive internal quality assurance/quality control (QA/QC) as required by the Los Alamos National Laboratory (LANL) Laboratory Services Contracts referenced in the Quality Assurance Project Plan (QAPP) (LANL 1996, 1292).

2.5 Measurements to Verify Assumptions and Requirements

The measurements collected at depth will confirm whether or not the ash material is vertically and horizontally homogeneous. The dioxins and furans analyses will confirm whether or not dioxins or furans were formed and are currently present in the ash material.

3.0 SAMPLING AND ANALYSIS PLAN IMPLEMENTATION

3.1 Field Methods

The locations for this sampling event have already been surveyed. At each of the twelve sampling locations surveyed above the bench, a metal probe will be used to estimate the depth of the ash material. The metal probe is a 4-ft long by 3/8-in. diameter steel rod, slightly sharpened on the end and attached to a T-handle. The probe will be oriented perpendicular to the slope and pushed into the ash material. At each sampling location, the probe will be inserted three times within the same proximity to ensure that an accurate thickness of ash material is determined, rather than the thickness to a solid object suspended within the ash. The three thickness readings will be recorded in the log book.

A Sharp Shooter™ spade will be used at the two locations where samples will be collected for laboratory analysis. LANL-ER-SOP-06.09 describes the spade and scoop method (LANL, 0875). A trench/hole will be excavated with the spade to an approximate depth of 12 in. A surface sample will be collected between 0 and 12 in. Digging will continue to reach the ash/soil or ash/tuff interface and a second sample will be collected from the lowest possible 12-in. interval. If layering is noted in the ash material, an intermediate sample may be collected. A new plastic disposable scoop will be used to sample each interval. Sampling will be conducted by scraping away the side of the trench to expose undisturbed soil from which the sample will be collected. To the extent possible, the sample intervals will be oriented perpendicular to the slope.

3.2 Measurement Methods

Samples of the ash material will be screened for volatile organic vapors using a Thermo Environmental Instruments™ Model 580B organic vapor monitor (photoionization detector) with a 10.6 eV bulb. In addition, these samples will be screened for ionizing radiation using a Ludlum™ Model 139 rate meter with an air proportional (alpha) probe and an Eberline™ ESP-1 rate meter with a beta/gamma probe. The photoionization detector will be calibrated and operated according to the manufacturer's directions. The radiation screening instruments will be calibrated and operated according to ESH-1 procedures; determinations of background will also be made according to ESH-1 procedures. Field screening results, calibration information, and background determinations will be recorded on the sample collection log.

All samples submitted to off-site laboratories will be analyzed using EPA SW-846 methods. The following special requirements will need to be pre-arranged with the Sample Management Office

(SMO) and documented on the Chain-of-Custody form in the "comments or special requirements" field.

- A detection limit of 3–4 mg/kg will be requested for the antimony analyses by ICPES.
- In the analyses for dioxins and furans, it will be required that 17 isomers with chlorine substituted in the 2, 3, 7, and 8 positions are reported individually; a detection limit of 1–2 parts per trillion will also be required. Because dichlorodiphenyldichloroethane (DDE) and dichlorodiphenyltrichloroethane (DDT) may cause interferences in the analysis of dioxins and furans, the laboratory will be notified that these chemicals may be present in the samples submitted. If the laboratory is informed of this prior to analysis, necessary precautions can be taken to avoid the interference.

3.3 Field Decisions

If elevated levels of radioactivity are detected in a sample, that sample will be submitted for radionuclide analysis. The depths at which subsurface samples are collected will be determined in the field based on observation of visually distinct layers. If there are no visually distinct layers, one sample will be collected from the lowest possible 12-in. interval.

3.4 Sample Handling

Samples will be collected in accordance with LANL-ER-SOP-06.09, "Spade and Scoop Method for Collection of Soil Samples" (LANL, 0875). The following standard operating procedures (SOPs) will also be followed:

- LANL-ER-SOP-01.02, "Sample Containers and Preservation,"
- LANL-ER-SOP-01.03, "Handling, Packaging, and Shipping of Samples," and
- LANL-ER-SOP-01.04, "Sample Control and Field Documentation."

All samples requiring dioxin and furan analysis must be collected in amber-colored glass containers with polytetrafluoroethylene-lined caps.

3.5 Data Tracking

Field data from sample collection logs will be checked against the field log book and any other field forms before being submitted for entry into the Facility for Information Management, Analysis, and Display (FIMAD) database. Data generated by the analytical laboratories will be submitted to the SMO in accordance with the requirements of the Environmental Restoration (ER) Project Statement of Work for Analytical Services (LANL 1995, 1278). These requirements include electronic and hard copy deliverables for routine analyses. Data verification and validation will be conducted before the data are uploaded to the FIMAD database.

3.6 Schedule

The additional Phase I sampling described in this plan is tentatively scheduled for the third week of November, 1996. This scheduling is based on the assumptions that the field team will have completed the appropriate training and the weather will permit the sampling to take place. If one of these assumptions is not met, the sampling will be postponed to a later date. The sampling will take approximately one day to complete.

4.0 DATA ASSESSMENT

4.1 Verification of Field Measurements and Sample Information

Field data from the sample collection logs will be checked against the field log book and any other field forms before being submitted for entry into the FIMAD database. The field sample information and measurements must be reviewed and verified before and after they are loaded into the central database.

4.2 Verification and Baseline Data Validation for Laboratory Data

All data to be used for site decision making will be loaded into the FIMAD database. These data will include field sample information, field measurements, and results from fixed-laboratory analyses. The fixed-laboratory analytical data will undergo standard internal laboratory data validation procedures, standard data verification, and baseline validation as described in the LANL ER Project QAPP (LANL 1992, 1292). Validation qualifiers will be assigned as necessary.

4.3 Data Quality Assessment for Laboratory Data

The data quality assessment procedure outlined in the QAPP will be followed. This may result in focused validation if questions or inconsistencies are encountered.

5.0 REFERENCES

LANL (Los Alamos National Laboratory). "Los Alamos National Laboratory Environmental Restoration Program Standard Operating Procedures," Los Alamos National Laboratory report, Los Alamos, New Mexico. **(LANL, 0875)**

LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1071," Los Alamos National Laboratory Report LA-UR-92-810, Los Alamos, New Mexico. **(LANL 1992, 0781)**

LANL (Los Alamos National Laboratory), July 1995. "Statement of Work–Analytical Support," Revision 2, RPF No. 9-XS1-Q4257, ER ID No. 49738, Los Alamos, New Mexico. **(LANL 1995, 1278)**

LANL (Los Alamos National Laboratory), March 1996. "Quality Assurance Project Plan Requirements for Sampling and Analysis," Los Alamos National Laboratory Report LA-UR-96-441, Los Alamos, New Mexico. **(LANL 1996, 1292)**