LANL 97
TA-73

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: ~~August~~ September 25, 1997
Refer to: EM/ER:97-326

Mr. Ted Taylor
US Department of Energy
Los Alamos Area Office, MS A316
Los Alamos, NM 87545

SUBJECT: SAMPLING AND ANALYSIS PLAN COVERING PHASE II RFI FOR PRS 73-002 IN TA-73 (FORMER OU 1071)

Dear Ted:

Enclosed please find the Sampling and Analysis Plan (SAP) covering Phase II Resource Conservation and Recovery Act Facility Investigation for Potential Release Site 73-002 in Technical Area 73. Your Field Project Manager has reviewed this SAP and did not have any comments. After your review and approval of this SAP, we will submit it to the New Mexico Environment Department for informational purposes.

If you have any questions, please call Garry Allen at (505) 667-3394 or Bonnie Koch at (505) 665-7202.

Sincerely,

Jorg Jansen, Program Manager
Environmental Restoration

JJ/ss

Enclosure: Sampling and Analysis Plan for PRS 73-002

73-002-99
73-002
003
004(a,b)
006

4815

An Equal Opportunity Employer/Operated by the U

Cy (w/ enc.):
G. Allen, CST-7, MS E525
D. Griswold, AL-ERD, MS A906
J. Harry, EES-5, MS M992
B. Koch, LAAO, MS A316
T. Longo, DOE-HQ, EM-453
C. Rodriguez, CIO, MS M769
J. White, ESH-19, MS K490
EM/ER File, MS M992
RPF, MS M707

Cy (w/o enc.):
T. Baca, EM, MS J591
T. Glatzmaier, DDEES/ER, MS M992
D. McInroy, EM/ER, MS M992
J. Plum, LAAO, MS A316
G. Rael, AL-ERD, MS A906
J. Vozella, LAAO, MS A316

TA-73

Sampling and Analysis Plan for Phase II RFI for PRS 73-002

Solid Waste Management Group 73-2

Field Unit 1

Environmental Restoration Project

August 1997

A Department of Energy
Environmental Cleanup Program

Los Alamos
NATIONAL LABORATORY

LA-UR-97-3167

CONTENTS

1.0 PROBLEM DEFINITION 1

1.1 Purpose and Approach 1

1.2 Site Description 1

1.3 Historical Data 2

1.4 Regulatory Context 2

2.0 SAP DESIGN 5

Perimeter Surface Soil Samples 5

Ash and Sub-ash Soil Samples 7

Sediment Samples 7

2.1 Overview of Required Information 8

2.2 Data Utilization 8

2.3 Design Assumptions 9

2.4 Data Quality Requirements 9

2.5 Measurements to Verify These Assumptions and Requirements 10

3.0 SAP IMPLEMENTATION 10

3.1 Field Methods 10

3.2 Measurement Methods 10

3.3 Field Decisions 12

3.4 Sample Handling 12

3.6 Schedule 13

4.0 DATA ASSESSMENT 13

4.1 Verification of Field Measurements and Sample Information 13

4.2 Verification and Baseline Data Validation 13

4.3 Data Quality Assessment 13

5.0 ADMINISTRATION 14

5.1 Project Task Organization 14

5.2 Training 14

5.3 Reporting and Records 15

5.4 Oversight 15

6.0 REFERENCES 16

ATTACHMENT A PHASE I ANALYTICAL DATA 1

LIST OF TABLES

Table 3.1 Sample Matrix for PRS 73-002 Phase II RFI 11

Table 5.1 Project Task Organization and Personnel 14

Table A-1 73-002 Inorganic Summary Phase I Data 2

Table A-2 73-002 Detected Organics Summary Phase I Data 4

Table A-3 Dioxins/Furan Summary Phase i Data 6

LIST OF FIGURES

Figure 1. PRS 73-002 Site Location Map 3

Figure 1.2 PRS 73-002 Phase I Sampling Locations 4

Figure 2.1 PRS 73-002 Phase II Sampling Locations. 6

1.0 PROBLEM DEFINITION

1.1 Purpose and Approach

This sampling and analysis plan (SAP) describes the proposed Phase II Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) sampling at potential release site (PRS) 73-002, an incinerator/surface ash disposal area. There are several sampling objectives, one of which is to define the lateral and downgradient extent of the ash material. Other objectives are to provide information regarding the vertical extent of potentially affected soil below the ash disposal area, the degree to which fluvial deposits downgradient of the disposal area may be affected by site contaminants, and the approximate volume of ash and affected soil. The sampling approach will focus primarily on the lateral and downgradient extremities of the ash disposal area, and the drainage pathways leading from the disposal area. Data from this investigation will supplement the Phase I RFI data, and will be used to evaluate whether a no further action (NFA) decision should be recommended, or to select a final remedy if it becomes apparent that NFA is not a viable alternative.

1.2 Site Description

PRS 73-002 is an incinerator/surface ash disposal area located slightly west and north of the Los Alamos Airport terminal (Fig. 1.1). The incinerator began operation in 1947, but because of problems with incomplete combustion, operated only for a short period of time, as discussed in the Operable Unit (OU) 1071 RFI work plan (LANL 1992, 0781). The incinerator was used to destroy municipal trash from the town site in addition to classified documents from the Los Alamos National Laboratory. The incinerator equipment and stack were removed and the building is currently used for storage.

Land Waste?

Associated with the incinerator is an ash disposal area located north of the building, immediately below the south rim of Pueblo Canyon. A sizable deposit of noncombustibles, primarily composed of rusted tin cans, is located on a ledge below the top of the canyon. From this ledge, the ash deposit extends approximately 140 ft to the top of the canyon at a slope of approximately 40 degrees. The width of the ash deposit is narrowest at the top (approximately 65 ft) and fans out, becoming widest at the ledge (approximately 160 ft). Below the ledge, accumulations of ash and other noncombustibles continue downslope in an irregular manner for some distance, but terminate at least 700 ft from the bottom of the canyon.

1.3 Historical Data

Before conducting the Phase I RFI, little specific information was available concerning the chemical nature of the ash material. It was only known that the incinerator burned municipal trash and classified documents. However, since the contents of municipal trash can be highly heterogeneous, the resulting ash could contain a variety of substances, particularly if the combustion process was incomplete.

Phase I RFI activities conducted in June 1996 (Phase 1a) and January 1997 (Phase 1b) included the collection of ash and soil samples from 18 locations within and downgradient of the ash disposal area. The ash samples contained a high percentage of noncombustible metal and glass fragments. The samples were analyzed for one or more of the following analytes: volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), organochlorine pesticides/polychlorinated biphenyls (PCBs), dioxins/furans, TAL metals, toxicity characteristic leaching procedure (TCLP) metals for waste management purposes, and gross alpha/beta/ gamma for Department of Transportation (DOT) shipping purposes. The Phase I sampling locations are shown on Figure 1.2 and the analytical results are summarized in Attachment A.

The Phase I data, presented in Attachment A, indicate that there are several metals which exceed background screening values, a few of which also exceed screening action levels (SALs). However, the TCLP concentrations, not summarized in Attachment A, were all below regulatory levels, indicating that TCLP metals are present in the ash in relatively nonleachable forms. Several VOCs and SVOCs, including pesticides and dioxins/furans, were detected at relatively low concentrations (see Table A-3). No radiological constituents were identified by the field or laboratory screening.

A PCB isomer (Aroclor 1254) was detected above its SAL.

1.4 Regulatory Context

The current regulatory context for the PRS 73-002 investigation is RCRA. Since RCRA contaminants of potential concern (COPCs) were identified in the Phase I RFI, additional sampling is being proposed to determine extent and support a risk assessment. Ultimately, the sampling data will be used to evaluate whether the site should be recommended for NFA or to select a final remedy if it becomes apparent that NFA is not a viable alternative.

Although collectable volumes of surface water have not been observed running off of PRS 73-002 during storm events, BMPs were installed to prevent run-on. Because site contaminants appear to be insoluble components and runoff is negligible, surface water is not expected to cause measurable migration of contaminants from the site. Therefore, it is appropriate to address surface water issues via the site-wide investigation that is in the planning stage.

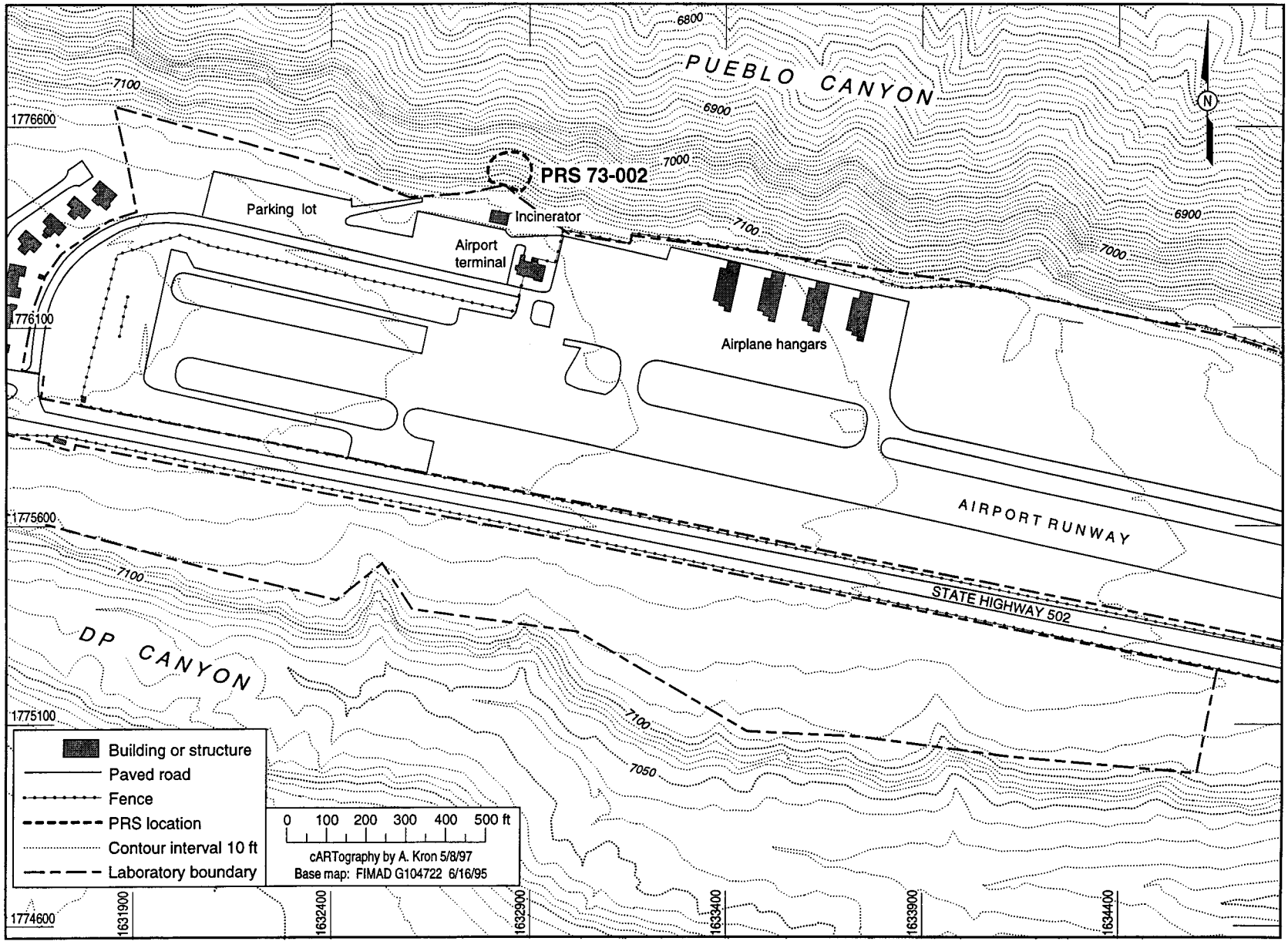

Fig. 1.1 PRS 73-002 site location map.

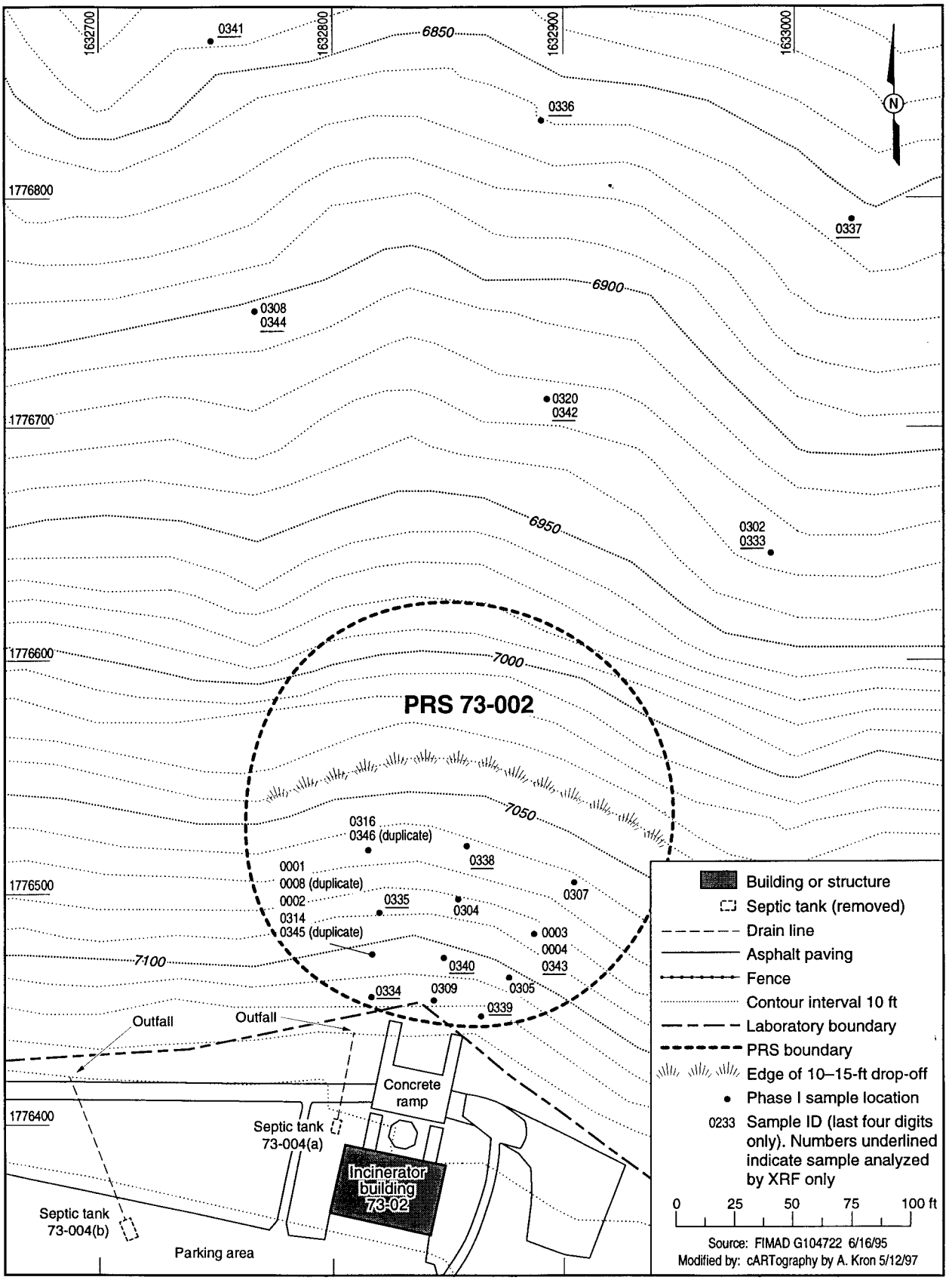

Fig. 1.2 PRS 73-002 phase I sampling locations.

2.0 SAP DESIGN

Before collecting samples, the approximate lateral and downgradient extent of the ash and other noncombustible materials will be visually defined and marked with pin flags or surveyor's flagging. This task will include geomorphologic mapping for the purpose of identifying sediment catchment sites in the three drainages potentially receiving runoff from the ash disposal area. Of particular interest will be those catchments with thick sediment deposits that have been accumulating over a period of years at locations where flow gradients decrease, such as near the bottom of the canyon where slopes begin to flatten.

Perimeter Surface Soil Samples

For the purpose of verifying that the visually defined, lateral and downgradient extent of the ash material also defines the horizontal extent of contamination, a minimum of seven perimeter soil samples will be collected from 5 to 10 ft outside of the observed ash/soil boundary (Fig. 2.1). Each sample will be collected from the 0.1–0.5-ft interval, field screened, and submitted to TA-21 for gross radiological analysis and to a fixed laboratory for analysis of the COPCs as defined in Section 3.2. Before collecting the perimeter samples, a small trench or hole will be dug by hand at each location to confirm that the soil is not detrital debris that has washed or otherwise moved over the edge of the ash deposit. At any perimeter sampling location where this is found to be the case, the location will be moved outward until it is beyond the edge of the buried ash. It is assumed that the maximum lateral extent of ash material and associated contamination will be limited by the drainage ravines on either side of the ash disposal area. These ravines are estimated to be less than 50 ft from the east and west edges of the ash.

If the distance between any of the three Phase II downgradient perimeter samples and the closest Phase I channel sediment sample is greater than 50 ft, additional soil samples may be collected at points midway between these locations. Additional samples will be collected during Phase II only if the initial Phase II samples are reported by analytical laboratories to contain detections of organic chemicals or elevated detections of metals. The list of COPCs for which these additional samples would be analyzed will be determined after reviewing the initial Phase II results. Dioxins/furans would be analyzed in the additional Phase II samples only if warranted by detects in the adjacent, upgradient sample.

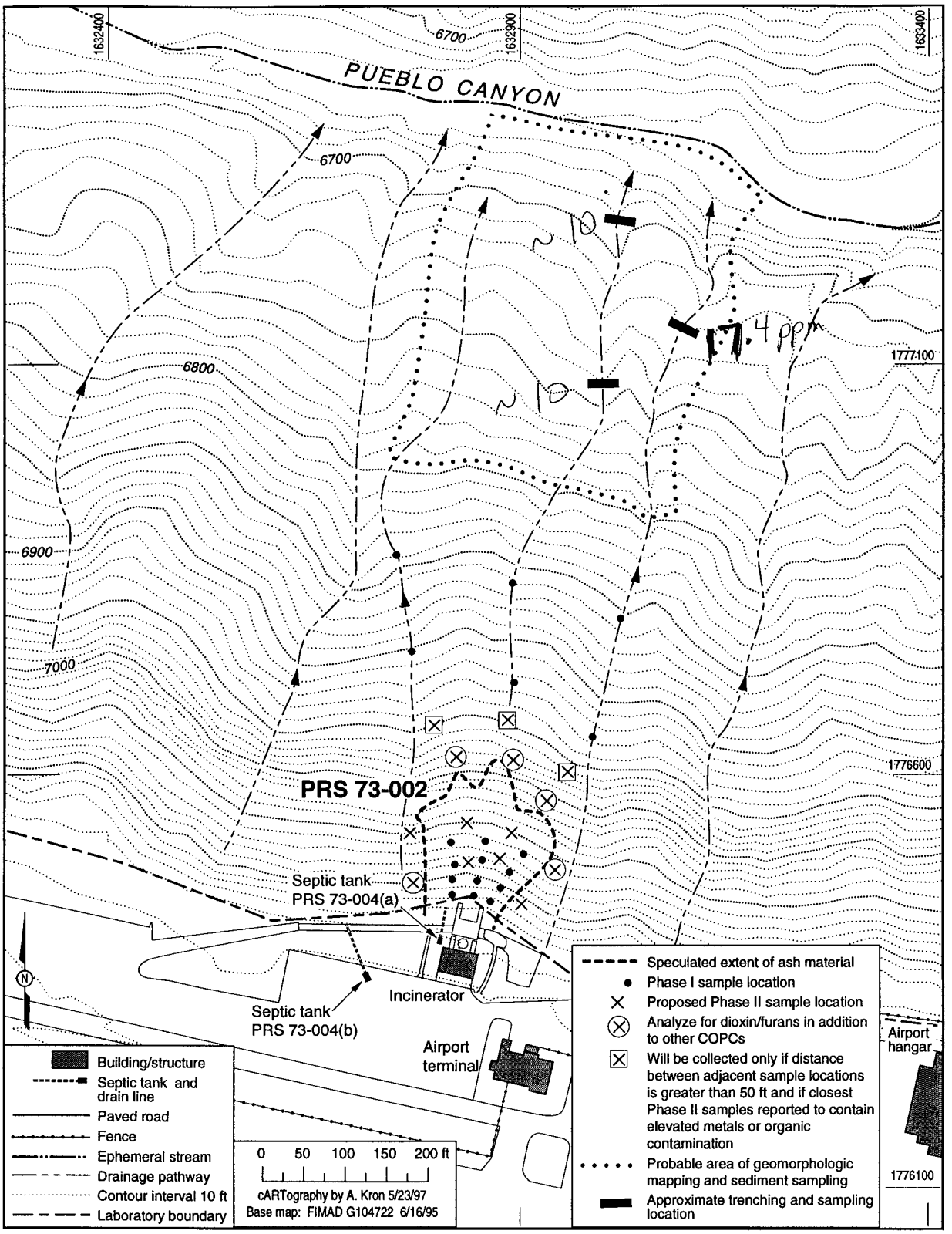

Fig. 2.1 PRS 73-002 phase II sampling locations.

Ash and Sub-ash Soil Samples

Four locations within the ash debris area will be selected for additional sampling. Two will be located under the tin cans on the ledge and two will be located near the previous sample locations where the highest levels of lead were detected (Fig. 2.1). At each location, a trench will be dug through the cans and ash to the ash/soil or tuff contact. Immediately above the contact, an ash sample will be collected at two of the locations, preferably the locations under the tin cans. If the ash is in contact with soil, trenching will continue into the soil for approximately 1.5 ft, being careful to avoid cross-contamination of the soil. However, since some cross contamination may be unavoidable due to the loose nature of the ash and soil, the uppermost 0.5 ft of soil will not be sampled. Two soil samples will be collected, one from the 0.5–1-ft interval below the ash/soil contact, and a second from the 1–1.5-ft interval. All samples will be field screened, and submitted to TA-21 for gross radiological analysis and to a fixed laboratory for analysis of the appropriate COPCs as defined in Section 3.2. However, the deeper soil samples will be analyzed only if there are detections of organic chemicals or elevated detections of metals in the overlying soil samples. Therefore, the deeper samples will be shipped to the laboratory with instructions to hold them for analysis, and possibly extract them as a means of extending the holding times.

Sediment Samples

Sediment samples will be collected to determine if there has been movement of ash or other contamination down slope from the disposal area. As many as six samples will be collected from within the primary sediment catchment sites at locations to be determined following the geomorphologic mapping. Two catchment sites will be selected and sampled within the drainage directly downgradient from the ash: one closer to the bottom of Pueblo Canyon and one closer to the ash. A third catchment site will be selected and sampled within the drainage to the east of the ash.

At each catchment location, a narrow exploratory trench will be dug into the sediment by hand. While trenching, the sediment will be examined for visual evidence of ash or other noncombustible materials that may have been washed down the drainage and deposited. Other aspects of the sediment, such as color, lithology, grain size, bedding, and organic debris deposits, will be noted and described. In each of the trenches, if evidence of ash or noncombustible materials is found, samples will be collected from the interval in which the material was found. If no such evidence is found, one sample will be collected from near the surface at 0.1–0.5 ft, and a second sample will be collected from a deeper interval based on observation of factors thought to indicate a higher probability of detecting contamination in the ash disposal area (such as

changes in sediment color or coarseness). All samples will be field screened and submitted to TA-21 for gross radiological analysis, and sent to a fixed laboratory for analysis of the appropriate COPCs as defined in Section 3.2.

2.1 Overview of Required Information

Information required from this investigation to support the decision making process includes field screening data, thickness and extent of ash and noncombustible material, and chemical and radiological analytical data obtained from samples submitted for fixed laboratory analyses. Specific required information includes:

- Horizontal and vertical extent of contaminated ash and soil.
- Presence or absence of contaminants, including dioxins/furans, in sediment deposits.

2.2 Data Utilization

Information to be collected at this site will be used for a variety of reasons:

- Field screening of samples will be performed for health and safety reasons, to provide a preliminary indication if radiological analyses might be required, and to direct sampling efforts should comparatively high readings be unexpectedly observed.
- The samples submitted to TA-21 for analysis of gross alpha, beta, and gamma radiation will provide information that is required to meet sample transportation requirements.
- Horizontal and vertical extent information will be used to assess the degree of risk involved with leaving the contaminated material in place. This information may also be used to determine the approximate area and volume of material that would need to be removed or otherwise remediated.
- Sediment sample results will provide information regarding the downgradient extent of COPC contamination and the degree to which mass movement of ash material may be occurring via overland stormwater flow.

The fixed laboratory analytical data will be used to finalize the list of COPCs for the site. Determination of COPCs will be made by comparing the analytical results with LANL-wide

background data (Longmire et al. 1995, 1142) and with SALs as described in the Risk-Based Corrective Action Process document (Dorries 1996, 1297).

2.3 Design Assumptions

The assumptions underlying the design are based on historical information regarding the operation of the incinerator and on the Phase I data. Historical evidence indicates that only municipal trash and classified documents were incinerated, and that use of the incinerator was discontinued due to incomplete combustion. Therefore, the presence of radioactive constituents above background levels would not be expected, and the Phase I screening data verify this. SVOC and VOC contamination would also not be expected at elevated levels due to the incineration of the waste. The problem of incomplete combustion may explain the presence of some organic compounds at low concentrations.

Another assumption is that the bulk of the contamination is confined to the ash material itself because of the insoluble nature of the primary contaminants (see Section 1.3). Thus, it is assumed that the soil below the ash disposal area will be contaminated only within a narrow zone of mixing at the contact with the ash. Similarly, sediment deposits within the drainages receiving runoff from the ash disposal area will be contaminated only to the degree that significant quantities of ash material have been deposited within the sediment. If significant downslope movement of the ash is not occurring, then it is not expected that COPCs will be detected above background levels in the sediment.

2.4 Data Quality Requirements

Data will be obtained using field screening methods 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 methods that include extensive internal quality assurance/quality control (QA/QC) as required by the LANL Laboratory Services Contracts referenced in the Quality Assurance Project Plan (QAPP) (LANL 1996, 1292). Provided the analytical data obtained from the fixed laboratories are collected according to the standard SW-846 protocols as indicated, the observed analytical data will be adequate to support a screening assessment decision for the site (and also a risk assessment, if needed). Corroboration of the analytical results can be obtained by comparison with field screening results. Results obtained from analysis of the field duplicate samples collected from three locations will provide some further information on the reliability of the analytical results.

2.5 Measurements to Verify These Assumptions and Requirements

Several measurements will be collected to confirm the assumptions used as the basis of this design. The ash samples collected in the Phase Ib sampling indicated that some detected organics and elevated inorganics may be COPCs. The extent of these detected chemicals will be confirmed through fixed laboratory data and field screening data for the Phase II samples.

A baseline validation of all fixed laboratory data obtained will be performed as described in the LANL Environmental Restoration (ER) Project QAPP. If the analytical data do not meet expectations and it appears that the problems impact the screening assessment decision to be made, then a more focused validation may be requested. The field screening data and fixed laboratory data will also be compared for consistency of results.

3.0 SAP IMPLEMENTATION

3.1 Field Methods

The initial mapping phase will involve visually locating and marking the extent of the ash material and the primary fluvial deposits downgradient of the ash material. Potential sampling locations will be based on the results of this task. At completion, sufficient geodetic surveying will be done to permit the construction of a site map accurately depicting the disposal area, fluvial deposits, and sampling locations.

Surface samples will be collected in accordance with LANL-ER-SOP-06.09, RO, "Spade and Scoop Method for Collection of Soil Samples." Due to the potential for photodegredation of some of the organic constituents, the uppermost one inch of ash or soil will be pushed aside, and the sample will be collected from approximately the 0.1- to 0.5-ft interval. Deeper samples will be collected using " LANL-ER-SOP-06.10, R0, "Hand Auger and Thin-Wall Tube Sampler." If the material is too loose and friable to maintain an open borehole, the spade and scoop method will also be used to collect the deeper samples. The steepness of the slope, poor access, and threatened and endangered species considerations prevent the use of powered sampling equipment.

3.2 Measurement Methods

Samples will be field screened for radioactivity using an Eberline™ ESP-1 with an HP-260 probe or equivalent to detect beta/gamma radiation, and a Ludlum™ Model 139 with an air proportional probe or equivalent to detect alpha radiation. Field screening results will be

recorded on the sample collection log. Daily operation checks will be performed on the beta/gamma and alpha radiation detectors using appropriate radiation check sources in accordance with ESH-1 Procedures ESH-1-07-85 and ESH-1-07-86.

Samples will also be field screened for VOCs using a Thermo Environmental™ or equivalent photoionization detector (PID) with an 11.7 eV lamp. Field screening results will be recorded on the sample collection log.

To meet sample transportation requirements, each sample will be submitted to TA-21 for analysis of gross alpha, beta, and gamma radiation.

Samples submitted to a fixed laboratory will be analyzed for the COPCs using EPA SW-846 methods (Table 3.1).

TABLE 3.1

SAMPLE MATRIX FOR PRS 73-002 PHASE II RFI

PRS No.	Number of Samples[a]	Sample Type	TA-21	Fixed Lab COPCs			
			Gross Alpha/ Beta/ Gamma[b]	VOCs	SVOCs	Dioxins/ Furans	TAL Metals[d]
73-002	7	Sediment	X			X	X
73-002	11	Perimeter Soil	X		X	X[c]	X
73-002	9	Sub-ash Soil	X	X	X	X	X
73-002	2	Ash	X			X	

Notes and Assumptions:
Isotopic analyses may be requested as warranted by the rad. screening results.
[a] Sample totals includes 10% duplicates.
[b] Five-minute count time for shipping purposes only.
[c] Of the 11 possible perimeter samples, a minimum of 6 will be analyzed for dioxins/furans (see Figure 2.1).
[d] Will analyze for customized list composed of antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, silver, and thallium (based on Phase I sampling results).

3.3 Field Decisions

There are several factors that may alter the number and depth of samples being collected, such as:

- The number of downgradient perimeter soil samples collected will depend on the distance between the ash and the closest existing channel sediment samples. If this distance is greater than 50 ft, additional perimeter samples may be collected as discussed in Section 2.0.
- The number of soil samples collected below the ash will be dependent upon the thickness of the soil profile at the four sampling locations. If the ash is in direct contact with tuff, or if the soil is less than 0.5 foot thick, no samples will be collected below the ash because the ash is not expected to mix with the tuff.
- The number and depth of sediment samples collected will be dependent upon the location, thickness, and morphology of the sediment deposits that are mapped as a result of the geomorphologic mapping process.
- Field screening results or visual evidence of contamination may require minor deviations from the sampling plan. Additional samples may need to be collected or samples may need to be collected at different locations.

3.4 Sample Handling

Samples will be identified, preserved, stored, and transported as outlined in LANL-ER-SOP-01.02, R0, "Sample Container and Preservation," LANL-ER-SOP-01.03, R1, "Handling, Packaging, and Shipping of Samples," and LANL-ER-SOP-01.04, R3, "Sample Control and Field Documentation." Samples requiring dioxin/furan analysis must be collected in amber-colored glass containers with teflon-lined caps. All samples will be shipped to off-site laboratories for analysis, with the exception of samples submitted to TA-21 for radiological screening purposes.

3.5 Data Tracking

Data will be recorded in the field and reviewed by the field team as required by LANL-ER-SOP-01.01, R0, "General Instructions for Field Investigations," LANL-ER-SOP-01.04, R0, "Sample

Control and Field Documentation," and LANL-ER-SOP-03.12, R0, "Field and Laboratory Notebook Documentation for Environmental Restoration Earth Science Studies." Data generated by the analytical laboratories will be submitted to the Field Support Facility (FSF) following the requirements of the ER Project statement of work for analytical services; these requirements include electronic and hard copy deliverables for routine analyses. The FSF is responsible for data verification, validation, and upload to the LANL ER Project electronic database system, Facility for Information Management, Analysis, and Display (FIMAD).

3.6 Schedule

The Phase II investigation is scheduled to begin in October 1997. The field investigation will require approximately three to four days 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. This information will again be reviewed and verified after being loaded into the central database.

4.2 Verification and Baseline Data Validation

All data to be used for site decision making will be loaded into FIMAD. These data will include field sample information, field measurements, and fixed laboratory analyses. The analytical data produced by the fixed laboratories will undergo standard internal laboratory data validation procedures, and will undergo standard data verification and baseline validation as described in Sections D1 and D2 of the LANL ER Project QAPP (LANL 1996, 1292).

4.3 Data Quality Assessment

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 ADMINISTRATION

5.1 Project Task Organization

Table 5.1 shows the Field Unit 1 project task organization for the PRS 73-002 Phase II investigation.

TABLE 5.1

PROJECT TASK ORGANIZATION AND PERSONNEL

Title	Name	Organization	Phone
Field Project Management			
Field Project Leader (FPL)	Garry Allen	CST-18	667-3394
Field Operations Manager (FOM)	Carl Newton	EM/ER	665-9259
Field Team Manager (FTM)	Steve Calhoun	ERM/Golder	662-1340
Field Team			
Field Team Leader (FTL) / Sampler / Waste Manager (WM)	To Be Determined (TBD)	ERM/Golder	662-3700
Site Safety Officer (SSO)/Radiological Screening Person (RSP)	Raymond Wright	ERM/Golder	662-1325

5.2 Training

All personnel involved with the implementation of the SAP will have fulfilled the required training for applicable roles in accordance with LANL-ER-AP-05.2, R1, "Determination, Completion, and Documentation of Environmental Restoration Worker Training." At a minimum, all field team members will have documentation of 40-hour Occupational Safety and Health Act (OSHA) Hazardous Waste Operations (HAZWOPER) training, a current 8-hour annual HAZWOPER Refresher (if applicable), LANL Radiological Worker II, LANL General Employee Training, a current medical fit-for-work statement, and employer hazard communication. In addition, sampling personnel will have completed fall protection training and be familiar with the fall protection equipment. One of the field team members will be a qualified competent person for fall protection (as defined by OSHA). Personnel training records will be kept on site and available for inspection during field activities.

5.3 Reporting and Records

A daily field activity log will be prepared during active field operations. Each log will describe the specific field activities conducted during the day, any surveys performed, sampling activities including number and types of samples collected, field monitoring or screening results, and unexpected events. Field records will also be generated to document sample collection and tracking, health and safety briefings, and monitoring equipment performance checks. Field records include, but are not limited to:

- Sample Collection Log
- Chain of Custody/Request for Analysis Form
- Tailgate Safety Meeting/Attendee Signoff Sheet
- Daily Safety Inspection Checklist
- PPE Inspection Checklist
- Rad Monitoring/Performance Check
- Site Access/Exclusion Zone Log
- Field Team Leader (FTL) Logbook
- Site Safety Officer (SSO) Logbook
- Waste Management Logbook
- Visitors Log

All original documents will be transferred to the ER Records Processing Facility (RPF) in accordance with LANL-ER-AP-02.1, R1, "Procedure for LANL ER Records Management," with copies submitted to the Project File.

5.4 Oversight

Prior to the initiation of field work, a project opening meeting will be conducted and attended by all field personnel and other interested individuals. In addition to reviewing the readiness review file, the project scope and any health and safety issues will be discussed.

A brief training session will also be conducted for all field personnel by the airport operations manager, at which time airport safety guidelines and requirements will be reviewed.

6.0 REFERENCES

Dorries, A. M. (Ed.), June 1, 1996. "Risk-Based Corrective Action Process," Revision 1, Los Alamos National Laboratory Report, LA-UR-96-2811, Los Alamos, New Mexico. **(Dorries 1996, 1297)**

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. **(LANL1992, 0781)**

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)**

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

ATTACHMENT A PHASE I ANALYTICAL DATA

TABLE A-1

73-002 INORGANIC SUMMARY
PHASE I DATA

	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead
UTL[a]	**38700**	**1**	**7.82**	**315**	**1.95**	**2.6**	**6120**	**19.3**	**19.2**	**15.5**	**21300**	**23.3**
SAL	**77000**	**31**	**n/a**	**5300**	**n/a**	**38**	**n/a**	**211**	**4600**	**2800**	**n/a**	**400**
0173-96-0302	1400	10 U	0.93	20	0.52 U	0.52 U	1300	1.7	1 U	2.6	4400	14
0173-96-0304	8340	54.5 U	15	5290	0.29 U	5	12800	94.8	26	**3690**	225000	**4500**
0173-96-0304D	11048	54.6 U	18.3	**5597**	0.29 U	11.03	17067	85.2	40.18	2157	200200	**3938**
0173-96-0305	13400	40.1 U	11.4	883	0.21	12.6	12500	76.5	22.5	999	160000	**3020**
0173-96-0307	4390	85.7 U	31.1	440	0.46 U	7.5 U	24300	90.2	37.8	543	431000	**4290**
0173-96-0308	4400	12 U	1.4	60	0.62 U	0.62 U	1700	3.7	2	5.4	7200	48
0173-96-0309	18300	54.4 U	8.5	**6280**	0.43	15.1	39800	106	30.3	843	174000	**2170**
0173-96-0314	15200	**119**	11.1	3030	0.22	11.4	29600	103	18	**6320**	106000	**9620**
0173-96-0316	4320	41.3 U	12.2	689	0.22 U	4.5	8990	58.3	24.7	1360	265000	**1380**
0173-96-0320	2500	11 U	1	37	0.56 U	0.56 U	2400	1.9	1.3	2.6	4500	13
0173-96-0345	19000	**95.3**	16	4090	0.4	13.3	33200	109	21.1	2420	117000	**9780**
0173-96-0346	4540	50.8 U	3	646	0.27 U	5	15900	29.5	11.6	588	115000	**1210**
0173-97-0001	16900	**32.5**	27	1490	0.58	23.3	45900	73.9	17.2	2760	52800	**6790**
0173-97-0002	18900	**49**	76.5	2020	0.65	24.9	36200	74.3	16.7	2230	98600	**3770**
0173-97-0003	25300	16.8	19.8	2330	0.65	11.2	30300	133	22.7	1550	78400	**2690**
0173-97-0004	22900	29.6	20.1	1920	0.51	**42.9**	38700	90.5	17.7	**4590**	70600	**4480**
0173-97-0008	16700	**159**	20.4	1240	0.5	31.1	40600	71.8	15.6	2390	83500	**13100**

Notes:
[a] UTLs are the 95% upper confidence
D = Laboratory Duplicate
U = Non-detect
All concentrations reported in mg/kg (ppm).
Outlined cells indicate concentration is greater than UTL.
Bolded data indicate concentration is greater than SAL.

TABLE A-1

73-002 INORGANIC SUMMARY
PHASE I DATA (Continued)

	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
UTL[a]	**4610**	**714**	**0.1**	**15.2**	**3410**	**1.7**	**n/a**	**915**	**1**	**41.9**	**50.8**
SAL	**n/a**	**3200**	**23**	**1500**	**n/a**	**380**	**380**	**n/a**	**5.4**	**540**	**23000**
0173-96-0302	270	110	0.1 U	2.4	240	0.21 U	2.1 U	43	1.3 U	3.4	42
0173-96-0304	1290	1240	2	131	1150	1.7	213	842	0.41 U	6.4 U	3820
0173-96-0304D	10439	2036	1.4	189	1926	1.3 U	224	1109	0.41 U	6.4 U	13100
0173-96-0305	6010	1250	1.3	165	1990	0.93 U	28.9	940	0.31	5.5	1470
0173-96-0307	964	1960	0.55	119	806	0.96 U	23.2	675	0.3 U	10 U	752
0173-96-0308	720	270	0.12 U	4.7	770	0.25 U	2.5 U	83	1.5 U	7.5	52
0173-96-0309	2380	1500	1.4	134	2040	4.3 U	**448**	1760	0.4 U	12.6	2530
0173-96-0314	2440	1140	2.3	94.1	2660	1 U	156	2280	0.36	14.4	4260
0173-96-0316	1250	1190	1.1	81.2	640	0.99 U	41.8	674	0.37	4.8 U	1050
0173-96-0320	470	280	0.11 U	3.4	470	0.22 U	2.2 U	72	1.4 U	4.6	470
0173-96-0345	3800	1340	0.07 U	104	3270	1.2 U	188	2480	0.48	15.9	4250
0173-96-0346	711	770	0.07 U	50.5	582	1.2 U	31.6	613	3.6 U	5.9 U	1590
0173-97-0001	4800	1330	0.41	79.9	4290	2	21.3	3930	**7.4**	13.2	4790
0173-97-0002	4020	1880	0.49	147	4610	2.1	55.3	3180	**10.6**	8.2	3860
0173-97-0003	3200	1660	1.2	236	3220*	2.8	55.4	3530	**9.3**	12.5	4380
0173-97-0004	3960	1760	2.2	112	5040	1.9	19.6	7760	**6.4**	12.8	7170
0173-97-0008	4380	1530	0.44	101	4240	3.8	17.9	4190	**8.6**	7.8	3790

Notes:
[a] UTLs are the 95% upper confidence
D = Laboratory Duplicate
U = Non-detect
All concentrations reported in mg/kg (ppm).
Outlined cells indicate concentration is greater than UTL.
Bolded data indicate concentration is greater than SAL.
*This cell is not outlined, it is an effect that is created by the surrounding cells.

TABLE A-2

73-002 DETECTED ORGANICS SUMMARY
PHASE I DATA

	1,1,1-Trichloroethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	4,4'-DDE	4,4'-DDT	Acetone	Aroclor-1254	Benzene	Beta-BHC
SAL	1200	1100	500	3.6	1.3	1.3	2100	0.1	0.63	0.25
0173-96-0302	0.0053 U	0.17 U	0.17 U	0.17 U	0.0035 U	0.0035 U	0.021 U	0.035 U	0.0053 U	0.0017 U
0173-96-0304	0.002 J	0.48 U	0.48 U	0.006 U	0.032	0.024	0.024 U	0.046	0.006 U	0.0026
0173-96-0305	0.025	0.41 U	0.41 U	0.006 U	0.0057	0.0041 U	0.067	0.066	0.005 J	0.002 U
0173-96-0307	0.005 J	0.37 U	0.37 U	0.006 U	0.0038 U	0.0038 U	0.022 U	0.038 U	0.006 U	0.0019 U
0173-96-0308	0.0054 U	0.18 U	0.18 U	0.18 U	0.029	0.034	0.022 U	0.035 U	0.0054 U	0.0018 U
0173-96-0309	0.008	0.43 U	0.43 U	0.006 U	0.019	0.02	0.024 U	0.047 U	0.001 J	0.0023 U
0173-96-0314	0.008	0.42 U	0.42 U	0.048	0.03	0.022	0.026 U	**0.17**	0.006 U	0.0022 U
0173-96-0316	0.008 U	0.38 U	0.38 U	0.008 U	0.0072	0.006	0.008 J	0.059	0.008 U	0.002 U
0173-96-0320	0.0056 U	0.18 U	0.18 U	0.18 U	0.0037 U	0.0037 U	0.022 U	0.037 U	0.0056 U	0.0018 U
0173-96-0345	0.015	0.44 U	0.44 U	0.006 U	0.027	0.023	0.026 U	**0.13**	0.006 U	0.002 U
0173-96-0346	0.006 J	0.42 U	0.42 U	0.006 U	0.005	0.0039 U	0.024 U	0.04	0.006 U	0.0019 U
0173-97-0001	0.032 U	0.032 U	0.032 U	0.032 U	0.032	0.017	0.082	0.043 U	0.032 U	0.002 U
0173-97-0004	0.03 U	0.12	0.12	0.03 U	0.027	0.004 U	0.12 U	0.039 U	0.03 U	0.002 U
0173-97-0008	0.03 U	0.03 U	0.03 U	0.03 U	0.035	0.019	0.097	0.04 U	0.03 U	0.002 U

U = Non-detect in that sample.
J = Estimated concentration.
All concentrations reported in mg/kg.
Bolded data indicate concentration is greater than SAL.

TABLE A-2

73-002 DETECTED ORGANICS SUMMARY
PHASE I DATA (Continued)

	Bis(2-ethyl hexyl)phthalate		Chlordane - Alpha		Methylene Chloride		Phenanthrene		Tetrachloroethene		Toluene		Trichloroethene		Trichlorofluoromethane	
SAL	32		0.34		7.8		N/A		5.4		790		3.2		380	
0173-96-0302	0.17	U	0.0017	U	0.0053	U	0.17	U	0.0053	U	0.0053	U	0.0053	U	0.0053	U
0173-96-0304	0.48	U	0.0022	U	0.056		0.48	U	0.004	J	0.006	U	0.002	J	0.01	
0173-96-0305	0.41	U	0.002	U	0.13		0.41	U	0.019		0.003	J	0.03		0.041	
0173-96-0307	0.37	U	0.0019	U	0.098		0.37	U	0.005	J	0.006	U	0.003	J	0.008	J
0173-96-0308	0.18	U	0.0051		0.0054	U	0.18	U	0.0054	U	0.0054	U	0.0054	U	0.0054	U
0173-96-0309	0.43	U	0.0023	U	0.082		0.43	U	0.005	J	0.006	U	0.013		0.016	
0173-96-0314	0.42	U	0.0022	U	0.12		0.42	U	0.008		0.006	U	0.004	J	0.018	
0173-96-0316	0.38	U	0.002	U	0.028		0.38	U	0.004	J	0.008	U	0.008	U	0.008	U
0173-96-0320	0.18	U	0.0018		0.0056	U	0.18	U	0.0056	U	0.0056	U	0.0056	U	0.0056	U
0173-96-0345	0.44	U	0.002		0.11		0.44	U	0.013		0.006	U	0.004	J	0.025	
0173-96-0346	0.42	U	0.0019		0.066		0.42	U	0.009		0.006	U	0.006		0.007	
0173-97-0001	0.43	U	0.002	U	0.01		0.43	U	0.032	U	0.032	U	0.032	U	0.032	U
0173-97-0004	0.19		0.002	U	0.03	U	0.25		0.03	U	0.03	U	0.03	U	0.03	U
0173-97-0008	0.12		0.002	U	0.03	U	0.4	U	0.03	U	0.03	U	0.03	U	0.03	U

U = Non-detect in that sample.
J = Estimated concentration.
All concentrations reported in mg/kg.
Bolded data indicate concentration is greater than SAL.

TABLE A-3

DIOXINS/FURAN SUMMARY
PHASE I DATA

Sample No.	0173-97-0001	0173-97-0002	0173-97-0003	0173-97-0004	0173-97-0008
Furans					
TCDFs (Total)	510	790	570	5,400	510
2,3,7,8-TCDF	29	42	32	350	31
PeCDFs (Total)	240	430	400	1,900	270
1,2,3,7,8-PeCDF	14	23	19	110	15
2,3,4,7,8-PeCDF	21	35	32	150	20
HxCDFs (Total)	120	150	210	500	100
1,2,3,4,7,8-HxCDF	12	25	23	46	15
1,2,3,6,7,8-HxCDF	11	17	21	49	10
2,3,4,6,7,8-HxCDF	12	18	27	52	9.8
1,2,3,7,8,9-HxCDF	ND	ND	ND	ND	ND
HpCDFs (Total)	170	110	250	610	150
1,2,3,4,6,7,8-HpCDF	98	66	130	350	71
1,2,3,4,7,8,9-HpCDF	5.3	6.4	11	8.8	4
OCDF	48	31	100	150	43
Dioxins					
TCDDs (Total)	100	120	270	710	110
2,3,7,8-TCDD	3.3	4.5	6.4	37	6.6
PeCDDs (Total)	100	71	250	580	150
1,2,3,7,8-PeCDD	8.2	8.4	16	49	13
HxCDDs (Total)	180	140	460	1,000	290
1,2,3,4,7,8-HxCDD	6.2	5.9	14	26	6.3
1,2,3,6,7,8-HxCDD	24	21	56	140	37
1,2,3,7,8,9-HXCDD	22	25	65	120	37
HpCDDs (Total)	330	330	1,800	1,600	510
1,2,3,4,6,7,8-HpCDD	180	180	1,100	900	280
OCDD	640	680	4,800	3,200	1,000

Notes:
ND = Not detected.
All concentrations reported in ppt (parts per trillion).