

EGG-WM-10067  
Revision 1  
June 1992

INFORMATION ONLY



**Idaho  
National  
Engineering  
Laboratory**

*Managed  
by the U.S.  
Department  
of Energy*

## **Field Sampling Plan for OU 2-09 Track 2 Investigation**

**Hopi Salomon**



*Work performed under  
DOE Contract  
No. DE-AC07-76ID01570*

**FIELD SAMPLING PLAN    INFORMATION ONLY**  
**FOR**  
**OU 2-09**  
**TRACK 2 INVESTIGATION**

**Hopi Salomon**

**Published June 1992**

**Idaho National Engineering Laboratory**  
**EG&G Idaho, Inc.**  
**Idaho Falls, ID 83415**

**Prepared for the**  
**U.S. Department of Energy**  
**Office of Environmental Restoration and Waste Management**  
**Under DOE Idaho Field Office**  
**Contract DE-AC07-76ID01570**

# FIELD SAMPLING PLAN FOR OU 2-09 TRACK 2 INVESTIGATION

INFORMATION ONLY

Prepared by:

\_\_\_\_\_  
Hopi Salomon  
Operable Unit 2-09 Project Manager

\_\_\_\_\_  
Date

Reviewed by:

\_\_\_\_\_  
William F. Lewis  
Test Reactor Area Facility Representative

\_\_\_\_\_  
Date

\_\_\_\_\_  
Jerry P. Shea  
Environmental Restoration Program  
Independent Review Committee Chairman

\_\_\_\_\_  
Date

Approved by:

\_\_\_\_\_  
Andrew R. Baumer II  
Waste Area Group 2 Manager

\_\_\_\_\_  
Date

Original signatures appear on DRR number ERD-590, dated 6/3/92.

# FIELD SAMPLING PLAN FOR OU 2-09 TRACK 2 INVESTIGATION

INFORMATION ONLY

Prepared by:

\_\_\_\_\_  
Hopi Salomon  
Operable Unit 2-09 Project Manager

\_\_\_\_\_  
Date

Reviewed by:

\_\_\_\_\_  
William F. Lewis  
Test Reactor Area Facility Representative

\_\_\_\_\_  
Date

\_\_\_\_\_  
Jerry P. Shea  
Environmental Restoration Program  
Independent Review Committee Chairman

\_\_\_\_\_  
Date

Approved by:

\_\_\_\_\_  
Andrew R. Baumer II  
Waste Area Group 2 Manager

\_\_\_\_\_  
Date

Original signatures appear on DRR number ERD-590, dated 6/3/92.

Document EGG-WM-10067

Revision 1

Date 6/04/92

Page iv

## ABSTRACT

INFORMATION ONLY

An environmental site characterization investigation of a wastewater treatment/disposal site at the Test Reactor Area of the Idaho National Engineering Laboratory (INEL) is being conducted by the Waste Area Group 2 Unit of the EG&G Idaho, Inc., Environmental Restoration Department (ERD). This Field Sampling Plan provides guidance to field personnel for collecting environmental characterization samples. Sites included under this plan include the Sewage Treatment Plant and Sludge Pit and the Final Sewage Leach Pond. Data collected by this effort will assess the existence of a contaminant source, and to a lesser extent, determine if any releases have occurred to the subsurface soils. This assessment will be used to reach a decision for no further action, interim action, or proceed to a Remedial Investigation/Feasibility Study for the various sites in accordance with the INEL Federal Facility Agreement and Consent Order (FFA/CO) of December 9, 1991. Activities specified in this plan will meet the objectives of a Track 2 investigation under the FFA/CO.

INFORMATION ONLY

Document EGG-WM-10067

Revision 1

Date 6/04/92

Page vi

## CONTENTS

## INFORMATION ONLY

ABSTRACT .....	v
ACRONYMS .....	ix
1. INTRODUCTION .....	1
1.1 Site Background .....	1
1.2 Cold Waste Pond .....	2
1.2.1 Cold Waste Pond Conceptual Model .....	4
1.3 Sewage Treatment Plant and Sludge Pit and the Final Sewage Leach Pond .....	5
1.3.1 Sewage Treatment Area Conceptual Model .....	7
2. SAMPLING OBJECTIVES .....	8
2.1 Data Analytical Levels .....	8
2.2 Sampling and Data Objectives .....	8
2.2.1 Sewage Leach Pond Sampling Objectives .....	9
3. SAMPLE LOCATION AND FREQUENCY .....	12
3.1 Sewage Treatment Area Sampling .....	12
4. SAMPLE DESIGNATION .....	18
5. SAMPLING EQUIPMENT AND PROCEDURES .....	19
5.1 Sampling Equipment .....	19
5.2 Sampling Procedures .....	20
5.2.1 Surface Soil Sampling with a Spade, Spoon, or Scoop .....	20
5.2.2 Subsurface Soil Sampling .....	21



5.2.3 Compositing/Homogenizing Soil Samples with Mixing Bowls . . .	28
5.2.4 Sampling and Filtering Perched Water . . . . .	29
5.2.5 Equipment Decontamination . . . . .	29
6. SAMPLE HANDLING AND ANALYSIS . . . . .	31
6.1 Sample Preservation Methods . . . . .	31
6.2 Field Documentation . . . . .	31
6.3 Shipping Requirements . . . . .	32
7. WASTE MANAGEMENT . . . . .	33
8. REFERENCES . . . . .	34

## FIGURES

1. Relationship between the various TRA wastewater disposal ponds and the approximate extent of the perched water below TRA . . . . .	2
2. Configuration of the TRA CWP . . . . .	3
3. Configuration of the TRA STA with the proposed sampling locations. . . . .	6
4. Generalized composite sample area indicating approximate distribution of subsample locations and volatile grab samples. . . . .	10

## TABLES

1. SAP table for chemical and radiological analysis . . . . .	13
2. Summary of sampling collection, holding time, and preservation requirements. . . . .	15

## ACRONYMS

ARDC	Administrative Record and Document Control Office
ASTM	American Society for Testing and Materials
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program of the EPA
COC	Chain-of-Custody
CWP	Cold Waste Pond
DA	Determinative analysis
DOE	U.S. Department of Energy
DQO	Data quality objective
EPA	Environmental Protection Agency
ERD	Environmental Restoration Department of EG&G Idaho, Inc., at the INEL
FFA/CO	Federal Facility Agreement/Consent Order of December 4, 1991
FSP	Field Sampling Plan
FTL	Field team leader
HDPE	High-density polyethylene
HPLC	High-purity liquid chromatography
INEL	Idaho National Engineering Laboratory
OU	Operable unit
PCB	Polychlorinated biphenyl
PD	Program Directive of ERP
PE	Preparation extraction
PID	Photoionization detectors(s)
QAPjP	Quality Assurance Project Plan
QA/QC	Quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
RWMC	Radioactive Waste Management Complex
SAP	Sampling and Analysis Plan
SLP	Sewage Leach Pond
SOP	Standard operating procedure
STA	Sewage Treatment Area
STP	Sewage Treatment Plant
TCLP	Toxicity Characteristic Leaching Procedure
TRA	Test Reactor Area
WAG	Waste Area Group
WWP	TRA Warm Waste Pond
ZHE	Zero headspace extraction

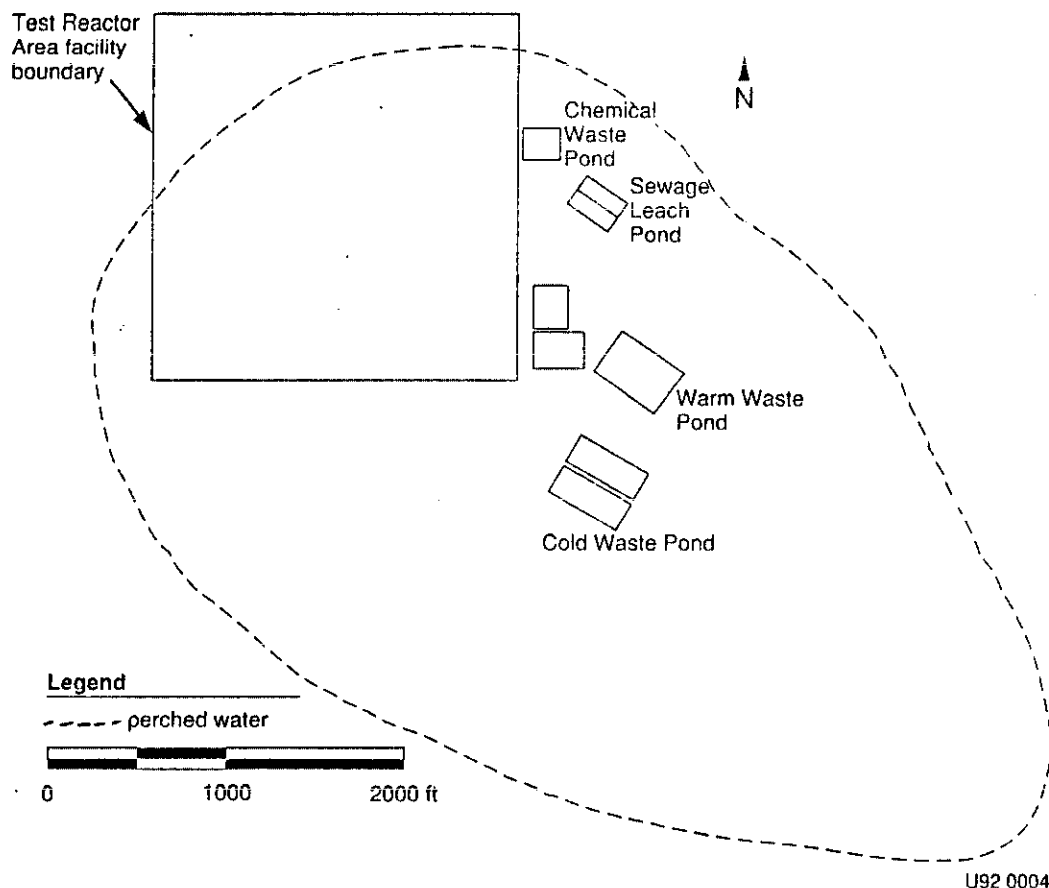
# **FIELD SAMPLING PLAN FOR OU 2-09 TRACK 2 INVESTIGATION**

## **1. INTRODUCTION**

The Waste Area Group 2 (WAG 2) Unit of the EG&G Idaho, Inc., Environmental Restoration Department (ERD) is undertaking an environmental site characterization investigation of a wastewater disposal site. This investigation will be used to reach a decision for no further action, interim action, or proceed to a Remedial Investigation/Feasibility Study (RI/FS) for the site in accordance with the Idaho National Engineering Laboratory (INEL) Federal Facility Agreement and Consent Order (FFA/CO) of December 4, 1991.<sup>1</sup> Activities specified in this Field Sampling Plan (FSP) will meet the objectives of a Track 2 investigation under the FFA/CO. Data collected by this effort will assess the existence of a contaminant source, and to a lesser extent, determine if any releases have occurred to the subsurface soils. The purpose of this FSP is to provide guidance to field personnel for collecting the specified samples while meeting the project Data Quality Objectives (DQOs). This plan shall be used in conjunction with *Quality Assurance Project Plan for Track 2 Investigations and Remedial Investigations for Waste Area Group 2 Operable Units*.<sup>2</sup> Together, these documents make up the Sampling and Analysis Plan (SAP). Sampling activities described by this FSP are expected to begin in June 1992 and last approximately 1 week.

### **1.1 Site Background**

Operable Unit (OU) 2-09 encompasses the Test Reactor Area (TRA) Sewage Treatment Plant and Sludge Pit (TRA-07), the Final Sewage Leach Pond (TRA-13), and the Cold Waste Disposal Pond (TRA-08) at the INEL. For simplicity and organization, the OU will be broken down into two sites for sampling: the Cold Waste Disposal Pond (CWP) and the Sewage Treatment Plant (STP), Sludge Pit, and the Final Sewage Leach Pond (SLP), which are referred to collectively as the Sewage Treatment Area (STA). Figure 1 indicates the SLP, CWP with respect to other disposal ponds, and the perched water at TRA. These ponds have served as a source of water to the perched water, which is being evaluated in another OU.

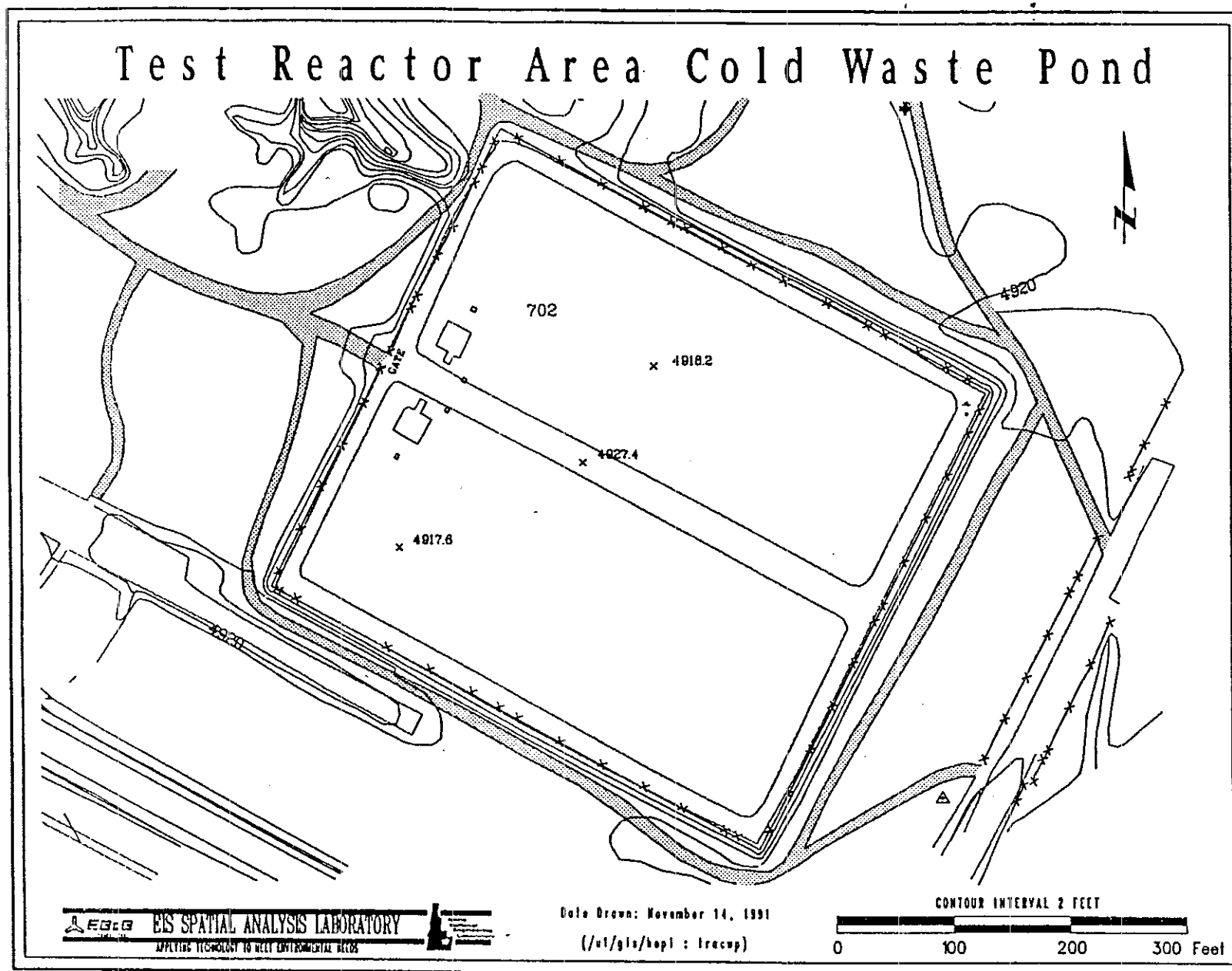


**Figure 1.** Relationship between the various TRA wastewater disposal ponds and the approximate extent of the perched water below TRA.

## 1.2 Cold Waste Pond

The CWP is located about 450 ft to the southeast of the TRA security fence and consists of two cells measuring approximately 440 x 180 x 10 ft each (see Figure 2). The current average discharge rate is about 450 gpm. The pond, which was completed and put into service in 1982, is used for cold waste disposal, primarily from cooling tower blowdown, but also air conditioning units, secondary system drains, floor drains, and other nonradioactive drains throughout TRA. Waste of this type generated before 1982 were discharged to the TRA Disposal Well, Warm Waste Pond (WWP) and well USGS-53. Between 1982 and 1983 less than 0.1 kg of chromium was released to the CWP from the TRA Hydraulic Test Facility.<sup>3</sup> In addition, approximately 370 gal of sulfuric acid were released to the CWP in January 1992.<sup>a</sup> Effluent to the pond has been routinely monitored by the Environmental

<sup>a</sup> EG&G Idaho, Inc., TIPS Incident Report ATR-92-4, January 15, 1992.



**Figure 2.** Configuration of the TRA CWP.

Monitoring Unit since 1986. The nonradiological monitoring program analyzes for various metals, anions, and total organic carbon. A more detailed description of this pond and the disposal history is located in the *Environmental Characterization Report for the Test Reactor Area*.<sup>4</sup>

A few soil samples, collected from the cell bottoms in 1990, were analyzed for the Resource Conservation and Recovery Act (RCRA) Toxic Characteristic Leaching Procedure (TCLP) metals group and gamma-emitting radioisotopes. Barium was the only metal detected from the TCLP test at levels up to 0.66 mg/L, well below the RCRA regulatory limits found in 40 CFR 261.<sup>5</sup> The radioisotopic analysis indicated the presence of <sup>60</sup>Co and <sup>137</sup>Cs slightly above background levels.<sup>a</sup>

### 1.2.1 Cold Waste Pond Conceptual Model

The sampling discussed in Section 1.2 has indicated slight levels of radioisotope contamination on the pond surface. This may be a result of wind blown accumulation from the WWP. Since an extensive system of cold waste lines and drains exist and TRA is an industrial facility, contaminants could exist from other sources. However, this pond has only been in existence for 10 years and effluents have been routinely monitored since 1986 to make sure that unacceptable contaminants are not entering the system. It is, therefore, likely that risk driving levels of contaminants will not exist, assuming reasonable risk scenarios.

The DOE, Environmental Protection Agency (EPA) Region 10, and the Idaho Department of Health and Welfare concluded, based on process knowledge, that there is no reason to suspect that contamination which would require action has occurred.<sup>b</sup> Therefore, the CWP will not be sampled in this investigation. Historical information concerning the CWP will be evaluated in the Track 2 Scoping Summary Report following the logic in the Track 2 guidance document. It is assumed that the evaluation will lead to a no further action determination for the site.

---

<sup>a</sup> L. J. Peterson-Wright correspondence to R. D. Johnson, "Closure of EMS-106-90," LJPW-01-91, January 7, 1991.

<sup>b</sup> Information resulting from meetings and conference calls with DOE, EPA, and Idaho Department of Health and Welfare, March 1992.

### 1.3 Sewage Treatment Plant and Sludge Pit and the Final Sewage Leach Pond

The STA is located 150 ft east of the TRA security fence (see Figure 3) and is comprised of an Imhoff tank, trickling filter, chlorination basin, sludge pit, and leach pond containing two cells into which effluent is discharged. The dimensions of the northern cell, constructed in 1950 (50 cell), are approximately 250 x 50 x 14 ft, and the dimensions of the southern cell, constructed in 1965 (65 cell), are approximately 250 x 80 x 18 ft. Since 1952, the system has been used continuously receiving effluent from sanitary sewer drains throughout TRA at average discharges of 20 to 30 gpm. Effluent to the pond has been routinely monitored by the Environmental Monitoring Unit since 1986. The nonradiological monitoring program analyzes for various metals, anions, and total organic carbon. A more detailed description of the sanitary sewage system, including results of effluent monitoring, is located in the *Environmental Characterization Report for the Test Reactor Area*.<sup>4</sup>

As part of the characterization program conducted during 1990, a borehole (SB-09) was drilled and soil samples collected near the sewage leach pond (see Figure 3) to investigate potential contamination from the SLP. Specific data collected from this borehole are located in the *Environmental Characterization Report for the Test Reactor Area*.<sup>4</sup> In summary, soil samples collected 25 to 47 ft below land surface indicated the possible presence of <sup>90</sup>Sr (beta emitter) and alpha-emitting radioisotopes, and no detectible levels of man-made, gamma-emitting radioisotopes. Results from the analysis of metals at SB-09 showed the presence of metals slightly above background levels, which is common for SLPs.<sup>6</sup> In 1991, during routine operational monitoring, the bottom of the 65 cell of the SLP was sampled for gamma-emitting radioisotopes and surveyed for general radiation fields. Results indicate the presence of gamma-emitting radionuclides in the soil as high as 935 pCi/g and radiation fields as high as 2 mR/hr in the pond. In addition, low levels of gamma-emitting isotopes were found in vegetation within the pond.<sup>a,b</sup> No other sampling of the pond is known to have been completed.

The sludge pit, located 20 ft south of the STP, is sampled so the sludge can be disposed when capacity is reached. Results indicated that the sludge is contaminated with low levels

---

<sup>a</sup> S. T. Laflin correspondence to L. C. Van Deusen, "Radioisotope Sample Results from the TRA Sewage Pond," STL-35-91, July 5, 1991.

<sup>b</sup> R. D. Sayer Office Vision note to H. Salomon, "Steve Laflin's Letter," (STL-35-91), December 6, 1991.

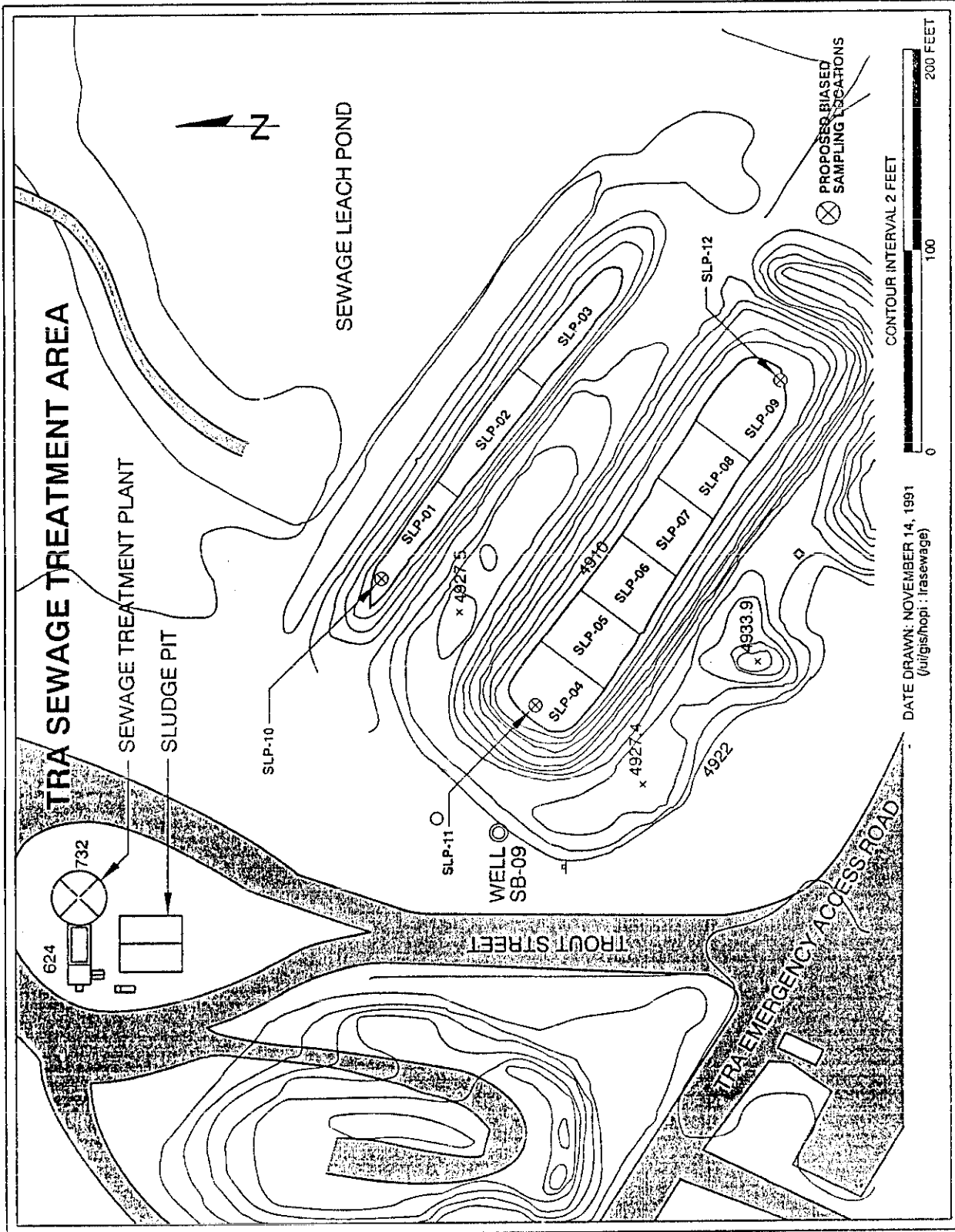


Figure 3. Configuration of the TRA STA with the proposed sampling locations.



of gamma-emitting radionuclides<sup>a</sup> and low gross alpha/beta content.<sup>b</sup> As a result of this contamination, the sludge is sent to the Radioactive Waste Management Complex (RWMC) for disposal. This sludge will not be sampled during this investigation because the sludge pit is concrete lined and the sludge is removed when capacity is reached.

### **1.3.1 Sewage Treatment Area Conceptual Model**

Because the STA has been in operation since the reactors at TRA started operating, and for most of the early years of operation no records were kept indicating whether contaminants, other than sanitary waste, were disposed into the sewer lines, the possibility of contamination cannot be ruled out. As stated above, analysis of sediments from the pond bottoms and soil boring, SB-09, has already indicated the presence of radionuclides. There are two possible sources of the contamination in the pond bottom. First, contamination may have entered the system from sewer lines originating within reactor buildings at TRA. This contamination could have resulted from personnel decontamination in showers that drain to the sewer lines. Second, windblown sediments originating in the WWP 400 ft to the south (see Figure 1) may have been blown into the pond bottoms.

The contamination found at depth in SB-09 could have two possible sources. First, it may have infiltrated from the pond bottoms. Second, it may have migrated with groundwater originating from the warm waste disposal system at TRA. There is also reason to believe that the data may be suspect.

Because surface contamination is present, potential pathways to receptors exist. These pathways may include external exposure, inhalation, and ingestion of soil and groundwater. These pathways will be evaluated for both radionuclides and other contaminants found during this investigation. Actual impacts of the sewage disposal system on groundwater are being evaluated in the OU 2-12 RI/FS (TRA Perched Water).

Because there are no known releases from the STP and the effluent and sludge in the system are transient, it is assumed that the evaluation done on the SLP will be adequate to evaluate risk from the STP. Therefore, no samples will be collected at the STP.

---

<sup>a</sup> T. J. Haney correspondence to J. A. Johnson, "RML Gamma-Ray Analysis of One Solid TRA Drying Bed Sample," TJH-102-91, September 23, 1991.

<sup>b</sup> EG&G Idaho Inc., Radiochemistry Gross Alpha/Beta Screening, Sample I.D. = TRA Drying Beds, Computer File Name: 911002A3, Analysis Date: 9-27-91.

## **2. SAMPLING OBJECTIVES**

This section describes the DQOs that will be pursued by this investigation and includes laboratory/field sample analytical levels and sampling objectives that will be met. For the purposes of this FSP, individual samples will not be considered critical; if data are not collected because of field or laboratory problems, the missing data and how it affects the data quality objectives will be evaluated in the Track 2 Scoping Summary Report. Most of the types of analysis specified by this investigation have been used in previous investigations at TRA. Therefore, analytical results produced by this investigation should be directly comparable to analytical results from previous work (e.g., collection/analysis of TRA background samples).<sup>4</sup> Specific analysis methods are referenced in the Quality Assurance Project Plan (QAPjP) and will be detailed in the laboratory statement of work for the project.

### **2.1 Data Analytical Levels**

All chemical data analyzed by subcontracted labs will meet the requirements of EPA analytical Level III.<sup>7</sup> Standard isotopic determinations for radiological analysis of soil and water samples will also meet the requirements of EPA analytical Level III. Method validation will be performed on this data using ERD Level B criteria in accordance with procedures described in Section 5.2 of the QAPjP.

### **2.2 Sampling and Data Objectives**

The principal sampling objective is to collect and analyze samples of the stated quality level to meet the intended data use requirements. Data collected in the SLP will be used to determine presence or absence of contaminants, risk assessment, and if necessary, evaluation of remedial alternatives and engineering design.

To verify the presence or absence of contaminants, soil samples will be analyzed for a wide range of compounds [Contract Laboratory Program (CLP) volatile and semivolatile organics, pesticides/polychlorinated biphenyls (PCBs), inorganics, and radionuclides (gamma spectroscopy, alpha, and beta isotopic determinations)]. Groundwater samples will be analyzed for purgeable organic compounds using EPA Method 524.2 because detection levels are lower than the CLP volatile organic method. In addition, anions will be analyzed for in the groundwater samples from SB-09 as an indication of whether water in the well

originated in the SLP. TCLP analysis will be performed on some samples from the SLP for RCRA hazardous waste determination and development of disposal options for waste produced by this investigation.

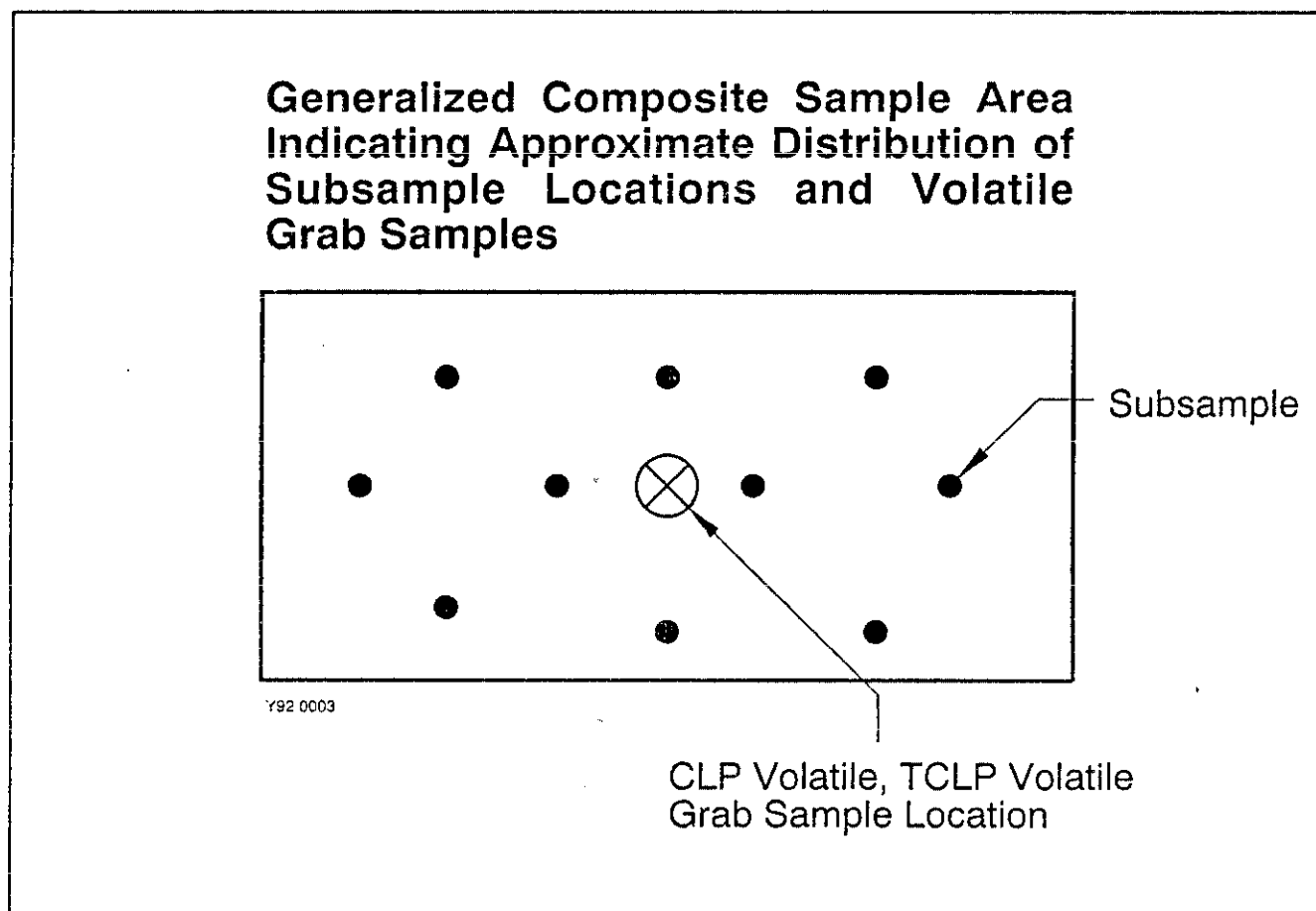
### **2.2.1 Sewage Leach Pond Sampling Objectives**

The primary sampling strategy for the SLP is designed to provide representative mean concentration estimates of surface contaminants for risk analysis. Because risk analysis is based on mean concentrations, the majority of samples collected from the pond bottoms will be composite soil samples. The composite samples will be created from 10 subsamples, collected systematically across the area the composite is to represent, and then homogenized. The number of samples, including subsamples, were selected to meet precision requirements in the estimates of variation described in Sections 2.1.5 and 8.1 of the corresponding QAPjP. Since the SLP has been in operation since the 1950s there is uncertainty about possible contaminants being released. Therefore, sampling will cover a wide range of contaminants.

Samples collected for analysis of radionuclides and CLP inorganics, semivolatiles, and pesticides/PCBs will be collected as composites down to a depth of 4 in. to best represent actual surface concentrations for risk assessment calculations.<sup>8</sup> CLP volatile organic samples will be collected from grid areas as grab samples where organic field screening instruments indicate organic levels above background, if possible. If organics are not detected above background levels, the center of the composite area will be used to collect the volatile grab sample. The top 6 in. of pond soil above the volatile grab sample location will be removed before collection so that surface volatilization effects caused as a result of surface heating can be minimized. The FTL is responsible for identifying the approximate location of subsamples and the volatile grab samples (if field screening is not successful) as shown in Figure 4.

The secondary purpose of the SLP sampling is to provide initial information for possible later phases of the project. This would include a strategically located grab sample (not composite) used to identify the highest radiation levels and samples collected to show contaminant distributions with depth and analysis of groundwater that helps to identify specific release mechanisms from the unit.

The strategically located surface grab sample will be collected at the SLP to identify the highest contaminant concentrations based on gamma-emitting radiation fields. During the



**Figure 4.** Generalized composite sample area indicating approximate distribution of subsample locations and volatile grab samples.

routine operational monitoring conducted in 1991, radiation fields were detected as high as 2 mR/hr in the bottom of the 65 cell of the SLP. Because of this suspected contamination and ease of detection at radiation levels above background, one sample will be collected where portable radiation field instruments indicate the highest radiation fields. This sample could come from either cell but is expected to come from the 65 cell where the previous operational monitoring picked up the highest fields (southeast corner).

As an indicator of the presence or absence of contaminants at depth, two shallow soil borings will be drilled and samples taken. The soil borings will be located near the inlets to each pond cell where contamination by infiltrating wastewater is most likely located. Samples will be homogenized from composites integrated over 2-ft depth intervals. These intervals will include 0 to 2 ft, 2 to 4 ft, and 4 to 6 ft below the surface. These homogenized samples will be analyzed for CLP inorganics, semivolatile organics, pesticides/PCBs, and radioisotopes. CLP volatile organic samples will be collected as grab samples from the middle of each interval to avoid volatilization. Groundwater samples from well SB-09 have never been taken, so samples will be collected (if sufficient water is available); this may help define specific release mechanisms from the unit. The samples will be analyzed for radionuclides, CLP inorganics, purgeable organic compounds using EPA Method 524.2, and CLP semivolatiles, pesticides/PCBs, and anions. The CLP inorganics sample will be filtered to simulate the dissolved inorganic constituents and allow for comparison with previous sampling results obtained from similar wells at TRA. The anion sample is collected so that nitrates, which are often associated with sanitary sewage systems, can be compared to values obtained from other TRA wells. In addition, the results of the sample will be compared to routine effluent monitoring results so the contributing source of water to SB-09 can be indicated. This may help identify whether radionuclides found in soil samples obtained from SB-09 have come from the SLP.

### **3. SAMPLE LOCATION AND FREQUENCY**

When used in conjunction, the proposed sampling locations (see Figure 3), Table 1, SAP Table for Chemical and Radiological Analysis, and Table 2, Summary of Sampling Collection, Holding Time, and Preservation, give the sample frequency, locations, numbering scheme, and various analysis and bottle types that have been determined for use in this investigation.

Liquid effluents are continuously being discharged to the SLP. However, the pond contains two cells, and effluents are only discharged to one at a time. If necessary, the FTL will work with facility operations personnel to redirect discharges into the cell, which is not being sampled, in order to facilitate sampling.

#### **3.1 Sewage Treatment Area Sampling**

Nine composite samples will be collected from the bottom of the SLP, six from the larger 65 cell, and three from the smaller 50 cell (see Figure 3). Composite surface soil/sludge samples will be created from 10 subsamples that are collected systematically across the area the composite is to represent (see Figure 4). These composite samples will be collected as surface samples to a depth of 4 in. to best represent actual surface concentrations. Each composite sample will represent approximately the same area for each cell and will be analyzed for radionuclides and CLP inorganics. These samples will be located in grids SLP-01 to SLP-09 (see Figure 3).

Three samples will be analyzed for CLP volatile and semivolatile organics and pesticides/PCBs in each cell of the SLP. Each grid area in the 50 cell will be sampled for these constituents and alternating grids from three of the six grid areas in the 65 cell will be sampled (SLP-04, 06, and 08). CLP semivolatiles and pesticides/PCBs will be collected and composited from these grids with the CLP inorganics and radionuclides discussed previously. However, the CLP volatile samples will be collected differently. Photoionization detectors (PIDs) will be used to indicate the presence of volatile organic compounds, if possible. A CLP volatile grab sample will be collected where the PID indicates the highest organic levels. If the PID does not indicate organic contaminant levels above background, the center of the composite area will be used to collect the volatile grab sample. In either case, the top 6 in. of pond soil above the volatile grab sample location will be removed before collection so that surface volatilization effects can be minimized.

**Table 1. SAP table for chemical and radiological analysis.**

SAP Number: EGG-WM-10067

SAP Table No. 1

Date: 05/06/92

Revision: 6.0

SAMPLING AND ANALYSIS PLAN TABLE FOR CHEMICAL AND RADIOLOGICAL ANALYSIS

Project: TRA DU 2-09 TRACK II INVESTIGATION

Project Manager: NOPJ SALOMON

Page 1 of 2

Form No: SAP11B

SAMPLE DESCRIPTION						SAMPLE LOCATION				ENTER ANALYSIS TYPES (AT) AND QUANTITY REQUESTED																			
SAMPLING ACTIVITY	SAMPLE TYPE	MEDIA	COLL TYPE	SAMPLING METHOD	PLANNED DATE	AREA	LOCATION	TYPE OF LOCATION	DEPTH (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										RB	CI	CV	CS	TV	TC	AN	DV												
2SL010	REG	SOIL	COMB		05/01/92	TRA	SLP-01	SLP-50 CELL	SURFACE	1	1	1	1	1	1														
2SL020	REG	SOIL	COMB		05/01/92	TRA	SLP-02	SLP-50 CELL	SURFACE	1	1	1	1																
2SL030	REG	SOIL	COMB		05/01/92	TRA	SLP-03	SLP-50 CELL	SURFACE	1	1	1	1																
2SL040	REG	SOIL	COMB		05/01/92	TRA	SLP-04	SLP-65 CELL	SURFACE	1	1	1	1																
2SL050	REG	SOIL	COMP		05/01/92	TRA	SLP-05	SLP-65 CELL	SURFACE	1	1																		
2SL060	REG	SOIL	COMB		05/01/92	TRA	SLP-06	SLP-65 CELL	SURFACE	1	1	1	1																
2SL070	REG	SOIL	COMP		05/01/92	TRA	SLP-07	SLP-65 CELL	SURFACE	1	1																		
2SL080	REG	SOIL	COMB		05/01/92	TRA	SLP-08	SLP-65 CELL	SURFACE	1	1	1	1																
2SL090	REG	SOIL	COMB		05/01/92	TRA	SLP-09	SLP-65 CELL	SURFACE	1	1			1	1														
2SL102	REG	SOIL	COMB		05/01/92	TRA	SLP-10	SLP-50 CELL	0-2'	1	1	1	1																
2SL104	REG	SOIL	COMB		05/01/92	TRA	SLP-10	SLP-50 CELL	2-4'	1	1	1	1																
2SL106	REG	SOIL	COMB		05/01/92	TRA	SLP-10	SLP-50 CELL	4-6'	1	1	1	1																
2SL112	REG	SOIL	COMB		05/01/92	TRA	SLP-11	SLP-65 CELL	0-2'	1	1	1	1																
2SL114	REG	SOIL	COMB		05/01/92	TRA	SLP-11	SLP-65 CELL	2-4'	1	1	1	1																
2SL116	REG	SOIL	COMB		05/01/92	TRA	SLP-11	SLP-65 CELL	4-6'	1	1	1	1																

Enter the appropriate analysis type code in the boxes between the double lines under "ENTER ANALYSIS TYPES". Refer to SAP Table 2, Sampling And Analysis Plan Table - Codes & Descriptions.

Enter the number of bottles in the single line boxes below the analysis type for each sampling activity.

Any descriptions for non-standard analysis types (not given in SAP Table 2) should be entered under "COMMENTS" on the lines below.

COMMENTS

AT1: Gamma Spectroscopy/Radiochemistry  
 AT2: CLP Metals  
 AT3: CLP Volatiles  
 AT4: CLP SemiVol, Pesticides/PCBs  
 AT5: TCLP Volatiles  
 AT6: TCLP Metals/Semis/Pests/Herbs  
 AT7: Anions  
 AT8: Drinking Water VOAs (524.2)  
 AT9:  
 AT10:

AT11:  
 AT12:  
 AT13:  
 AT14:  
 AT15:  
 AT16:  
 AT17:  
 AT18:  
 AT19:  
 AT20:

D/S = DUPLICATE samples (for VOAs) or SPLIT samples (for remaining analyses)

COMB = Combination of COMPOSITE and GRAB samples. All soil samples will be collected as COMPOSITE samples except for CLP and TCLP Volatile samples, which will be collected as GRAB samples taken from the center of each composite area, middle of berm, or middle of the split spoon return.

Table 1. (continued).

SAP Number: EGG-WM-10067  
SAP Table No. 1  
Date: 05/06/92                      Revisions: 6.0

Revision: 6.0

SAMPLING AND ANALYSIS PLAN TABLE FOR CHEMICAL AND RADIOLOGICAL ANALYSIS

Project: TRA OU 2-09 TRACK 11 INVESTIGATION

Project Manager: HOPI SALOMON

Form No. SAP11B

[illegible]

Enter the appropriate analysis type code in the boxes between the double lines under "ENTER ANALYSIS TYPES". Refer to SAP Table 2, Sampling And Analysis Plan Table - Codes & Descriptions. Enter the number of bottles in the single line boxes below the analysis type for each sampling activity. Any descriptions for non-standard analysis types (not given in SAP Table 2) should be entered under "COMMENTS" on the lines below. COMMENTS:

## CONTENTS

AT1: Gamma Spectroscopy/Radiochemistry\_\_\_\_\_

AT2: CLP Metals\_\_\_\_\_

AT3: CLP Volatiles\_\_\_\_\_

AT4: CLP SemiVol, Pesticides/PCBs\_\_\_\_\_

AT5: TCLP Volatiles\_\_\_\_\_

AT6: TCLP Metals/Semis/Pests/Herbs\_\_\_\_\_

AT7: Anions\_\_\_\_\_

AT8: Drinking Water VORS (524.2)\_\_\_\_\_

AT9: \_\_\_\_\_

AT10: \_\_\_\_\_

AT11: \_\_\_\_\_

AT12: \_\_\_\_\_

AT13: \_\_\_\_\_

AT14: \_\_\_\_\_

AT15: \_\_\_\_\_

AT16: \_\_\_\_\_

AT17: \_\_\_\_\_

AT18: \_\_\_\_\_

AT19: \_\_\_\_\_

AT20: \_\_\_\_\_

D/S = DUPLICATE samples (for VOAs) or SPLIT samples (for remaining analyses)

COMB = Combination of COMPOSITE and GRAB samples. All soil samples will be collected as COMPOSITE samples except for CLP and TCLP Volatile samples which will be collected as GRAB samples taken from the center of each composite area, middle of berm, or middle of the split spoon return.



**Table 2.** Summary of sampling collection, holding time, and preservation requirements.

Analysis	Sample Medium	Volume	Container Type	Holding Time	Preservative
Gamma Spectroscopy-Radiochemistry	Soil	16 oz	Wide Mouth Plastic Jar	Analyze within 1 year.	None
Gamma Spectroscopy-Radiochemistry	Water	540 ml	Plastic	Analyze within 1 year.	HNO <sub>3</sub> to pH<2
CLP Metals	Soil	250 ml	Wide Mouth Glass Jar	Analyze within 6 months, except Hg - analyze within 28 days.	4°C
CLP Metals	Water	1,000 ml	HDPE Bottle	Analyze within 6 months, except Hg - analyze within 28 days.	HNO <sub>3</sub> to pH<2
CLP Volatiles	Soil	125 ml	Wide Mouth Glass Jar	Analyze within 14 days.	4°C
EPA Method 524.2 (Purgeable Organic Compounds)	Water	160 ml	40 ml Glass Vial, teflon lined cap	Analyze within 14 days.	4°C, (add 25 ml ascorbic acid or drops of HCl to pH<2, as necessary)
CLP Semivolatiles, Pesticides/PCBs	Soil	250 ml	Wide Mouth Glass Jar	Extract within 14 days, analyze extracts within 40 days of extraction.	4°C
CLP Semivolatiles, Pesticides/PCBs	Water	1,000 ml	Amber Glass Jugs	Extract within 7 days, analyze extracts within 40 days of extraction.	4°C
Anions	Water	125 ml	HDPE Bottle	Analyze within 48 hours for NO <sub>3</sub> and PO <sub>4</sub> . All others - 28 days.	4°C
TCLP Volatiles	Soil	250 ml	Wide Mouth Glass Jar, teflon lined cap	Extract using zero headspace extraction (ZHE) within 14 days, analyze within 14 days of the ZHE.	4°C
TCLP Metals/Semivolatiles/Pesticides/Herbicides	Soil	2,000 ml	Wide Mouth Glass Jar, teflon lined cap	For semivolatiles, pesticides & herbicides: 1) complete TCLP extraction within 14 days; 2) complete preparative extraction (PE) within 7 days; and 3) complete determinative analysis (DA) within 40 days of the PE. For metals, except Hg: 1) complete TCLP extraction within 6 months; and 2) complete DA within 6 months of TCLP extraction. For Hg: 1) complete TCLP extraction within 28 days; and 2) complete DA within 28 days of TCLP extraction.	4°C

Near the inlet to each cell of the SLP, a boring will be drilled and samples collected over 2-ft intervals to assess the vertical distribution of contaminants. The intervals sampled will include 0 to 2 ft, 2 to 4 ft, and 4 to 6 ft below the surface. A CLP volatile organic sample will be collected in a brass sleeve (to avoid volatilization) or equivalent from the middle of each interval. The remaining sample material will be composited and homogenized from the interval and CLP inorganic, semivolatile organic, pesticide/PCB, and radionuclide samples collected. Surface conditions will be used as criteria for locating these borings. The criteria will be detection by field instruments (radiation detector or organic vapor analyzer) of contaminants above background, or visual identification of a low point near the cells' inlets selected by the FTL as having the highest potential for contamination. These sample locations will be called SLP-10 and SLP-11 (see Figure 3). If the sampling area is covered with an excessive amount of water and the FTL is not able to have facility operations redirect discharge, these locations may change because augering operations would be difficult. However, the location would be kept as close to the inlet area as possible. In the event that sufficient recovery is not achieved to fill the sample containers, additional borings will be made next to the initial boring and samples collected for the missing analytes from the missing horizons.

A strategically located surface grab sample will be collected at the SLP to identify the highest contaminant concentrations based on highest observed gamma-emitting radiation fields. This location is expected to be the southeast corner of the 65 cell where routine operational monitoring conducted in 1991 noted radiation fields above background. Radiation detection equipment is used as a field screen to collect this sample because, based on the limited information available, radionuclides may be the principal contaminants of concern in the SLP. Enough sample material will be collected so that the sample can be composited and split for both CLP inorganic and radionuclide analyses. The sample location will be called SLP-12 (see Figure 3).

A groundwater sample will be collected from SB-09 if sufficient standing water exists. The sample will be analyzed for radionuclides, CLP inorganics and semivolatiles, pesticides/PCBs, purgeable organic compounds using EPA Method 524.2, and anions. The CLP inorganics sample will be filtered to simulate the dissolved inorganic constituents. This well is located approximately 30 ft from the northwest corner of the 65 cell of the SLP.

Two quality control (QC) field duplicates/splits will be collected from soil samples in the SLP and one from the groundwater sample at SB-09 following the requirements in Table 7 of the QAPjP. One of the samples will be collected as a duplicate/split from the surface

soils at composite area SLP-04. The sample will be split for CLP inorganic, semivolatile, pesticide/PCB and radionuclide analysis, and a duplicate (collocated) sample collected for CLP volatile organic analyses. The second sample will be collected as a split from the 0-to 2-ft interval at location SLP-10. This sample will be analyzed by the same methods and for the same analysis as the sample it is to split.

The QC sample from the groundwater in well SB-09 will be collected as a duplicate (collocated) sample. The sample will be analyzed for the same constituents as the sample it is to duplicate.

#### 4. SAMPLE DESIGNATION

A systematic character sample identification code will be used to uniquely identify all samples. The uniqueness of the code is required for maintaining consistency and ensuring no two samples are assigned the same identification code. The sample identification code used in this investigation has been cleared with the Integrated Environmental Data Management System Unit, which is chartered by EG&G Idaho. This is the organization responsible for ensuring unique sample identification.

Table 1 is a useful tool for coding the expected samples. A 10-digit sample identification code will be used. The first number of the code, "2", refers to the WAG. The following two letters refer to the general or type location (SL = Sewage Leach Pond). The next two numbers designate the unique sample location. The following number designates the depth or horizon in which the sample is collected (0 = surface soil, or groundwater sample, and 2 = 0- to 2-ft integrated depth composite, and 4 = 2- to 4-ft integrated depth composite, etc.). The next two numbers refer to a sequential order for a specific type of sample [Quality Assurance/Quality Control (QA/QC)], collected at a location or as an operation (e.g., rinsates and trip and field blanks, etc.). The next two characters refer to a specific analysis and bottle type, which are described in Tables 1 and 2.

An example of the sample identification code is given below:

**2SL11401C1**

					Analysis: CLP metals
					Sequential order: first sample
					Depth/horizon: 2- to 4-ft depth composite
					Unique sample location: SLP-11
					General sample location: Sewage Leach Pond
					Waste Area Group: 2 = TRA

If additional samples are collected in the field, the FTL is responsible for ensuring the identification scheme described in this section is used to identify new samples.

No relationship will exist between the three numbers that designate the unique sample location and QA/QC duplicates collected at the same location. This will ensure that the laboratory cannot correlate duplicate QA/QC samples with their respective regular samples.

## 5. SAMPLING EQUIPMENT AND PROCEDURES

This section lists the equipment and procedures necessary to conduct this sampling program.

### 5.1 Sampling Equipment

A generalized equipment checklist is given below:

#### Decontamination

- ☐ aluminum foil
- ☐ spray bottles
- ☐ SS<sup>a</sup> decontamination pans
- ☐ brushes
- ☐ deionized, organic-free HPLC<sup>b</sup> or ASTM<sup>c</sup> Type II grade water
- ☐ surgical gloves
- ☐ tap water (available)
- ☐ steam cleaner (if necessary)
- ☐ pesticide-grade isopropyl alcohol
- ☐ nonphosphate detergent

#### Sampling

- ☐ logbook(s)
- ☐ SS spoons
- ☐ SS mixing bowls/pans
- ☐ latex gloves
- ☐ marker flags
- ☐ sample labels
- ☐ cellophane tape
- ☐ scissors, knives
- ☐ vermiculite
- ☐ Blue Ice (prefrozen)
- ☐ custody seals
- ☐ COC<sup>f</sup> forms
- ☐ radiation detection equip.
- ☐ bailer/submersible pump
- ☐ radiation swipes
- ☐ WaTerra Inertial Pump/filter
- ☐ sample jars/lids
- ☐ auguring equipment
- ☐ split-spoon samplers
- ☐ brass sleeves with caps
- ☐ shipping forms
- ☐ sample preservation kit including: HNO<sub>3</sub>, HCl, pH indicator paper, filtering device, thermometers
- ☐ coolers

#### General

- ☐ 100-ft tape measure
- ☐ duct tape
- ☐ black waterproof pens
- ☐ Kim wipes/paper towels
- ☐ garbage bags
- ☐ miscellaneous tools
- ☐ plastic sheeting
- ☐ appropriate SOPs<sup>d</sup>, ERD PDs<sup>e</sup>, company procedures

---

<sup>a</sup> SS - stainless steel

<sup>b</sup> HPLC - high-purity liquid chromatography

<sup>c</sup> ASTM - American Society of Testing Materials

<sup>d</sup> SOPs - Standard operating procedures

<sup>e</sup> PDs - Program directives

<sup>f</sup> COC - chain-of-custody

## **5.2 Sampling Procedures**

EG&G Idaho company procedures and ERD control documents such as PDs or ERD SOPs, and ASTM manuals, or EPA guidance documents, which dictate specific procedures for sample collection, sample shipping, etc., will be kept in the field by the FTL. The procedures and their respective issue/revision date will be noted in the appropriate logbook; these procedures are referenced and briefly described below. Other procedures, which are not expected to change, are also referenced and detailed below.

If necessary procedures that better facilitate the collection of samples may be substituted for the procedures identified below. This would be done at the discretion of the project manager and FTL. Any change will be documented in the appropriate logbook including any deviations from procedures.

### **5.2.1 Surface Soil Sampling with a Spade, Spoon, or Scoop**

The simplest, most direct method of collecting soil samples for subsequent analysis is with the use of a spade, spoon, or scoop. A normal lawn or garden spade can be used to remove the top cover of soil to the required depth and then, a smaller stainless steel scoop can be used to collect the sample. This method can be used for most soil types but is limited somewhat to sampling the near surface. Samples from depths greater than 50 cm become extremely labor-intensive in most soil types. Very accurate, representative samples can be collected with this procedure, depending on the care and precision demonstrated by the technician. The use of a flat, pointed mason trowel to cut a block of the desired soil will be of use when undisturbed profiles are required. A stainless steel scoop or lab spoon will suffice in most other applications. This method will be used to collect all surface composite and biased grab samples except samples for volatile analysis.

This method uses the following steps:

- Carefully remove the top layer of soil to the desired sample depth with a precleaned spade (not required for surface samples).
- Using a precleaned, stainless steel scoop or trowel, remove and discard a thin layer of soil from the area that comes in contact with the shovel.

- Collect and transfer the sample into an appropriate compositing container or sample bottle (see Table 2) with a stainless steel lab spoon or equivalent.

### **5.2.2 Subsurface Soil Sampling**

Subsurface soil sampling can be conducted in accordance with ASTM Procedure D 1587-83<sup>9</sup>, a standard practice for thin-walled tube sampling of soils. As described in the procedure, any drilling equipment may be used that provides a reasonably clean hole; does not disturb the soil to be sampled; and does not hinder the penetration of the thin-walled sampler. For this operation, a small, hollow stem auger may be used to gain access to the subsurface. If penetration becomes a problem, requirements outlined in ASTM Procedure D 1586-84<sup>10</sup> for split-barrel sampling may be used to obtain samples. The FTL will specify whether the Giddings drill rig or Little Beaver procedure will be used.

A portable, trailer mounted Giddings drill rig may be used to facilitate the collection of subsurface samples. The manufacturer's procedures and operating hints are listed below.

#### **Operating Hints**

- Be sure that vehicle is well braked. Electric brake locks are worth the price in preventing damage to tubes, augers, and to the machine. Most auto parts store handle them.
- Be sure machine is plumb. A machine off plumb can cause trouble removing tubes and augers from the ground.
- All machines are equipped with one 8-ft Kelly bar that allows probing or drilling to depths of approximately 11 ft. Additional Kelly bars are available in 4, 6, and 8 ft lengths. Kelly bars are connected with flush pins to allow continuous operation through the head.
- Rotary heads are equipped with a wheel type spring pin. The wheel works best if kept lubricated and pressure is released before attempting to turn the wheel.
- There are two types of probing bits: taper and quick relief. The taper bit gradually tapers from lip to back. The quick relief drops off sharply 3/8 in. from the lip. One

bit will work in soils where the other will not. BE SURE TO SPECIFY WHICH TYPE IS DESIRED WHEN ORDERING.

- If oil sprays from the top of the tank, check oil level at once! If oil level is okay, check system for a loose connection. System will draw in air when it will not leak oil.
- DO NOT rotate slotted tubes. Tubes to be rotated do not have slots.
- Be careful not to lift vehicle off ground as it may slide to one side and bend tubes or augers.
- Do not try to cross rough terrain with the mast upright. Damage to the foot and machine may result. It takes very little time to lay down the mast.
- All seals in the machine are standard items. Although they can be obtained from large suppliers, we recommend they be purchased from Giddings Machine to ensure proper fit. The seals used are much longer lived than "O" rings.

### **Swing and Anchor Operation**

- Swing mast to right side and lock. Extend stabilizer foot until machine is stable. Attach anchor to Kelly bar without bolt. Push anchor down and start rotary force anchor in soil but do not allow it to tear up the soil.
- When anchor is entered to maximum depth, raise head and detach anchor. Now swing mast to other side and repeat operation. When anchors are set, move mast to center and lock.
- Now pull out tie down bars No. 18 and attach chains to anchors. Then extend stabilizer foot until chains are snug. Unit is now ready for drill or probe operation.

### **Anchor Extraction Operation**

- Release stabilizer foot, swing mast over anchor, attach extractor to Kelly bar, lower head until extractor fits to anchor, and attach with bolt. Reverse rotary head and



raise to unscrew anchor from soil. Many times one anchor will be ample for the operation.

### **Starting Instructions (see Diagram 1)**

- Fill oil reservoir with 15 weight hydraulic oil (Amoco industrial oil #68 or equivalent). Start engine and run master cylinder up and down to dissipate air in system. Shut off engine and add more oil. System uses 10 to 12 quarts. Also, run rotary to fill with oil. Pull out on laydown control (No. 8) until there is slight movement on laydown cylinder (No. 14). This indicates the cylinder is filled with oil. Then with control No. 8, machine can be laid down and raised to upright position.
- Be sure turnbuckle is snug. With mast in reclining position, run stabilizer foot down and up. Raise mast upright. Machine should then be raised by stabilizer foot until mast is stable. Now run master cylinder to bottom of travel, shut down engine, and check oil level. Oil should be to center of sight gauge. The unit is now ready for probe or drilling operation.

### **Operating Instructions (see Diagram 1)**

- The Giddings Machines are designed to be easily operated by one person. All phases of operation can be handled from the rear of the vehicle.
- Once the sight for the sample has been located, the operator applies the parking brake. (Electric brake locks installed on the front wheels are a good investment.)
- The machine is raised to operating position by pulling out on the yellow laydown control (No. 8). **ROTARY HEAD SHOULD BE IN THE UP POSITION.** [If not, pull out on master cylinder control (No. 7) before attempting to raise mast.] Raise mast until it is fully up; relief will release with a squeal. See that hinge lock is fully engaged (No. 19). Mast should lean about 5 degrees past center; it will become plumb when stabilizer foot is extended. To adjust the angle, recline the mast slightly and turn the turnbuckle (No. 15). Two bolts on hinge (No. 11) are loosened to plumb the machine for right or left tilt of the vehicle. **MAST MUST BE RECENTERED BEFORE MACHINE IS RECLINED.**

1. Master cylinder
2. Mast
3. Guide
4. Spring pin wheel
5. Rotary head
6. Rotary control
7. Master cylinder control
8. Lay down control
9. Stabilizer foot control
10. Swing lock
11. Adjusting hinge
12. Foot cylinder
13. Stabilizer foot
14. Lay down cylinder
15. Turnbuckle
16. Lay down rest
17. Base channel
18. Tie down bars
19. Hinge lock

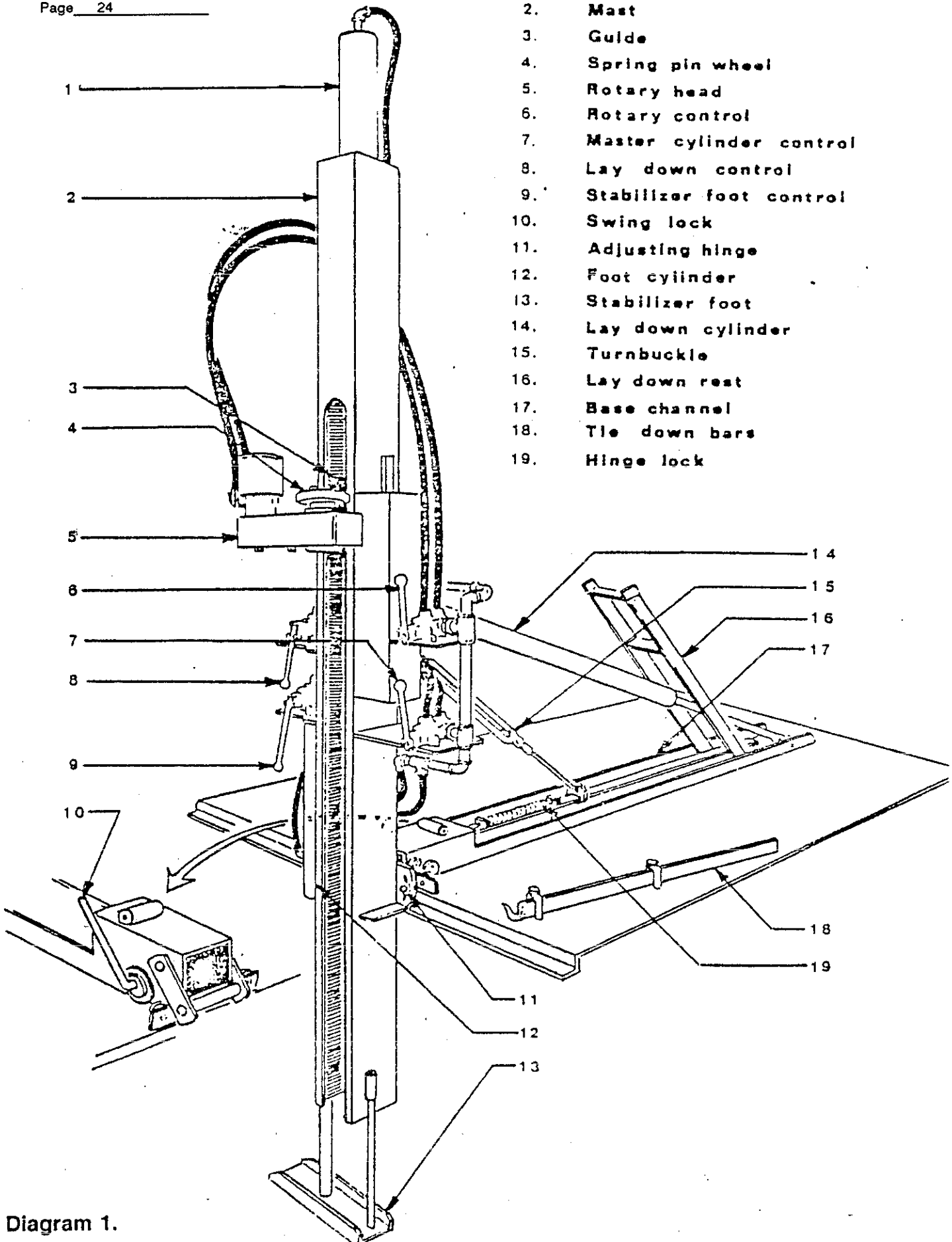


Diagram 1.

- Lower rotary head (No. 5) part way by pushing on master cylinder control (No. 7) so that the inside of the sleeve is visible. Rotate the spring pin wheel (No. 4) manually to locate the spring pin. Place the Kelly bar in the sleeve so the holes line up with the pin.
- If the machine is equipped with a swinging mast and anchors, the anchors should be installed before probing. Anchors will seldom be needed for augering (refer to Swing and Anchor Operation).
- Lower the stabilizer foot (No. 13) by pushing in on foot control (No. 9) until the mast is plumb and vehicle is stable. If anchors are used, the chains will govern how much the vehicle is raised.
- Select the tube or auger to be used and attach it to the Kelly bar with the adapter bolt (3/8 x 1 3/4 in.) provided. The bolt will help extend the life of the tube or auger and prevent the loss of the tool down the hole.
- Kelly bars may be connected with the flush pins (KB-100) to sample to greater depths. The Kelly bars will slide through the rotary head while connected. The foot holder fits around the Kelly bar at ground level to hold the bar while changes are made in the pin location. This becomes necessary when taking a deep sample.
- THE ROTARY HEAD MUST BE IN THE UP POSITION BEFORE RECLINING THE MAST TO ENSURE PROPER OPERATION AND TO PROTECT THE SHAFT FROM RUST.

### **Recommended Maintenance**

- Change oil filter after 250 hours, thereafter each 1000 hours or 12 months.
- Grease rotary head bearings every year.
- Oil rotary head chain every year.
- Grease spring pin wheel every 6 months.

- Check oil level once a month.
- Grease hinge every year.

If it is determined that smaller, easier to operate equipment is practical for the job then that equipment can be substituted for the Giddings without affecting sample integrity. An example of this is the "Little Beaver." The manufacturer's operating instructions are listed below.

### Torque Tube Assembly

- The torque tube consists of two parts. Part 1 is 60 in. long with a 1 1/2-in. square fitting on one end. Part 2 is 29 in. long with a 1 1/4-in. square fitting on one end. To assemble, slide Part 2 into Part 1 so that the square fittings are on opposite ends. Attach the larger end of the torque tube to the engine bracket as shown in Diagram 1. Attach the other end to the handle as shown in Diagram 2. Check the snap buttons to be sure they are snapped into place.

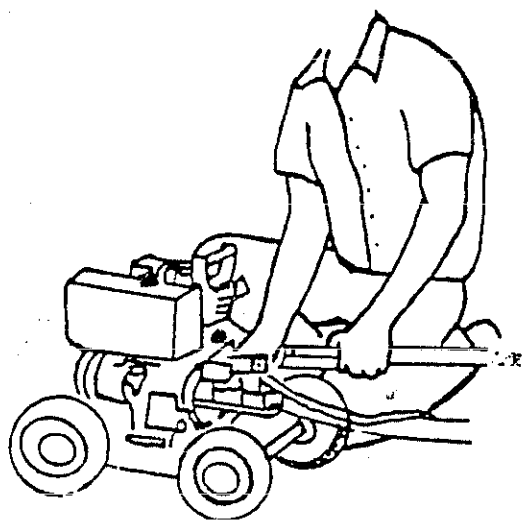


Diagram 1.

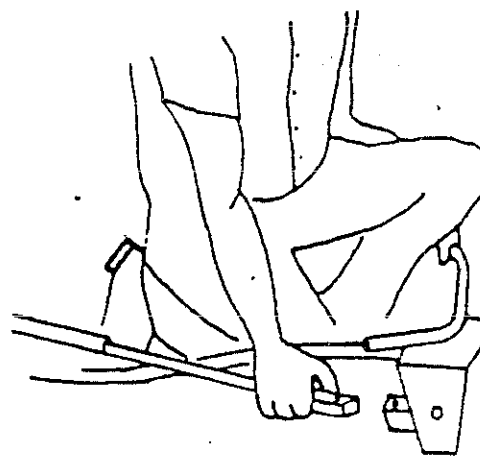


Diagram 2.

## **Maintenance and Lubrication**

- The transmission and flexible shaft are shipped fully greased and ready for use. Engines are shipped without oil or gas (see manufacturer's instructions). All nuts, fasteners, and fittings must be kept tightened. For lubrication schedules on the Little Beaver, see page 10 of the "Operating Instructions" for the flexible shaft and page 13 for the transmission.

## **Starting the Engine**

- Before starting the engine be sure that
  - The torque tube is properly attached.
  - There is no auger attached to the handle.
  - All kill switches are open.
- To start the engine, set the choke lever to the on position and pull the starter rope. The engine should start after 2 or 3 pulls. Set the choke lever to off and allow the engine to warm up for 2 or 3 minutes.

## **Operation**

- After the engine has warmed up, insert the auger into the drive adaptor on the bottom of the handle. Make sure that the bottom snaps into place. Hold the handle so that your left index finger can operate the throttle. Grasp the right handle bar with your right hand. Stand so that the auger is straight up and down and is properly positioned to dig your hole (see Diagram 3). Note the cautions and warnings in the owner's manual and on the handle decals.
- Start the auger turning by pulling the throttle lever in completely. Always allow the auger to turn at full speed and let it cut its way into the soil. In loose sand, apply slight pressure, but not enough to stall the auger or slow it down significantly. The auger works best when it turns at full speed.

- When the desired depth is reached, stop the auger by releasing the throttle lever. Then pull the auger completely out of the hole. DO NOT remove the auger from the hold while it is still turning.

### Check the Cutting Blade

- Check Item A, Diagram 4 on the auger frequently. If it becomes dull, it may be reversed to use the other cutting edge. If the outside of the blade wears even with the auger flighting, replace the blade or rebuild it with a hard surfacing rod. This is very important to reduce auger flighting wear and damage. The point (see Item B, Diagram 4) should be replaced when it loses its cutting shape.

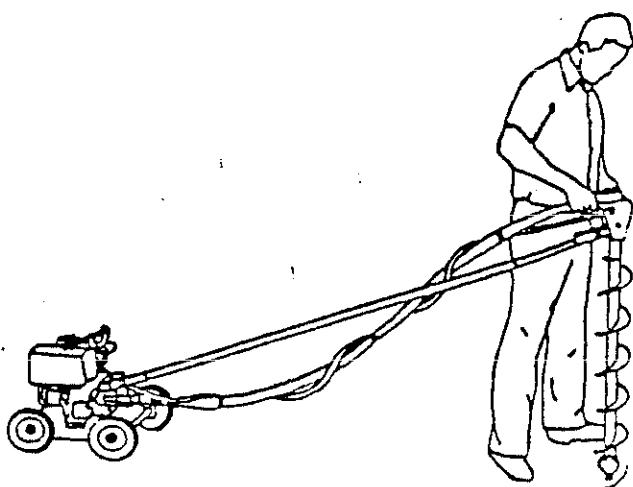


Diagram 3.

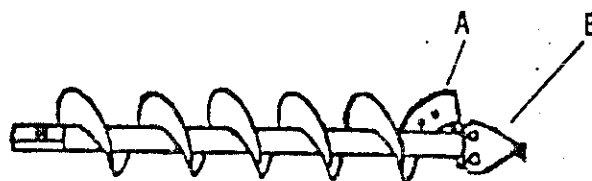


Diagram 4.

### 5.2.3 Compositing/Homogenizing Soil Samples with Mixing Bowls

An effective field compositing method used by the EPA<sup>11</sup> is achieved by using large stainless steel mixing bowls. The bowls can be decontaminated and are able to stand rough handling in the field. Subsamples are placed in the bowls, broken up, and then mixed using a stainless steel scoop or spoon. The rounded bottom of the mixing bowl was designed to create a mixing action when the material in it is turned with the scoop. Careful observance of the soil will indicate the completeness of the mixing. This method will be used for compositing and homogenizing all nonvolatile soil samples.

This method uses the following steps:

- Spread soil evenly in the bottom of the bowl after mixing is complete.
- Quarter the soil and take a small sample from each quarter.
- These subsamples are mixed together in a separate bowl and samples are taken and placed in respective bottles (see Table 2) for shipment to the analytical laboratory.

#### **5.2.4 Sampling and Filtering Perched Water**

Before sampling three well volumes of water or complete purging of standing water in well SB-09 will take place. This will be conducted in accordance with ERD SOP TGI-SOP 6.1.3, "Well Purging with a Submersible Pump".<sup>a</sup> This purgewater will then be placed in the 65 cell of the SLP.

Well SB-09 will be sampled using a WaTerra Inertial Pump using the procedures outlined in ERD SOP TRA-SOP 7.1.1.<sup>b</sup> Samples collected for CLP inorganic analysis will be filtered using a WaTerra model FHT-700 disposable in-line filter or equivalent attached to the end of the WaTerra riser tubing. The model FHT-700 has a filtration area of 700 cm<sup>2</sup> and consists of 0.45  $\mu$ m acrylic copolymer pleated membranes housed in a polyethylene capsule. The sample will be grabbed from the end of this filter, or in the case of nonfiltered water, from the end of the riser tubing.

#### **5.2.5 Equipment Decontamination**

Sampling equipment decontamination will be conducted in accordance with ERD SOP TGI-6.1.14<sup>c</sup>; however, two deviations are noted. HPLC water may be used in lieu of ASTM Type II water for rinsing equipment and as a rinsate sample material. Pesticide-grade

---

<sup>a</sup> EG&G Idaho, Inc., "Well Purging with a Submersible Pump," Environmental Restoration Program, TGI-SOP-6.1.3, Rev. 1.

<sup>b</sup> EG&G Idaho, Inc., "Purging Groundwater with a WaTerra Inertial Pump," Environmental Restoration Program, TRA-SOP-7.1.1.

<sup>c</sup> EG&G Idaho, Inc., "Decontamination of Sampling Equipment," Environmental Restoration Program, TGI-SOP-6.1.14, Rev. 1.

isopropyl alcohol will be used in lieu of pesticide-grade methanol in the rinsing process. Used or spent methanol employed in this manner may create a RCRA-listed (F003) hazardous waste.<sup>12</sup> By substituting isopropyl alcohol, a RCRA-listed hazardous waste has no chance of being created. Additionally, if either of the following two conditions are met, the spent isopropyl alcohol will not be a RCRA-characteristic hazardous waste: (1) the spent isopropyl alcohol evaporates immediately in the collection container (which is expected because of the small amount used) or (2) is mixed with the HPLC or ASTM Type II water as part of the decontamination process forming an aqueous solution and the resulting mixture is less than 50% alcohol by weight.<sup>13</sup>



## **6. SAMPLE HANDLING AND ANALYSIS**

Table 2 identifies sample preservation methods, types of sampling jars, and holding times. All containers will be precleaned and obtained from an EPA-approved supplier for Superfund sites. Extra containers will be available in the event of breakage, contamination, or if additional samples are collected. Sample containers will be marked with a waterproof, gummed label with the name of the project, sample identification number, and analysis to be performed.

After all the samples containers have been filled, any remaining sample material will be returned to the site in the general area in which it was collected.

### **6.1 Sample Preservation Methods**

Sample preservation will be performed immediately upon sample collection following the recommendations given in Table 2. The sampling team will be equipped with a field preservation kit, which will include nitric acid, hydrochloric acid, pH indicator paper, a filtering device, and thermometers. Water samples being analyzed for metals will be filtered during collection to prevent preservatives from solubilizing metals from sediments.

Coolers and prefrozen Blue Ice will be used to chill samples during packaging, storage, and shipment. Thermometers will be placed in the coolers used to transport samples from the field to the shipping area. The cooler temperature will be checked periodically and recorded in the sample logbook.

### **6.2 Field Documentation**

The FTL is responsible for the control and maintenance of all field documents and records and ensuring that all required documents are submitted to the ARDC.

Current revisions of ERD control documents, such as PDs or ERD SOPs, which dictate specific procedures for sample collection, record keeping, etc., will be kept by the FTL. The PD or SOP and the respective issue/revision date will be noted in the sample logbook.

The COC procedures detailed in ERD PD 5.7, "Chain-of-Custody Record," will be followed.

The FTL is responsible for ensuring all field logbooks are available to record site investigation activities. The use of logbooks will be in accordance with ERD PD 4.2, "Logbooks." All entries will be made in indelible black ink. Any error will be corrected by drawing a single line through the error and entering the correct information. All corrections will be initialed and dated.

### **6.3 Shipping Requirements**

All potentially hazardous material, including samples, will be shipped in accordance with EG&G Idaho Company Procedure 14.1, "Onsite Transportation of Hazardous Material." This procedure covers requirements of both on and offsite shipments of hazardous materials. These requirements are in accordance with the regulations issued by the Department of Transportation (49 CFR parts 171 through 173 and parts 175 through 178). The specific shipping procedures for this project can be found in the Section 3.3 of the QAPjP.

## 7. WASTE MANAGEMENT

The FTL is responsible for minimizing waste produced in the field. No RCRA hazardous waste is expected to be encountered or generated by field activities; however, solid and radioactive waste is expected to be generated. When working in radioactively contaminated areas such as the SLP, the FTL, in conjunction with the health physics technicians, will segregate the radioactive and solid waste. The FTL is responsible for tracking the quantity and type of waste generated by site for future WAG 2 reporting to the INEL Waste Minimization/Pollution Prevention Unit. Information required for reporting includes quantities of waste produced, waste minimization techniques employed and quantities of waste minimized, and quantities of waste disposed and the corresponding disposal sites (e.g., the Central Facilities Area Landfill, RWMC, or Waste Experimental Reduction Facility).

Disposal of unaltered soil and water samples returned from the analytical laboratory will be returned to the point of origin (sampling area), sent to the appropriate onsite disposal facility, or archived for future use. However, radioactive laboratory waste, including altered sample material, will be managed by the WAG 2 waste minimization coordinator and is beyond the scope of this plan.

## 8. REFERENCES

1. *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory*, State of Idaho, Department of Health and Welfare; U.S. Environmental Protection Agency; and U.S. Department of Energy Field Office, Idaho, December 1991.
2. S. C. Flynn and A. R. Baumer II, *Quality Assurance Project Plan for Track 2 Investigations and Remedial Investigations for Waste Area Group 2 Operable Units*, EGG-WM-10076, EG&G Idaho, Inc., 1992.
3. EG&G Idaho, Inc., *Installation Assessment Report for EG&G Idaho, Inc., Operations at the Idaho National Engineering Laboratory*, EGG-WM-6875, January 1986.
4. M. H. Doornbos, et al, *Environmental Characterization Report for the Test Reactor Area*, Rev. 0, EG&G Idaho, Inc., EGG-WM-9690, September 1991.
5. Code of Federal Regulations, 40 CFR 261.24, "Toxicity Characteristic," Office of the Federal Register, July 1991.
6. R. D. Kuchenrither and S. I. McMillan, "Preview Analysis of National Sludge Survey," *BioCycle*, 31, 7, July 1990.
7. Environmental Protection Agency, *Data Quality Objectives for Remedial Response Activities: Development Process*, EPA/540/G-87/003, March 1987.
8. Environmental Protection Agency, *Health Effects Assessment Summary Tables: Annual FY-1991*, NTIS/PB91-921199, January 1991.
9. ASTM D 1587-83, "Standard Practice for Thin-Walled Tube Sampling of Soils," American Society for Testing and Materials.
10. ASTM D 1586-84, "Standard Method for Penetration Test and Split-Barrel Sampling of Soils," American Society for Testing and Materials.
11. Environmental Protection Agency, *Preparation of Soil Sampling Protocol: Techniques and Strategies*, EPA-600/4-83-020, May 1983.
12. Code of Federal Regulations, 40 CFR 261.31, "Hazardous wastes from non-specific sources," Office of the Federal Register," July 1991.

13. Environmental Protection Agency, *Clarification of the Definition of the Characteristic of Ignitability for Hazardous Wastes*, OSWER Directive No. 9443.02(85), February 26, 1985.