4. SAMPLING LOCATION AND FREQUENCY

The material presented in this section is intended to support the DQOs summarized in Section 3.

4.1 Quality Assurance/Quality Control Samples

The QA samples will be included to satisfy the QA requirements for the field operations per the QAPjP (DOE-ID 2000a). The duplicate, blank, and calibration quality assurance/quality control (QA/QC) samples will be analyzed, as outlined in Section 3.

4.2 Sampling Frequency

Samples will be collected representing 30-cm (1-ft) intervals with the final sample collected at the depth representing the bottom of the core sample.

As an example, the basalt underlying Zone 3 may be 1.83 m (6 ft) deep. Four cores will be collected within the zone and samples of each core collected from 0 to 30 cm (0 to 1 ft), 30 to 61 cm (1 to 2 ft), 61 to 91 cm (2 to 3 ft), 91 cm to 1.22 m (3 to 4 ft), 1.22 to 1.52 m (4 to 5 ft), and 1.52 to 1.83 m (5 to 6 ft). The 0 to 30-cm (0 to 1-ft) samples of each core will be composited to provide one analytical sample to be submitted to the laboratory, as will the samples from each of the other depth intervals.

A seismic refraction survey of the CFA-04 pond area was performed to determine the depth to rock. An estimated 1,280 m (4,200 ft) of seismic refraction profile data were acquired along profiles spaced 30 m (100 ft) apart with depth determinations made at a 2-m (6.56-ft) spacing along the total profile length. From these profile data, a depth-to-rock contour map was generated (see Figure 4-1). From this map, the depth to rock can be estimated for a given core sampling location, thereby enabling the sampling team to calculate the number of subsamples to be expected from a given location given the intervals prescribed above.

It is realized that the depths of each of the four cores within a given zone will vary. Only the cores that reach a given depth interval will be used to form the composite analytical sample for that interval. For example, if two cores reach a depth of 2.44 m (8 ft), these two cores will be used to create the composite sample for that depth.

4.3 Sampling Locations

For sampling purposes, the CFA-04 pond area has been subdivided into 15 zones (see Figure 4-3). The zones were defined based upon the source of contamination and similarity of mercury concentrations. For all the zones within the pond area, the sources of contamination are assumed to be waste calcine disposed to the pond, as well as mercury-containing waste water that was pumped to the pond and allowed to percolate down through the pond sediments. Zone 11 also includes asbestos-containing roofing materials that pose a potential hazard to sampling team members. Extra precautions should be taken when sampling in these areas in accordance with the HASP (INEEL 2002). The predominant source of contamination in Zone 1 is believed to be a result of the mercury retort activities that took place in the mid-1990s. The contamination in Zone 2 is attributed to windblown spread of mercury-containing pond sediments.

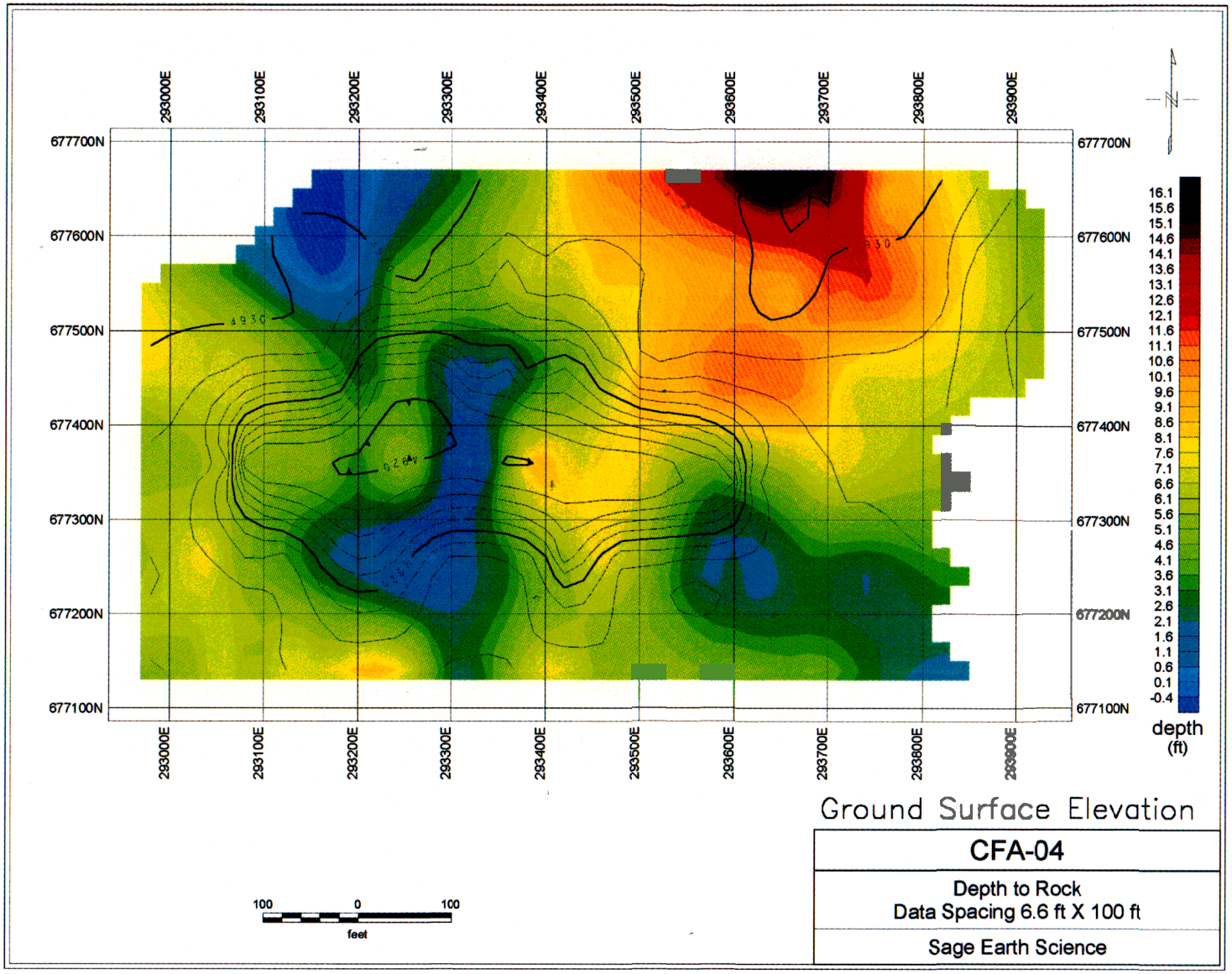

Figure 4-1. CFA-04 ground surface elevations—depth to rock.

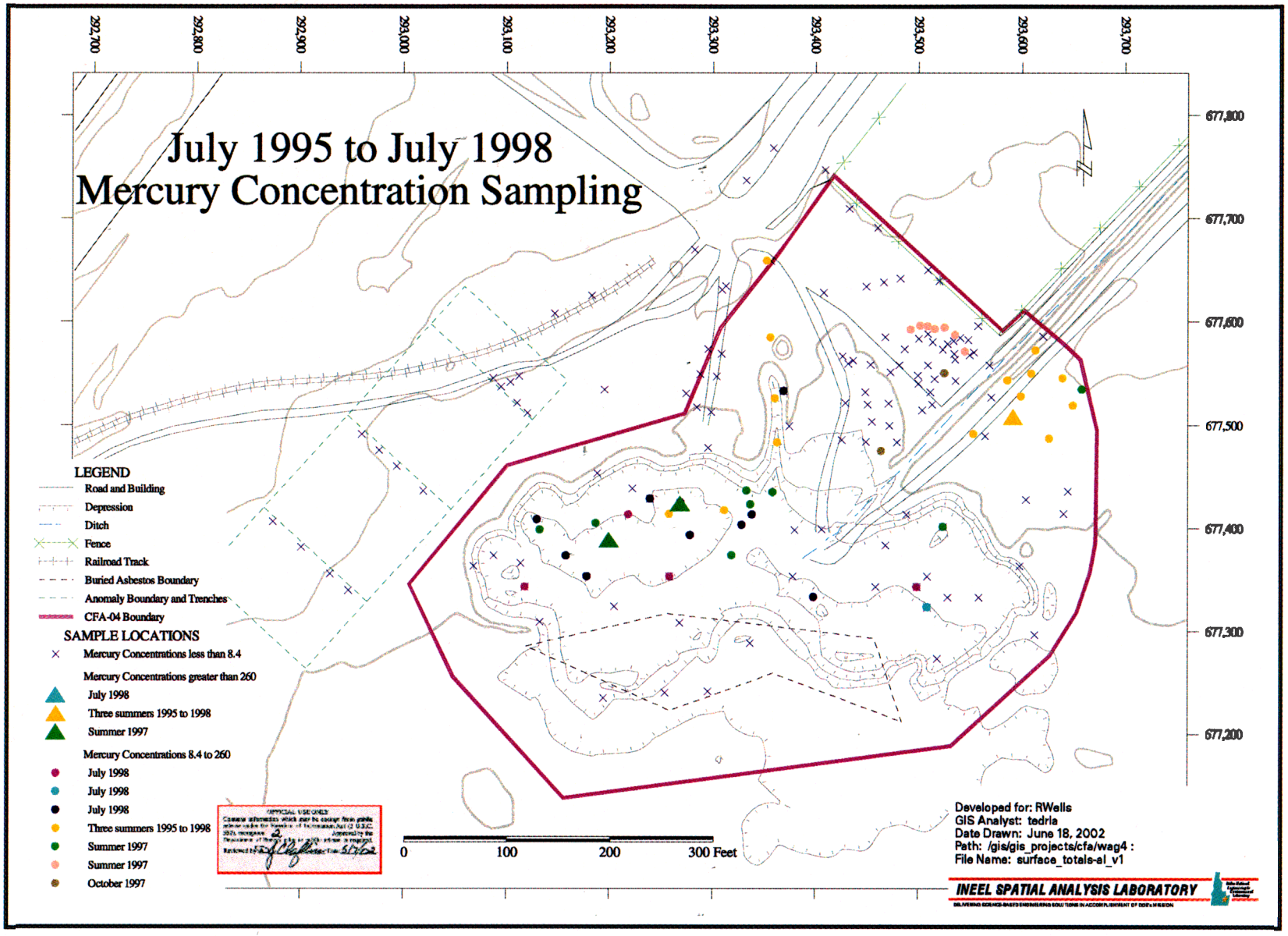

Figure 4-2. Historical mercury concentrations.

The highest mercury concentrations are believed to exist in Zones 7 and 8 based upon historical data. Zone 6 has the potential to have somewhat higher mercury concentrations than the remainder of the pond locations, with Zones 10 and 14 having the lowest mercury concentrations. Likewise, the mercury concentrations in Zone 11 are expected to be relatively low, but as stated earlier, the presence of asbestos poses the greater health risk in this area of the pond.

Figure 4-2 provides the locations where samples have previously been collected. The locations are segregated by those with concentrations below the final remediation goal of 8.4 mg/kg total mercury, those with concentrations ranging from 8.4 to 260 mg/kg, and locations with concentrations greater than 260 mg/kg. Figure 4-3 graphically delineates the sampling zones and the four proposed core locations within each zone. The zones were derived based upon the total mercury concentrations obtained from the historical sampling events. The coordinates will be based on the State Plane, Idaho East, Units Feet, North American Datum-27 system.

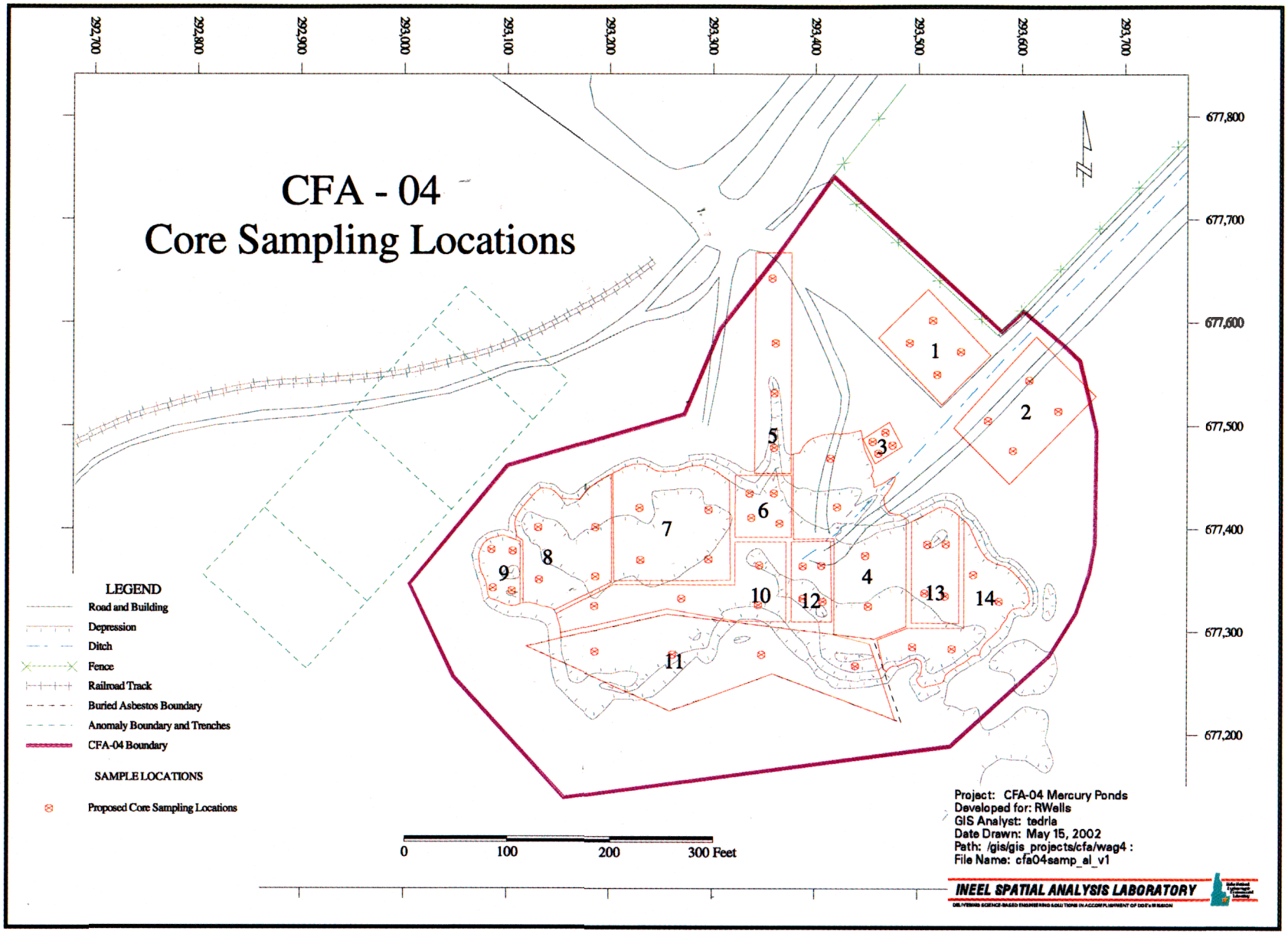

Figure 4-3. CFA-04 sampling locations.

5. SAMPLING DESIGNATION

5.1 Sample Identification Code

A systematic character identification (ID) code will be used to uniquely identify all laboratory samples. Uniqueness is required for maintaining consistency and preventing the same ID code from being assigned to more than one sample.

The first three designators of the code will always be **4**, **P**, and **4**. The first **4** refers to the sample as originating from WAG 4. The **P** refers to the sample being collected in support of the pre-remediation sampling effort. The next **4** refers to the sample being collected from CFA-04. The next three numbers designate the sequential sample number for the project. A two-character set (i.e., 01, 02) will then be used to designate field duplicate samples. The last two characters refer to a particular analysis and bottle type. Refer to the SAP tables in Appendix B for specific bottle code designations.

For example, a soil sample collected in support of determining the metals concentration of a target analyte list might be designated as 4P400101HG where (from left to right):

- **4** designates the sample as originating from WAG 4
- **P** designates the sample as being collected in support of the pre-remediation sampling effort
- **4** designates the sample as being collected from CFA-04
- **001** designates the sequential sample number
- **01** designates the type of sample (01 = original, 02 = field duplicate)
- **HG** designates mercury analysis.

A SAP table/database will be used to record all pertinent information associated with each sample ID code.

5.2 Sampling and Analysis Plan Table/Database

A SAP table format was developed to simplify the presentation of the sampling scheme for project personnel. The following sections describe the information recorded in the SAP table/database, which is presented in Appendix B.

5.2.1 Sample Description

The sample description fields contain information relating individual sample characteristics.

5.2.1.1 Sampling Activity. The sampling activity field contains the first six characters of the assigned sample number. The sample number in its entirety will be used to link information from other sources (field data, analytical data, etc.) to the information in the SAP table for data reporting, sample tracking, and completeness reporting. The analytical laboratory will also use the sample number to track and report analytical results.

5.2.1.2 Sample Type. Data in this field will be selected from the following:

REG	for a regular sample
QC	for a QC sample.

5.2.1.3 Media. Data in this field will be selected from the following:

SOIL	for soil samples
WATER	for QA/QC water samples.

5.2.1.4 Collection Type. Data in this field will be selected from the following:

GRAB	for grab sample collection
COMP	for composite sample collection
RNST	for rinsate QA/QC samples
DUP	for field duplicate samples
FBLK	for field blank QA/QC samples.

5.2.1.5 Planned Date. This date is related to the planned sample collection start date.

5.2.2 Sample Location Fields

This group of fields pinpoints the exact location for the sample in three-dimensional space, starting with the general AREA, narrowing the focus to an exact location geographically, and then specifying the DEPTH in the depth field.

5.2.2.1 Area. The AREA field identifies the general sample collection area. This field should contain the standard identifier for the INEEL area being sampled. For this investigation, samples are being collected from CFA, and the AREA field identifier will correspond to this site.

5.2.2.2 Location. The LOCATION field may contain geographical coordinates, x-y coordinates, building numbers, or other location-identifying details, as well as program-specific information such as borehole or well number. Data in this field will normally be subordinated to the AREA. This information is included on the labels generated by the Sampling and Analysis Management (formerly the Sample Management Office) to aid sampling personnel.

5.2.2.3 Type of Location. The TYPE OF LOCATION field supplies descriptive information concerning the exact sample location. Information in this field may overlap that in the location field, but it is intended to add detail to the location.

5.2.2.4 Depth. The DEPTH of a sample location is the distance in feet from surface level or a range in feet from the surface.

5.2.3 Analysis Types

5.2.3.1 AT1-AT20. These fields indicate analysis types (radiological, chemical, hydrological, etc.). Space is provided at the bottom of the form to clearly identify each type. A standard abbreviation will also be provided, if possible.

6. SAMPLING PROCEDURES AND EQUIPMENT

The following sections describe the sampling procedures and equipment to be used for the planned sampling and analyses described in this FSP. Prior to the commencement of any sampling activities, a pre-job briefing will be held to review the requirements of the FSP and the project HASP (INEEL 2002) and to ensure all supporting documentation has been completed.

6.1 Sampling Requirements

Requirements for the CFA-04 sampling activity are outlined in the following sections.

6.1.1 Site Preparation

All required documentation and safety equipment will be assembled at the sampling site, including radios, fire extinguishers, personal protective equipment, sample bottles, sampling tools and equipment, drilling equipment, and accessories. All sampling personnel are responsible for having read both this FSP and the project HASP (INEEL 2002) prior to sampling. The field team leader (FTL) will perform a daily site briefing to discuss potential hazards and ensure that all personnel have the required training. The FTL will assign a team member to maintain document control and note this appointment in the FTL's logbook in accordance with MCP-231, "Logbooks for ER and D&D&D Projects."

6.1.2 Sample Collection

As shown in Figure 4-3, the area to be sampled has been subdivided into zones. Each zone will require four core samples. Each core sample will be collected from the surface until the auger meets refusal at the basalt interface. The basalt underlying the pond is fairly undulating—ranging in depth from the basalt outcroppings visible on the southern edge of the pond to an approximate depth of 3 m (10 ft) in a few locations. Following the collection of the core, samples will be subdivided from the core at set intervals. The analytical sample submitted to the laboratory will consist of a composite of the individual core samples collected from a discrete depth within a given zone.

Samples will be collected following the procedures delineated in technical procedure (TPR)-6559, "Sampling with a Hollow-Stem Auger," as well as the requirements set forth in the subcontractor's scope of work and specifications. Much of the area to be sampled is covered with a 15- to 30-cm (6- to 12-in.) layer of gravel. Prior to sampling at a given location, the gravel layer will need to be removed by hand digging prior to using the drill auger. The gravel layer will not require sampling since it was emplaced in 2001 as a fire mitigation method and was not contaminated in the same manner as the pond sediments.

The 11.4 cm (4.5 in.) (nominal) auger will be equipped with a core catcher, a split inner barrel, and a Lexan liner. The auger will be advanced approximately 0.9 m (3 ft) or until refusal, whichever occurs first. The inner split barrel will be recovered with a wireline and the liner retrieved. After removing the inner barrel shoe and head, both ends of the liner will be capped and taped for delivery to the sampling team. A new liner will be installed inside an inner barrel with associated ends and inside augers. The next 0.9 m (3 ft) section of the borehole will be augered. These steps will continue until refusal is encountered at the basalt interface. After the final core section is removed from the borehole, the borehole will be backfilled with residual sample material or non-contaminated gravel or sand.

The sampling team will collect individual sample aliquots using disposable sampling spoons. The aliquots will be placed in certified, pre-cleaned sample containers with an appropriate sample label affixed that has been obtained from Sampling and Analysis Management (formerly the Sample Management Office). Refer to Table 6-1 for the specific sample requirements.

Table 6-1. Specific sample requirements.

Analytical Parameter	Container		Preservative	Analytical Method	Holding Time
	Size	Type			
Soil/Sediment Samples					
Hg	4 oz	Glass	Cool to 4°C	SW-846 Method 7000 series	28 days for Hg
TCLP Hg/Cr/Ag	8 oz	Glass	Cool to 4°C	SW-846 Method 1311/ 7000 series	28 days for Hg, 6 months for Cr and Ag
Radionuclides	16 oz	HDPE[a]	None	Radiochemical	6 months
Methyl mercury	4 oz	Glass	Cool to 4°C	EPA Method 1630	28 days for Hg
Liquid Samples (Equipment Rinsates)					
Hg/Cr/Ag	1 L	HDPE[a]	HNO_3 to pH< 2, Cool to 4°C	SW-846 Method 7000 series	28 days for Hg, 6 months for Cr and Ag
Radionuclides	2 L	HDPE[a]	HNO_3 to pH<2	Radiochemical	6 months
Methyl mercury	1 L	HDPE[a]	HNO_3 to pH< 2, Cool to 4°C	EPA Method 1630	28 days for Hg

HDPE = high-density polyethylene

6.1.3 Decontamination

All sampling equipment that comes in contact with the sample media will be decontaminated following the procedures delineated in TPR-6575, "Decontaminating Sampling Equipment in the Field." As components of the drill rig may become contaminated during the sampling process, decontamination of those components will be performed following the procedures outlined in TPR-6574, "Decontaminating Heavy Equipment in the Field." Dry decontamination methods will be used to the extent practicable to minimize the generation of liquid decontamination waste.

6.1.4 Mercury Field Screening

Aliquots of the laboratory samples intended for total mercury analysis will be retained for screening for mercury content using a field analytical technique. This will determine the efficacy of using the field method for determining whether the remediation goals have been met when performing the remedial action and also for ensuring that the waste acceptance criteria of the treatment and/or disposal facility are met when shipping contaminated soils offsite. The specific field portable instrument operates on the principal of thermal decomposition of the sample allowing for direct detection of mercury using atomic absorption spectrometry. A statistical correlation study of the field data to laboratory analytical data will be performed to ascertain the instrument's viability in meeting the project's goals.

6.1.5 Shipping Screening

Given that the radionuclide contamination is at background levels for CFA-04, radiological control (RadCon) screening methods will suffice for screening. In the event that a sample is questionable, it may be submitted to the Radiation Measurements Laboratory located at the Test Reactor Area at the INEEL for a 20-minute gamma screen prior to shipment. Gamma screening will require that a separate sample be collected for analysis.

6.1.6 Sample Shipping

Samples will be transported in accordance with the regulations promulgated in 49 CFR Parts 171 through 178 and EPA sample handling, packaging, and shipping methods delineated in 40 CFR 262 Subpart C and 40 CFR 263. Additional information pertaining to sample shipping is found in MCP-3480, "Environmental Instructions for Facilities, Processes, Materials, and Equipment." All samples will be packaged and transported to protect the integrity of the samples and prevent sample leakage.

Upon receipt, laboratory personnel will verify the condition of the samples, including temperature (if samples are required to be shipped under controlled-temperature conditions). The laboratory will communicate any discrepancies to the field personnel and the project through Sampling and Analysis Management (formerly the Sample Management Office). The project personnel will determine the appropriate corrective action on a case-by-case basis.

6.2 Handling and Disposition of Remediation Waste

Characterization waste will be generated during the sampling activities, as described herein. The disposition and handling of waste for this project will be consistent with the *Waste Certification Plan for the Environmental Restoration Program* (INEEL 1997). Samples will be handled in accordance with MCP-3480, "Environmental Instructions for Facilities, Processes, Materials, and Equipment." All waste streams generated from the sampling activity will be characterized in accordance with MCP-62, "Waste Generator Services – Low-Level Waste Management," and will be handled, stored, and disposed of accordingly.

All CERCLA-generated waste will be maintained in accordance with the requirements of the previously established CERCLA Waste Storage Unit (CWSU) in which the waste is stored. All CWSUs at the INEEL have been established in accordance with the applicable or appropriate and relevant requirements. This waste shall be maintained in compliant storage until such time as it can be disposed at the ICDF.

Waste will be generated as a result of the sampling activities conducted during this project. Wastes expected to be generated include the following:

- Personal protective equipment
- Liquid decontamination residue
- Solid decontamination residue
- Plastic sheeting
- Unused/unaltered sample material

- Sample containers
- Miscellaneous wastes
- Contaminated equipment.

Wastes may be hazardous. As sampling continues, additional waste streams may be identified. All new waste streams, as well as those identified above, are required to have the waste identified and characterized. A hazardous waste determination must be completed and presented to the appropriate waste management organization (e.g., Waste Generator Services [WGS]) for approval by that organization at the time of generation.

The wastes associated with the sampling activities will be managed in a manner that complies with the established applicable or relevant and appropriate requirements (ARARs), protects human health and the environment, and achieves minimization of remediation waste to the extent possible. The ARARs applicable to the storage of wastes are defined in accordance with the ROD (DOE-ID 2000b). The basic provisions of the ARARs provide for appropriate waste containerization and compliant storage of the wastes for an interim storage period. Protection of human health and the environment is achieved through implementation of the ARARs and through implementation of the waste management approach described herein.

6.2.1 Waste Minimization

Waste minimization techniques will be incorporated into planning and daily work practices to improve worker safety and efficiency. In addition, such techniques will aid in reducing the project environmental and financial liability. Specific waste minimization practices to be implemented during the project will include, but not be limited to::

- Excluding materials that could become hazardous wastes in the decontamination process (if any)
- Controlling transfer between clean and contaminated zones
- Designing containment such that contamination spread is minimized
- Collecting all samples necessary at one time, such that additional wastes are not generated due to resampling.

The *U.S. Department of Energy Idaho Operations Office Idaho National Engineering and Environmental Laboratory Interim Pollution Prevention Plan* (DOE-ID 2000d) addresses the efforts to be expended and the reports required to track waste generated by projects. This plan directs that the volume of waste generated by INEEL operations be reduced as much as possible.

Industrial wastes do not require segregation by type; therefore, containers will be identified as industrial waste and maintained outside the controlled area for separate collection. Industrial waste is defined as solid waste generated by industrial processes and manufacturing. Industrial waste is not radioactive, hazardous, or mixed waste (40 CFR 243.101). Contaminated waste has the potential to be hazardous. This waste will require segregation as either incinerable (e.g., wipes, personal protective equipment) or nonincinerable (e.g., polyvinyl tubing), in anticipation of subsequent waste management. Containers for collection of contaminated waste will be clearly labeled to identify waste type and will be maintained inside the controlled area as defined in the project HASP (INEEL 2002) until removal for subsequent management.

6.2.2 Laboratory Samples

All laboratory and sample waste will be managed in accordance with Sampling and Analysis Management (formerly the Sample Management Office) master task agreements, as part of the contract for the subcontracted laboratory. The laboratory will dispose of any unused sample material. The laboratories are responsible for any waste generated as a result of analyzing the samples. In the event that unused sample material must be returned from the laboratory, only the unused, unaltered samples in the original sample containers will be accepted from the laboratory. These samples will be returned to the waste stream from which they originated. If the laboratory must return altered sample material (e.g., analytical residue), the laboratory will specifically define the types of chemical additives used in the analytical process and assist in making a hazardous waste determination. This information will be provided to the project FTL and environmental compliance coordinator. Management of this waste will also require separation from the other unaltered samples being returned.

6.2.3 Packaging and Labeling

Containers used to store and transport hazardous waste must meet the requirements of 40 CFR 264, Subpart I. The *Idaho National Engineering and Environmental Laboratory Reusable Property, Recyclable Materials, and Waste Acceptance Criteria* (DOE-ID 2001), hereinafter referred to as the RRWAC, contains additional details concerning packaging and container conditions. Appropriate containers for CERCLA waste include 208-L (55-gal) drums and other suitable containers that meet the Department of Transportation's regulations on packaging (49 CFR 171, 173, 178, and 179) or RRWAC Sections 4.4, 4.5, and 4.6. The WGS will be consulted to ensure that the packaging is acceptable to the receiving facility.

Waste containers will be labeled with standard CERCLA remediation waste labels. The following information will be included on the labels:

- Unique bar code serial number
- Name of generating facility (i.e., OU 4-05)
- Phone number of generator contact
- Listed or characteristic waste code(s)
- Waste package gross weight
- Waste accumulation start date
- Maximum radiation level on contact and at 1 m (3 ft) in air
- Waste stream or material identification number as assigned by the receiving facility
- Prior to shipping, other labels and markings as required by 49 CFR 172, Subparts D and E
- Any of the above information that is not known when the waste is labeled may be added when the information is known.

The unique bar code serial number is used for tracking and consists of a five-digit number followed by a single alpha designator. The alpha designator indicates which facility generated the bar code.

Presently, only the Waste Reduction Operations Complex (WROC) generates the bar codes and their alpha designator is "K." These bar codes will be furnished by WROC in lots of 50. A new bar code will be affixed to each container when waste is first placed in the container.

Any waste shipped off the INEEL from WAG 4 must be labeled in accordance with applicable Department of Transportation labels and markings (49 CFR 172). In addition, waste labels must be visible, legibly printed or stenciled, and placed so that a full set of labels and markings are visible. See the RRWAC (DOE-ID 2001) Section 4.4, 4.5, or 4.6 for additional labeling information.

6.2.4 Storage and Inspection

Wastes may be stored in an established CWSU. Solid wastes segregated as potentially hazardous and/or mixed and placed in 208-L (55-gal) drums will be stored in the CWSU. The wastes will be stored in either one of two CSWUs previously established at the INEEL. These units include CFA-637-101-A located at CFA, and CPP-1789-000-A located at the Idaho Nuclear Technology and Engineering Center. To meet the substantive requirements of 40 CFR 264, Subpart I, the RCRA ARARs inspection of the CWSU will be conducted as part of the weekly waste container inspection. The purposes of the weekly container inspection are to look for containers that are leaking or that are deteriorating due to corrosion or other factors, to ensure that the containment system has not deteriorated due to corrosion and to verify that labels are in place and legible. Inspections of the containers and the CWSU are conducted to meet the guidance contained in MCP-3475, "Temporary Storage of CERCLA-Generated Waste at the INEEL." The inspections will be documented on a weekly inspection form when completed. The checklists used to guide the inspection will be maintained by WGS.

6.2.5 Personal Protective Equipment

The personal protective equipment requiring disposal may include, but not be limited to, gloves, respirator cartridges, shoe covers, and coveralls. The personal protective equipment will be disposed of in accordance with the requirements set forth in the RRWAC (DOE-ID 2001) and the *Waste Certification Plan for the Environmental Restoration Program* (INEEL 1997).

6.2.6 Hazardous Waste Determinations

All wastes generated will be characterized as required by 40 CFR 262.11. Hazardous waste determinations will be prepared for all waste streams as per the requirements set forth in MCP-62, "Waste Generator Services – Low-Level Waste Management." Completed hazardous waste determinations will be maintained for all waste streams as part of the project file held by WGS. The hazardous waste determinations may use two approaches to determine whether a waste is characteristic:

1. Process knowledge may be used if there is sufficient existing information to characterize the waste. Process knowledge may include direct knowledge of the source of the contamination and/or existing validated analytical data.

2. Analysis of representative samples of the waste stream may be performed by either specialized RCRA protocols, standard protocols for sampling and laboratory analysis that are not specialized RCRA methods, or other equivalent regulatory approved methods. In addition, process knowledge may influence the amount of sampling and analysis required in order to perform characterization.

Land disposal restrictions for hazardous wastes are addressed in 40 CFR 268. The INEEL-specific requirements for treatment, storage, and disposal are addressed in the RRWAC (DOE-ID 2001). After the hazardous waste determinations are completed, the INEEL Interim Waste Tracking System profile number is assigned and the appropriate information entered into the tracking system.

6.2.7 Waste Disposition

At the conclusion of the investigations, or when deemed necessary, industrial waste will be disposed of in the INEEL landfill, following the protocols and completing the forms identified by the RRWAC (DOE-ID 2001). To achieve this waste management activity, industrial waste will be turned over to CFA operations personnel for management under existing facility waste streams and in accordance with standing facility procedures. When sufficient quantities of waste have been accumulated to ship to one of the INEEL waste management units or off the INEEL to a commercial waste management facility, WGS will be contacted and the appropriate forms will be completed and submitted for approval, as required. The waste generator interface will provide assistance in packaging and transporting the waste.

Waste that is determined to be RCRA-hazardous is not intended to be stored in a permitted treatment, storage, and disposal facility. However, if this becomes necessary, it will be labeled as CERCLA to facilitate eventual management in accordance with CERCLA treatment, storage, or disposal that may become available. Should further characterization of the contaminated waste be necessary, services will be requested from WGS and Sampling and Analysis Management (formerly the Sample Management Office). Requesting these services requires completion of Form 435.26, "SMO/WGS Services Request Form." For final disposition of RCRA-hazardous waste, WGS will be contacted to determine whether the waste qualifies for disposal under terms of existing Master Task Agreements.

All low-level radioactive and mixed wastes shall be handled and disposed of in accordance with the requirements set forth in the RRWAC (DOE-ID 2001). Care should be taken to ensure that all containers used to store waste or sampling equipment are in a "like-new" condition. Following completion of sampling, the individual waste streams destined for disposal at an on-Site facility will be approved and prepared for disposal in accordance with the requirements of the RRWAC (DOE-ID 2001) and the *Waste Certification Plan for the Environmental Restoration Program* (INEEL 1997). In so much as the various waste streams meet the waste acceptance criteria, the intent is to dispose of them in the ICDF once the facility becomes operational.

Management of contaminated wastes, generated at a subcontract laboratory during analytical testing, will be the responsibility of the subcontract laboratory. However, overall management of the samples must be in accordance with the requirements of MCP-3480, "Environmental Instructions for Facilities, Processes, Materials, and Equipment." Specifically, MCP-3480 requires the facility environmental, safety, and health manager to provide written approval prior to return of any media and that written documentation of sample disposition be developed and maintained. To initiate the return of these wastes to the INEEL, the subcontract laboratory shall notify Sampling and Analysis Management (formerly the Sample Management Office) in the form of a written report identifying the known volume and characteristics of each waste type, including shipping and packaging details. Final authorization for the return of wastes will be provided in writing, from Sampling and Analysis Management (formerly the Sample Management Office) with concurrence from the technical task manager to the subcontract laboratory. In the event that laboratory wastes are returned, WGS will be contacted and will be responsible for the disposition of those wastes.

Waste streams to be generated during this sampling effort may include the following categories:

- Hg < 260 mg/kg, non-characteristic, non-radiologically contaminated
- Hg < 260 mg/kg, characteristic, non-radiologically contaminated
- Hg > 260 mg/kg, non-characteristic or characteristic, non-radiologically contaminated
- Hg < 260 mg/kg, non-characteristic, radiologically contaminated
- Hg < 260 mg/kg, characteristic, radiologically contaminated
- Hg > 260, non-characteristic or characteristic, radiologically contaminated.

For those wastes contaminated with mercury greater than 260 mg/kg, it does not matter whether the soils are characteristic as the prescribed treatment is retort. The majority of wastes generated during the sampling effort are expected to have mercury contamination levels less than 260 mg/kg, non-characteristic, and non-radiologically contaminated. A smaller subset may be radiologically contaminated, with yet smaller subsets consisting of wastes that are characteristic for mercury or greater than 260 mg/kg.

6.2.8 Record Keeping and Reporting

Records and reports related to waste management are required to be maintained, as indicated by MCP-3475, "Temporary Storage of CERCLA-Generated Waste at the INEEL." Some of these may be completed by others, but must be available either at CFA or with the WAG 4 project files. All information related to the tracking and disposition of wastes generated as a result of the sampling effort will be entered into the Integrated Waste Tracking System which is operated and maintained by WGS. These records shall include, but not be limited to:

- Hazardous waste determinations, characterization information, and statements of process knowledge (by others)
- CWSU and CSA inspection reports and log-in, log-out history
- Training records
- Documentation with respect to all spills.

6.3 Project-Specific Waste Streams

Several distinct waste stream types anticipated to be generated during this project have been identified. Some of these waste types will be clean, but many may be contaminated. Subsequent to generation, any or all of the waste may be reclassified; therefore, the intended waste management strategies for each are outlined below. The following sections describe the expected waste that will require compliant storage and/or disposal, including the intended management strategy from the time of generation until final disposition. Field and laboratory personnel will be responsible for segregating wastes. The anticipated quantities have also been approximated; however, they are to be considered a rough order-of-magnitude because, in some cases, the type of contamination present cannot be determined prior to sampling and analysis. Estimated waste volumes are based on historical sampling activities conducted in support of other CERCLA actions conducted at the INEEL in addition to calculated volumes based upon drawings and discussions with ER personnel.

6.3.1 Personal Protective Equipment

Personal protective equipment in the form of coveralls, leather and rubber gloves, and anti-contamination clothing may be generated for the sampling activities. The anticipated quantity of personal protective equipment to be generated and requiring disposal as a result of the sampling activities is 0.76 m^3 (1 yd^3), classified as clean.

6.3.2 Liquid Decontamination Residue

The decontamination methods for field and sampling equipment will ensure containment of all decontamination fluids, minimize waste, and minimize contamination of equipment. Decontamination fluids will be generated by wet decontamination of field (e.g., drilling equipment) and sampling (e.g., spoons, shovels) equipment. They may contain oil and/or grease in addition to any radionuclide and/or hazardous contamination that may be present. The anticipated quantity of decontamination fluids to be generated and requiring disposal as a result of the sampling activities is 57 L (15 gal), classified based upon the site of origin. To verify the end classification of decontamination fluids, a sample of the rinsate water will be submitted for laboratory analysis. It is intended that the liquid decontamination residues will be consolidated and stabilized for eventual disposal in the ICDF. In the event that the residues do not meet the ICDF's waste acceptance criteria, an alternative treatment and disposal facility will need to be identified.

6.3.3 Solid Decontamination Residue

As with the liquid decontamination residues, solid decontamination methods will ensure the minimization of waste and minimization of equipment contamination. Solid decontamination residues will be generated by the dry decontamination of field and sampling equipment. Dry decontamination methods will be used to the extent practicable to minimize the generation of liquid decontamination residues. The anticipated quantity of solid decontamination residues to be generated and requiring disposal as a result of the sampling activities is 57 L (15 gal), classified based upon the site of origin. The end classification of the solid decontamination residues will be based upon the results of the analytical samples collected from the contaminated source. It is intended that the solid decontamination residues will be consolidated for eventual disposal in the ICDF. In the event that the residues do not meet the ICDF's waste acceptance criteria, an alternative treatment and disposal facility will need to be identified.

6.3.4 Plastic Sheeting

Plastic sheeting may be used as an environmental barrier to contamination and to provide a laydown site for staging equipment and tooling. Based upon historical usage of plastic sheeting at environmental remediation sites, the anticipated volume to be generated and requiring disposal as a result of the sampling activities is 0.76 m^3 (1 yd^3), classified as clean.

6.3.5 Unused/Unaltered Sample Material

Unused/unaltered sample material will be generated from the sampling activities in the form of soils and waters not required for sampling and analysis. In most cases, the analytical laboratory will be responsible for disposal of the unused/unaltered sample material and any wastes generated as a result of analyzing the samples. In the event that unused sample material must be returned from the laboratory, only the unused, unaltered samples in the original sample containers will be accepted from the laboratory. The unused, unaltered sample material will be returned to the point of origin whenever possible. In those instances where sample material cannot be returned to the point of origin, it will be consolidated for disposal at the ICDF.

6.3.6 Analytical Residues

Analytical residues will be generated from the sample analytical activities conducted by subcontracted laboratories. Although the laboratories are required to dispose of analytical residues under terms of the subcontract, the potential does exist for return of the residues, particularly in the case of materials regulated under the Toxic Substances Control Act (TSCA). The potential sources of TSCA-regulated materials at CFA-04 are the asbestos-containing roofing materials buried at the site. Therefore, residues produced by subcontracted laboratories as a result of analyzing samples containing these roofing materials will be returned to the INEEL for final disposition. The anticipated quantity of analytical residues to be generated and requiring disposal as a result of the sampling activities is 57 L (15 gal), classified based upon the site of origin. Any residues returned to the INEEL for disposal will be consolidated for eventual disposal in the ICDF. In the event that the residues do not meet the ICDF's waste acceptance criteria, an alternative treatment and disposal facility will need to be identified.

6.3.7 Sample Containers

Sample containers will become a waste stream following analysis. As with unused/unaltered sample material, the analytical laboratory will be responsible for disposal of the sample containers. In the event that unused sample material must be returned from the laboratory, the samples will be consolidated for disposal and the sample containers, by virtue of the empty container rule, will be disposed of as clean waste.

6.3.8 Hydraulic Spills

A small quantity of hydraulic oil (less than 18.9 L [5 gal]) is expected to be generated during all sampling activities. The waste oil will be collected in drip pans. The collected hydraulic oil will be recycled, if possible, or drummed and sent to an approved disposal facility. Final determination will partially depend on the quantities generated and will be performed by WGS.

In the event of an inadvertent release of hydraulic oil to the environment (e.g., soil spill), the steps for containing and reporting the spill as outlined in Section 11 of the project HASP (INEEL 2002) will be followed. The affected soil will be placed in an appropriate container, sampled for total petroleum hydrocarbon analysis, and sent to an approved disposal facility with approval of WGS. If the spill occurs on contaminated soils, WGS will be contacted for determination of disposal options.

6.3.9 Miscellaneous Wastes

Miscellaneous wastes such as trash, labels, rags, and other miscellaneous debris may be generated during the project. The anticipated quantity of miscellaneous wastes to be generated and requiring disposal as a result of the sampling activities is 1.53 m^3 (2 yd^3), classified as clean. Clean miscellaneous waste will be removed to the CFA landfill.

7. DOCUMENTATION MANAGEMENT AND SAMPLE CONTROL

Section 7.1 summarizes document management and sample control. Documentation includes field logbooks used to record field data and sampling procedures. Section 7.2 outlines the sample handling and discusses chain-of-custody (COC) and radioactivity screening for shipment to the analytical laboratory (if required). The analytical results from this sampling effort will be documented in the semiannual operating/shutdown cycle reports.

7.1 Documentation

The FTL will be responsible for controlling and maintaining all field documents and records, and for ensuring that all required documents are submitted to ER Administrative Records and Document Control. All entries will be made in permanent ink. A single line will be drawn through any error with the correct information entered next to it. All corrections will be initialed and dated.

7.1.1 Sample Container Labels

Waterproof, gummed labels generated from the SAP database will display information such as the sample ID number, the name of the project, sample location, and analysis type. In the field, labels will be completed and placed on the containers before collecting the sample. Information concerning sample date, time, preservative used, field measurements of hazards, and the sampler's initials will be filled out during field sampling.

7.1.2 Field Guidance Forms

Field guidance forms, provided for each sample location, will be generated from the SAP database, to ensure unique sample numbers. Used to facilitate sample container documentation and organization of field activities, these forms contain information regarding the following:

- Media
- Sample ID numbers
- Sample location
- Aliquot ID
- Analysis type
- Container size and type
- Sample preservation.

7.1.3 Field Logbooks

In accordance with Administrative Records and Document Control format, field logbooks will be used to record information necessary to interpret the analytical data. All field logbooks will be controlled and managed according to MCP-231, "Logbooks for ER and D&D&D Projects."

7.1.3.1 Sample Logbooks. Sample logbooks will be used by the field teams. Each sample logbook will contain information such as:

- Physical measurements (if applicable)
- All QC samples
- Sample date, time, and location
- Shipping information (e.g., shipping dates, cooler ID number, destination, COC number, name of shipper).

7.1.3.2 Field Team Leader's Daily Logbook. An operational logbook maintained by the FTL will contain a daily summary of:

- All the project field activities
- Problems encountered
- Visitor log
- List of site contacts.

This logbook will be signed and dated at the end of each day's sampling activities.

7.1.3.3 Field Instrument Calibration/Standardization Logbook. A logbook containing records of calibration data will be maintained for each piece of equipment requiring periodic calibration or standardization. This logbook will contain sheets to record the date, time, method of calibration, and instrument ID number.

7.2 Sample Handling

Analytical samples for laboratory analyses will be collected in pre-cleaned containers and packaged according to American Society for Testing and Materials or EPA-recommended procedures. The QA samples will be included to satisfy the QA requirements for the field operation, as outlined in the QAPjP (DOE-ID 2000a). Only qualified (Sampling and Analysis Management-approved) analytical and testing laboratories will analyze these samples.

7.2.1 Sample Preservation

Preservation of water samples will be performed immediately upon sample collection. If required for preservation, acid may be added to the bottles prior to sampling. For samples requiring controlled temperatures of 4°C (39°F) for preservation, the temperature will be checked periodically prior to shipment to certify adequate preservation. Ice chests (coolers) containing frozen reusable ice will be used to chill the samples in the field after sample collection, if required.

7.2.2 Chain-of-Custody Procedures

The COC procedures outlined in MCP-3480, "Environmental Instructions for Facilities, Processes, Materials, and Equipment," and the QAPjP (DOE-ID 2000a) will be followed. Sample bottles will be stored in a secured area accessible only to the field team members.

7.2.3 Transportation of Samples

Samples will be shipped in accordance with the regulations issued by the Department of Transportation (49 CFR Parts 171 through 178) and EPA sample handling, packaging, and shipping methods (40 CFR 262 Subpart C and 40 CFR 263). All samples will be packaged in accordance with the requirements set forth in MCP-3480, "Environmental Instructions for Facilities, Processes, Materials, and Equipment."

7.2.3.1 Custody Seals. Custody seals will be placed on all shipping containers in such a way as to ensure that tampering or unauthorized opening does not compromise sample integrity. Clear, plastic tape will be placed over the seals to ensure that the seals are not damaged during shipment.

7.2.3.2 On-Site and Off-Site Shipping. An on-Site shipment is any transfer of material within the perimeter of the INEEL. Site-specific requirements for transporting samples within Site boundaries and those required by the shipping/receiving department will be followed. Shipment within the INEEL boundaries will conform to Department of Transportation requirements, as stated in 49 CFR. All shipments will be coordinated with WGS, as necessary, and conform to the applicable packaging and transportation MCPs. RadCon personnel shall screen all samples to be removed from the task site for radiological contaminants prior to shipment.

7.3 Document Revision Requests

Revisions to this document will follow the requirements set forth in MCP-135, "Creating, Modifying, and Canceling Procedures and Other DMCS-Controlled Documents." Any significant revisions to this document will require the concurrence of DOE-ID, IDEQ, and EPA.

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