0072427

DOE/RL-2003-33
Rev. 1

100-N Ancillary Facilities Waste Characterization Sampling and Analysis Plan

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Printed in the United States of America

DISCLM-5.CHP (11/99)

DOE/RL-2003-33
Rev. 1
OU: 100-NR-1, 100-NR-2, 100-DR-2
TSD: NA
ERA: NA

DOCUMENT CONTROL 03/01/07

STANDARD APPROVAL PAGE

Title: 100-N Ancillary Facilities Waste Characterization Sampling and Analysis Plan

Approval: U.S. Department of Energy, Richland Operations Office

Signature ____________ Date 2/1/07

Washington State Department of Ecology

Signature ____________ Date 2/5/07

U.S. Environmental Protection Agency

Signature ____________ Date 2/5/07

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DOE/RL-2003-33
Rev. 1

100-N Ancillary Facilities Waste Characterization Sampling and Analysis Plan

January 2007

United States Department of Energy

P.O. Box 550, Richland, Washington 99352

EXECUTIVE SUMMARY

This sampling and analysis plan (SAP) presents the strategy, requirements, and procedures for sampling and analysis activities to support waste management decisions associated with deactivation, decontamination, decommissioning, and demolition (D4) activities of ancillary support facilities located at the 100 Area's N Reactor site. The goal of the D4 activities is to dismantle the facilities and disposition the demolition waste in a safe, appropriate, and cost-effective manner.

Characterization of the 190-DR process water pump house was included in the original version of this SAP. The 190-DR process water pump house was characterized during fiscal year 2004 in accordance with revision 0 of this SAP. The 109-DR Building was subsequently demolished and disposed at the Environmental Restoration Disposal Facility; therefore, further reference to the 190-DR Building has been removed from this revision of this SAP.

The scope of this SAP includes ancillary facilities that supported plutonium-production reactor operations and maintenance on the Hanford Site. A summary of waste streams commonly found in the facilities, a list of contaminants of concern for each waste stream, and the analytical requirements for each contaminant of concern are presented. This SAP presents a characterization strategy that will be implemented for each facility.

The characterization strategy will include historical research, radiological and (as needed) industrial hygiene scoping surveys, inspections, and sampling and analyses (as needed) to support facility D4 activities. Focused (biased) sampling to estimate worst-case concentrations in media where contamination can be reliably expected to be found will be used to provide characterization data to support waste management decisions.

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ACRONYMS AND ABBREVIATIONS

CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CFR	*Code of Federal Regulations*
COC	contaminant of concern
CSS	characterization scoping survey
D4	deactivation, decontamination, decommissioning, and demolition
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
ETF	Effluent Treatment Facility
IH	industrial hygiene
QA	quality assurance
QAPjP	quality assurance project plan
QC	quality control
RAWP	removal action work plan
SAF	sample authorization form
SAP	sampling and analysis plan
SME	subject matter expert
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
WAC	*Washington Administrative Code*

METRIC CONVERSION CHART

Into Metric Units			Out of Metric Units		
If You Know	*Multiply By*	*To Get*	*If You Know*	*Multiply By*	*To Get*
Length			**Length**		
inches	25.4	millimeters	millimeters	0.039	inches
inches	2.54	centimeters	centimeters	0.394	inches
feet	0.305	meters	meters	3.281	feet
yards	0.914	meters	meters	1.094	yards
miles	1.609	kilometers	kilometers	0.621	miles
Area			**Area**		
sq. inches	6.452	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.093	sq. meters	sq. meters	10.76	sq. feet
sq. yards	0.0836	sq. meters	sq. meters	1.196	sq. yards
sq. miles	2.6	sq. kilometers	sq. kilometers	0.4	sq. miles
acres	0.405	hectares	hectares	2.47	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	grams	grams	0.035	ounces
pounds	0.454	kilograms	kilograms	2.205	pounds
ton	0.907	metric ton	metric ton	1.102	ton
Volume			**Volume**		
teaspoons	5	milliliters	milliliters	0.033	fluid ounces
tablespoons	15	milliliters	liters	2.1	pints
fluid ounces	30	milliliters	liters	1.057	quarts
cups	0.24	liters	liters	0.264	gallons
pints	0.47	liters	cubic meters	35.315	cubic feet
quarts	0.95	liters	cubic meters	1.308	cubic yards
gallons	3.8	liters			
cubic feet	0.028	cubic meters			
cubic yards	0.765	cubic meters			
Temperature			**Temperature**		
Fahrenheit	subtract 32, then multiply by 5/9	Celsius	Celsius	multiply by 9/5, then add 32	Fahrenheit
Radioactivity			**Radioactivity**		
picocuries	37	millibecquerel	millibecquerel	0.027	picocuries

1.0 INTRODUCTION

This sampling and analysis plan (SAP) presents the strategy, requirements, and procedures for characterization activities to support waste management decisions associated with deactivation, decontamination, decommissioning, and demolition (D4) of ancillary support facilities located at the 100 Area's N Reactor site (hereinafter referred to as the 100-N ancillary facilities). The 100-N ancillary facilities are located within the geographic area of the 100-NR-1 and 100-NR-2 *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) Operable Units as described by the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1989).

The goal of the D4 activities is to dismantle the facilities and dispose the demolition waste in a safe, appropriate, and cost-effective manner. Many of the facilities are contaminated with radiological and chemical hazardous materials due to their association with nuclear reactor operating areas and other potentially hazardous operations areas. Areas of potential radiological and chemical contamination are determined based on the processes that occurred in each facility. Some of the facilities in the scope of these D4 activities were not used for processes that resulted in significant levels of radioactive and chemical hazardous material contamination. However, the facilities are located near the materials processing facilities and, therefore, must be treated as potentially contaminated.

The sampling and analysis strategy described in this SAP will be used to provide characterization data to designate and dispose of demolition wastes generated during D4 activities. This SAP includes the following:

- Direction to collect and analyze waste materials to characterize various unknown and anomalous wastes associated with the facilities
- Characterization data to support waste management decisions for disposition of materials.

Final verification and closeout of the waste sites that are underneath or adjacent to these facilities is not within the scope of this SAP.

1.1 PROJECT SCOPE

Information in this SAP is based on the data quality objectives (DQOs) described in *Data Quality Objectives Summary Report for Waste Characterization of the 100-N Area Ancillary Facilities and the 190-DR Building* (hereinafter referred to as the DQO summary report) (BHI 2003a) and applies to the characterization activities for facilities in the 100-N Area. The application of the characterization strategy may be applied to other Hanford Site facilities on a case-by-case basis.

1.2 PROJECT OBJECTIVE

This SAP proposes a characterization strategy to provide the necessary and sufficient information to support characterization activities to support waste management decisions. Historical information and facility visits will be combined with results from radiological and industrial hygiene (IH) surveys to establish a contamination baseline and determine if additional characterization is required. If required, samples of specific media will be collected from selected locations and used to establish the bounding contaminant concentrations and waste designation information.

1.3 BACKGROUND

The scope of this SAP includes ancillary facilities that supported operation and maintenance of N Reactor. The N Reactor and associated facilities are located in the Hanford Site's 100-N Area, along the southern shore of the Columbia River in southeastern Washington. The N Reactor is a graphite-moderated, water-cooled reactor that was used to produce weapons-grade plutonium. Byproduct steam from the reactor was routed to the nearby Hanford Generating Plant to produce electricity. The N Reactor was constructed in 1963 and operated from December 1963 through December 1987. The Hanford Generating Plant operated from 1966 to 1987. The 100-N Area complex contains numerous ancillary support facilities that provided treated water, backup power and steam, material storage and distribution, and maintenance support during construction, operation, and deactivation of N Reactor. The 100-N ancillary facilities include offices, security buildings, warehouses, electrical switchgear facilities, water supply/storage and treatment facilities, auxiliary power and fuel storage facilities, and some radioactive waste-handling facilities.

A list of the 100-N ancillary facilities covered by this SAP and a brief description of their current status can be found in Table 1-2 of the *Removal Action Work Plan for 100-N Ancillary Facilities* (DOE-RL 2006). Additionally, structures approved by the lead regulatory agency and the lead agency (or the U.S. Department of Energy, Richland Operations Office), through written communications or through Unit Manager Meetings, to be included under the removal action work plan (DOE-RL 2006) are also included within the scope of this SAP. A partial list of facilities and the waste streams associated with each facility, provided during the original development of the SAP, is contained in Appendix A of this document. The 100-N ancillary facilities have been deactivated and cleaned to remove legacy wastes and other materials. Utilities have been isolated from many of the buildings.

1.4 CONTAMINANTS OF CONCERN

As a part of the DQO process, a master list of project-specific contaminants of potential concern was developed. Several of the contaminants of potential concern initially identified were excluded from the master list based on environmental fate, decay rates, and other characteristics. Through this process, a master list of contaminants of concern (COCs) was developed and documented in the DQO summary report (BHI 2003a). Table 1-1 presents the master list of COCs developed during the DQO process.

Contaminants of concern for each facility or group of facilities will be determined by the characterization lead, radiological engineer, waste management subject matter expert (SME), and other members of the project team (as needed) based on historical information, process knowledge, facility walkdowns, scoping surveys, and other pertinent information.

Table 1-1. Master Contaminants of Concern List. (3 Pages)

Final COC	Rationale for Inclusion
Radiological Constituents	
Americium-241	Known product of reactor operations.
Antimony-125	Known fission product.
Carbon-14	Known product of reactor operations.
Cesium-137	Known fission product.
Cobalt-60	Known activation product.
Europium-152	Known fission product.
Europium-154	Known fission product.
Europium-155	Known fission product.
Neptunium-237	Known production from fission reaction.
Nickel-63	Known activation product.
Plutonium-238	Known production from fission reaction.
Plutonium-239/240	Known production from fission reaction.
Radium-226	Needed for waste designation.
Radium-228	Needed for waste designation.
Strontium-90	Known fission product. Analyzed as total radioactive strontium.
Technetium-99	Known fission product.
Thorium-232	Reactor fuel/target component.
Tritium	Known product of reactor operations.
Uranium-234	Reactor fuel component.
Uranium-235	Reactor fuel component.
Uranium-238	Reactor fuel component.
Nonradiological Constituents – Metals	
Aluminum	Aqueous liquids only; needed for waste designation at the ETF.
Antimony	Needed for waste designation.
Arsenic	Suspected to be present in building materials.
Barium	Suspected to be present in building materials.
Beryllium	Suspected to be present in building materials.
Boron	Solids only; needed for waste designation.

Table 1-1. Master Contaminants of Concern List. (3 Pages)

Final COC	Rationale for Inclusion
Cadmium	Suspected to be present in building materials.
Calcium	Aqueous liquids only; needed for waste designation at the ETF.
Chromium	Suspected to be present in building materials.
Copper	Needed for waste designation.
Iron	Aqueous liquids only; needed for waste designation at the ETF.
Lead	Suspected to be present in building materials.
Magnesium	Aqueous liquids only; needed for waste designation at the ETF.
Manganese	Needed for waste designation.
Mercury	Suspected to be present in building materials.
Nickel	Needed for waste designation.
Potassium	Aqueous liquids only; needed for waste designation at the ETF.
Selenium	Suspected to be present in building materials.
Silicon	Aqueous liquids only; needed for waste designation at the ETF.
Silver	Suspected to be present in building materials.
Sodium	Aqueous liquids only; needed for waste designation at the ETF.
Thallium	Solids only; needed for waste designation.
Vanadium	Needed for waste designation.
Zinc	Aqueous liquids only; needed for waste designation at the ETF.
Nonradiological Constituents – General Inorganics	
Ammonia/ammonium	Used in water treatment processes.
Asbestos	Needed for waste designation.
Bromide	Aqueous liquids only; needed for waste designation at the ETF.
Chloride	Aqueous liquids only; needed for waste designation at the ETF.
Cyanide	Needed for waste designation.
Fluoride	Aqueous liquids only; needed for waste designation at the ETF.
Nitrate	Aqueous liquids only; needed for waste designation at the ETF.
Nitrite	Aqueous liquids only; needed for waste designation at the ETF.
Phosphate	Aqueous liquids only; needed for waste designation at the ETF.
Sulfide	Needed for waste designation.
Sulfate	Aqueous liquids only; needed for waste designation at the ETF.
Volatile Organic Compounds	
Freon	No basis for exclusion; assessed via VOA target analyte list
Paint thinner	No basis for exclusion; assessed via VOA target analyte list.
Perchloroethylene	No basis for exclusion; assessed via VOA target analyte list.
Trichloroethylene	No basis for exclusion; assessed via VOA target analyte list.
BTEX	No basis for exclusion; assessed via VOA target analyte list.

Table 1-1. Master Contaminants of Concern List. (3 Pages)

Final COC	Rationale for Inclusion
Organic Compounds	
Creosote	No basis for exclusion; assessed via SVOA target analyte list.
Polynuclear aromatic hydrocarbon	No basis for exclusion.
PCBs	No basis for exclusion.
Petroleum products	No basis for exclusion; assessed via VOA and SVOA target analytes.
Pesticides	No basis for exclusion.
Herbicides	No basis for exclusion.
Waste Characteristics	
Corrosivity	Needed for waste designation; assessed in aqueous streams via pH; assessed in nonaqueous streams via coupon method.
Gross alpha activity	Needed for waste designation.
Gross beta activity	Needed for waste designation.
Ignitability	Needed for waste designation.
SVOA target analytes	Needed for waste designation.
Total dissolved solids	Aqueous liquids only; needed for liquid waste disposition at the ETF.
Total organic carbon	Aqueous liquids only; needed for liquid waste disposition at the ETF.
Total organic halogens	Aqueous liquids only; needed for waste designation.
Total suspended solids	Aqueous liquids only; needed for liquid waste disposition at the ETF.
VOA target analytes	Needed for waste designation.

BTEX = benzene, toluene, ethylbenzene, xylene
COC = contaminant of concern
ETF = Effluent Treatment Facility
PCB = polychlorinated biphenyl
SVOA = semivolatile organic analysis
VOA = volatile organic analysis

1.5 CONCEPTUAL WASTE STREAM MODELS

Common waste streams are consistently encountered during D4 activities. Table 1-2 provides routine waste stream models and suspected contamination to provide a basis for categorizing types of waste that will be generated during D4 activities. Historical information and facility visits will be combined with radiological and IH survey data to establish COCs as described in Section 3.0. A list of the facilities and anticipated waste streams associated with each facility is contained in Appendix A.

Table 1-2. Routine Waste Streams and Source of Contamination. (2 Pages)

WS #	Waste Stream (Affected Media)	Known or Suspected Source of Contamination
1	Demolition debris: Concrete, concrete block, structural steel, plant process equipment, tanks, drain lines, electrical control panel, wires, sheetrock, piping, tools, miscellaneous hardware, nonasbestos-containing structural materials, Kraft[a] paper, PPE, rags, and wood	Interior and exterior dry and/or wet paint coatings
		Residue from external application of herbicides and pesticides
		Potential airborne and/or waterborne radioactive and chemical contamination from past operations
2	Machine shop metal cuttings, shavings, filings, and pieces	Potential airborne or waterborne radioactive, metals, chemical contamination from past operations, cutting oils, solid laboratory waste, metals, and contaminated gloves
3	Asbestos-containing material (includes, but is not limited to, floor tiles, ceiling tiles, cement asbestos board, cove mastic, sheetrock tape, roofing materials, roof flashing, pipe and building insulation, gaskets, ventilation)	Contamination and integral asbestos fibers in building materials
		Potential airborne and/or waterborne radioactive and chemical contamination from past operations
4	Miscellaneous aqueous liquids identified in the facilities (including liquids collected from sumps, tanks, piping, processing equipment, and accumulated rainwater)	Residue from water treatment reagents and chemicals and decontamination materials, laboratory waste
		Potential airborne and/or waterborne radioactive and chemical contamination from past operations
5	Miscellaneous bulk solids identified in the facilities (including sludge and solid materials collected from sumps, tanks, and processing equipment)	Insulating materials
		Residue from cleaning and machining metallic parts
		Residue from water treatment chemicals, decontamination materials, and laboratory waste
		Potential solids, airborne and/or waterborne radioactive and chemical contamination from past operations
6	Plant equipment lubrication grease, oil, hydraulic oils, transformer oils, oils in door actuators, and petroleum products (Bunker C and diesel oil) from plant piping systems	Residue from metallic parts, cleaning and decontamination materials, and lubricants
		Potential airborne and/or waterborne radioactive and chemical contamination from past operations
7	Process tanks with specialized coatings	Asphalt coatings on powerhouse and demineralization plant process tanks
8	Tank foundation material	Oiled sand, asphalt beneath storage tanks
9	Boiler and stack residue	Soot in powerhouse boilers and soot hoppers
10	Refrigerated systems (e.g., drinking fountains, coolers, chillers)	Refrigerants and soldered systems
11	Manometers, vacuum pumps, switches, mercury vapor lights	Elemental mercury
12	Lead packing, washers, and shielding	Packing in pipe joints, lead washers, and lead used for shielding

Table 1-2. Routine Waste Streams and Source of Contamination. (2 Pages)

WS #	Waste Stream (Affected Media)	Known or Suspected Source of Contamination
		Potential airborne and/or waterborne radioactive and chemical contamination from past operations
13	Fluorescent light ballasts	Internals of fluorescent light ballasts
14	Fluorescent light tubes, incandescent light bulbs	Internals of bulbs, leaded base
15	Emergency light batteries	Battery constituents
16	Exit signs and smoke detectors with radiation sources	Radioactive sources
17	Miscellaneous material for salvage (e.g., pumps, motors)	Potential airborne and/or waterborne radioactive and chemical contamination from past operations
18	Soil and sediment	Residue from petroleum products and cleaning materials
		Residue from external application of herbicides and pesticides
		Potential airborne and/or waterborne radioactive and chemical contamination from past operations
19	HEPA filters	Potential radioactive and chemical contamination from past operations
20	Unexpected media and waste forms including solids and liquids	To be determined on a facility-specific basis

[a] Kraft paper is a registered trademark of E.I. du Pont de Nemours and Company.
HEPA = high-efficiency particulate air
PPE = personal protective equipment
WS = waste stream

1.5.1 Waste Disposition Options

The primary disposal option for the waste stream models described in Table 1-2 is the Environmental Restoration Disposal Facility (ERDF). The ERDF waste acceptance criteria address radiological, chemical, and physical forms of waste (BHI 2003b).

1.6 DATA QUALITY OBJECTIVES

The *Guidance for Data Quality Objectives Process* (EPA 2000) was used to support development of this SAP. The DQO guidance provides a strategic planning approach using a systematic method for defining the data collection design criteria. Using the DQO process ensures that the type, quantity, and quality of environmental data used in decision making will be appropriate for the intended application.

This section presents only a summary of the key outputs resulting from the implementation of the seven-step DQO process. For additional details, refer to the DQO summary report (BHI 2003a).

1.6.1 Statement of the Problem and Decision Statements

Deactivated ancillary facilities in 100-N Area are scheduled for demolition and disposal. The DQO process was initiated to develop a sampling and analysis strategy to provide characterization data to support waste management decisions during D4 activities of the facilities.

1.6.2 Decision Statements

Table 1-3 identifies the decision statements that must be addressed for final disposition of demolition waste associated with D4 activities. These decision statements are the result of Step 2 of the DQO process (BHI 2003a).

Table 1-3. Decision Statements.

DS #	Decision Statements
1	Determine if the radionuclides present in the waste material exceed the disposal facilities waste acceptance criteria
2	Determine if the chemical and/or physical properties of the waste material exceed the disposal facility's waste acceptance criteria limits
3	Determine if the waste material is regulated as listed dangerous waste
4	Determine if the characteristic dangerous waste codes (e.g., corrosivity, ignitability, reactivity, and toxicity) apply to the waste material
5	Determine if the waste material meets the definition of a toxic dangerous waste in accordance with Washington State criteria of WAC 173-303-070
6	Determine if the waste material meets the definition of a persistent dangerous waste in accordance with Washington State criteria
7	Determine if the waste material is regulated due to PCB concentrations
8	Determine if the waste material is regulated due to asbestos content
9	Determine if LDRs impose treatment for waste material
10	Determine if the affected media meets the recycling requirements

DS = decision statement
LDR = land disposal restriction
PCB = polychlorinated biphenyl
WAC = *Washington Administrative Code*

1.6.3 Decision Rules

Decision rules are based on inputs from Steps 2 through 5 of the DQO process (BHI 2003a) and in the removal action work plan (RAWP) (DOE-RL 2006). The most restrictive concentration limits or action levels for disposal or recycle/reuse options are used. By meeting the analytical requirements for the most restrictive options, the data will be adequate for less restrictive options.

As identified in the DQO process (BHI 2003a), the most restrictive concentration limits include the following:

- *Environmental Restoration Disposal Facility Waste Acceptance Criteria*, BHI-00139, Rev. 4 (BHI 2003b)
- "Dangerous Waste Regulations," *Washington Administrative Code*, WAC 173-303
- "Universal Treatment Standards for Underlying Hazardous Constituents," *Code of Federal Regulations*, 40 *Code of Federal Regulations* (CFR) 268.48
- *Liquid Waste Processing Facilities Waste Acceptance Criteria*, HNF-3172 (FH 2005a)
- *Hanford Site Solid Waste Acceptance Criteria*, HNF-EP-0063 (FH 2005b)
- "Licensing Requirements for Land Disposal of Radioactive Wastes," 10 CFR 61, as amended.

The primary disposal option for the waste streams described in Table 1-2 is the ERDF. The ERDF waste acceptance criteria address the radiological, chemical, and physical forms of waste (BHI 2003b). Waste that does not meet the land disposal restrictions (WAC 173-303-140, 40 CFR 268) must be treated.

Liquid waste will either be sent to the Hanford Site's Effluent Treatment Facility (ETF) or treated to meet the acceptance criteria of the receiving facility. Liquid waste sent to ETF will meet the ETF acceptance criteria (HNF-3172) and will be treated separately from other CERCLA waste streams. Any treatment residues that meet ERDF waste acceptance criteria (BHI 2003b) may be disposed at ERDF. By approval of the 100-N Ancillary Facilities RAWP (DOE-RL 2006), the U.S. Environmental Protection Agency (EPA) has determined that ETF is an acceptable facility for storage and treatment of liquid waste generated by this removal action in accordance with 40 CFR 300.440, provided the applicable facility waste acceptance criteria are met. The solid segregated treatment residues generated by the ETF liquid waste treatment process shall be disposed in ERDF.

The ERDF cannot accept transuranic waste, transuranic mixed waste, greater-than-class C waste (as defined by 10 CFR 61), high-level waste, or dangerous waste that does not meet the land disposal restrictions or cannot be treated at ERDF. If transuranic waste or mixed waste cannot be sent to ERDF, the waste will be stored at the Central Waste Complex per the approved offsite determination for this facility (EPA 2002b).

1.6.4 Error Tolerance and Decision Consequences

Based on information developed in Step 6 of the DQO process (BHI 2003a), a focused sampling design is suited for obtaining waste characterization information for all waste streams identified as needing additional data for final disposition. There is no error defined for a focused sampling design used for waste characterization purposes. The potential environmental consequences for waste disposed at ERDF are generally acknowledged to have a low degree of severity because the matrix will reside in an engineered facility remote from human population centers. In addition, the waste is retrievable if necessary.

1.6.5 Sample Design Summary

The majority of the waste material is considered routine construction debris common to D4 operations. Much of the waste material can be designated for disposal using process knowledge and empirical data from previous sampling activities to address chemical and physical property designation concerns. If additional information is needed to designate anomalous waste materials, discrete samples of selected materials will be collected and analyzed to determine radiological and chemical contaminant concentrations. Examples of materials that may require sampling and analysis include suspect asbestos-containing materials, stained areas, sludge, drummed oils, and liquids from plant systems and components.

A focused (biased) sampling design was selected to provide characterization information that will meet the decision statements for all of the waste streams identified in this project. Historical information, process knowledge, existing sample data, radiation and IH surveys, and facility inspections will be used to develop a characterization strategy for the facilities.

If during facility inspections a focused sampling design that reliably characterizes the facility cannot be developed, then a statistical sampling approach will be used to estimate contaminant concentrations.

Section 2.0 presents the quality assurance project plan (QAPjP) and identifies the field procedures, as well as the activities and guidelines required to provide data of known and appropriate quality. Section 3.0 presents the field sampling plan.

2.0 QUALITY ASSURANCE PROJECT PLAN

This QAPjP presents the policies, organizations, objectives, functional activities, methods, and quality assurance (QA)/quality control (QC) procedures for collecting and analyzing samples to support decontamination and decommissioning, as well as waste characterization of the 100-N Area ancillary facilities.

This QAPjP follows the EPA guidelines contained in *EPA Guidance for Quality Assurance Project Plans* (EPA 2002a) and *EPA Requirements for Quality Assurance Project Plans* (EPA 2001).

2.1 PROJECT/TASK DESCRIPTION

The sampling and analysis strategy described in this SAP will be used to provide characterization data to safely and compliantly designate and dispose demolition wastes generated during D4 activities of 100-N ancillary facilities.

2.2 PROJECT MANAGEMENT

The following subsections address the basic areas of project management and will ensure that the project has defined goals, the participants understand the goals and approach to be used, and the participants understand the planned outputs.

2.2.1 Project/Task Organization

The following organizations will provide support for the sampling efforts:

- The D4 Project will provide project management, project engineering, and coordination of field support functions to support implementation of this SAP. This SAP is implemented under the direction of the D4 project task lead. Support will include the following:
  - Provide project, task, and engineering management necessary to carry out tasks
  - Act as a liaison to current contractor functional organizations, as required
  - Provide radiological work permits
  - Provide radiological surveys to support sample collection, packaging, and shipping
  - Provide radiological survey packages to summarize survey results
  - Prepare work packages to support the task team
  - Conduct and document pre-job meetings when supporting the task team
  - Provide field support to the task team
  - Provide the approved job hazard analysis
  - Provide industrial safety support and monitoring for the task team.

NOTE: Personal protective equipment to be worn during sampling shall be listed on the job-specific activity hazard analysis and the radiological work permit, as required.

- The Waste Operations organization will provide waste management and disposal support. Support will include the following:
  - Provide waste designation
  - Prepare waste profiles
  - Provide coordination with other Hanford Site organizations
  - Provide waste transportation specialist.
- The Environmental Sampling organization will provide personnel to support field activities including facility characterization, sample collection, sample packaging, sample shipment, and data management. Support will include the following:
  - Coordinate sampling and analysis activities
  - Perform/support sampling, packaging, and shipping activities
  - Arrange for laboratory analysis of samples
  - Receive data packages from the laboratory
  - Arrange for validation of data to the level identified in this SAP
  - Provide laboratory data packages.
- The Quality Assurance organization shall be responsible for performing independent QA activities, as appropriate.
- Data users include the following:
  - Waste Operations
  - Engineering Services
  - Environmental
  - Radiological Control
  - Safety and Health
  - Quality Assurance
  - Washington State Department of Ecology, EPA, and the U.S. Department of Energy, Richland Operations Office.

2.3 TRAINING REQUIREMENTS/CERTIFICATION

Training or certification requirements needed by current contractor personnel are described in BSC-1, *Business Services and Communications,* Section 2.0, "Training."

Field personnel shall be trained and qualified to perform work activities. Minimum training requirements are as follows:

- Occupational Safety and Health Administration 40-Hour Hazardous Waste Worker Training
- Radiation Worker Training
- Hanford General Employee Training.

2.4 DATA QUALITY

The QA objective of this plan is to provide data of known and appropriate quality for the needs identified through the DQO process (BHI 2003a). Data quality is determined by assessing precision, accuracy, representativeness, comparability, and completeness (i.e., PARCC parameters). Definitions of these terms, applicable procedures, and level of effort are described below:

- Precision is a measure of the data spread when more than one measurement has been taken on the same material. Precision can be expressed as the relative percent difference for duplicate measurements.

- Accuracy is an assessment of the closeness of the measured value to the true value. Accuracy of chemical/radiological test results is assessed by spiking samples with known standards, performing the analysis, and establishing the average recovery. For matrix spikes, known amounts of a standard compound (either the analyte of interest or a surrogate material expected to behave chemically the same as the analyte of interest) are added to the samples and carried through the analysis. For some radionuclide measurements, method calibrations against known standards are used to establish accuracy. Laboratory matrix spikes will be used to assess analytical accuracy.

- Representativeness is a measure of how closely the results reflect the actual concentration or distribution of the chemical compounds in the matrix samples. Documentation will be established to show that protocols have been followed and sample identification and integrity are ensured. Field duplicates may be used to assess field and transport contamination and method variation. Laboratory method blanks will be used to assess potential sample contamination from laboratory operations.

- Comparability expresses the confidence with which one data set can be compared to another. Data comparability will be maintained using defined procedures and consistent methods and units. Actual detection limits depend on the sample matrix and will be reported as defined for the specific samples.

- Completeness is a measure of the amount of valid data obtained from the analytical measurement system and the complete implementation of defined field procedures. Completeness is assessed during the data validation process.

2.5 FIELD DOCUMENTATION

Field documentation shall be maintained in accordance with ENV-1, *Environmental Monitoring & Management*, ENV-1-2.5, "Field Logbooks," and ENV-1-2.13, "Chain of Custody."

The standard fixed laboratory data packages shall be managed in accordance with ENV-1-2.11, "Sample Documentation Processing."

2.6 CHANGE CONTROL

The sample authorization form (SAF)/field sampling requirement information generated through the sample event coordination process shall specify the sampling container, size, and preservatives; onsite measurements test methods; laboratory analytical methods; turnaround times; and data deliverable types.

To ensure efficient and timely completion of tasks, minor changes can be made to the original workscope (outlined in this SAP) in the field by the characterization lead (or designee), provided that the changes do not impact the technical adequacy of the job or negatively impact the work schedule. Such changes shall be documented with justification in a field logbook.

2.7 MEASUREMENT/DATA ACQUISITION

The following subsections present quality objectives for measurement data and requirements for sampling methods, sample handling and custody, analytical methods, and field and laboratory QC. The requirements for instrument calibration, maintenance supply inspections, and data management are also discussed.

2.7.1 Analytical Performance Requirements

Applicable QA procedures, quantitative target limits, and data quality are dictated by the intended use of data and analytical methods used. Alignment of analytical parameters, applicable detection levels, analytical precision, and accuracy with the requirements identified in the DQO process are presented in Tables 2-1 and 2-2. Analytical laboratories are contractually obligated to meet the current methodology required by regulatory agencies.

Detection limits shown in Tables 2-1 and 2-2 meet or exceed the DQO requirements identified in Section 1.0. Actual laboratory reporting limits may be higher due to sample-specific matrix interference. Sample-specific limits will be reported for individual analytes.

Survey instrument performance requirements, applicable detection levels, analytical precision, accuracy, and completeness with the requirements identified in the DQO process are presented in Table 2-3.

Table 2-1. Analytical Performance Requirements for Solid/Other Materials. (3 Pages)

Analyte	Analytical Method	Action Level	RDL Requirement	Accuracy (% Recovery)	Precision (% RPD)
Radiological Constituents					
Americium-241	AmAEA	2 pCi/g	1 pCi/g	70-130[a]	±30[a]
Antimony-125	GEA	10 pCi/g	0.2 pCi/g	70-130[a]	±30[a]
Carbon-14	Liquid scintillation	50 pCi/g	50 pCi/g	70-130[a]	±30[a]
Cesium-137	GEA	10 pCi/g	0.1 pCi/g	70-130[a]	±30[a]
Cobalt-60	GEA	10 pCi/g	0.05 pCi/g	70-130[a]	±30[a]
Europium-152	GEA	10 pCi/g	0.1 pCi/g	70-130[a]	±30[a]
Europium-154	GEA	10 pCi/g	0.1 pCi/g	70-130[a]	±30[a]
Europium-155	GEA	2 pCi/g	0.1 pCi/g	70-130[a]	±30[a]
Neptunium-237	NpAEA	2 pCi/g	1 pCi/g	70-130[a]	±30[a]
Nickel-63	Liquid scintillation	30 pCi/g	30 pCi/g	70-130[a]	±30[a]
Plutonium-238	PuAEA	2 pCi/g	1 pCi/g	70-130[a]	±30[a]
Plutonium-239/240	PuAEA	2 pCi/g	1 pCi/g	70-130[a]	±30[a]
Radium-226	GEA	2 pCi/g	0.1 pCi/g	70-130[a]	±30[a]
Radium-228	GEA	2 pCi/g	0.2 pCi/g	70-130[a]	±30[a]
Total strontium	Rad-Sr	10 pCi/g	1 pCi/g	70-130[a]	±30[a]
Technetium-99	Proportional counting	30 pCi/g	15 pCi/g	70-130[a]	±30[a]
Thorium-232	ThAEA	2 pCi/g	1 pCi/g	70-130[a]	±30[a]
Tritium	Liquid scintillation	400 pCi/g	30 pCi/g	70-130[a]	±30[a]
Uranium-233/234	UAEA	2 pCi/g	1 pCi/g	70-130[a]	±30[a]
Uranium-235	UAEA	2 pCi/g	1 pCi/g	70-130[a]	±30[a]
Uranium-238	UAEA	2 pCi/g	1 pCi/g	70-130[a]	±30[a]
Nonradiological Constituents – Metals					
Antimony	EPA Method 6010	None[b]	6 mg/kg	70-130[c]	±30[c]
Arsenic	EPA Method 6010	100 mg/kg	10 mg/kg	70-130[c]	±30[c]
	EPA Method 1311/6010	5.0 mg/L[b]	0.5 mg/L	70-130[c]	±30[c]
Barium	EPA Method 6010	2,000 mg/kg	2 mg/kg	70-130[c]	±30[c]
	EPA Method 1311/6010	100 mg/L[b]	10 mg/L	70-130[c]	±30[c]
Beryllium	EPA Method 6010	None[b]	0.5 mg/kg	70-130[c]	±30[c]
Boron	EPA Method 6010	None	2 mg/kg	70-130[c]	±30[c]
Cadmium	EPA Method 6010	20 mg/kg	0.5 mg/kg	70-130[c]	±30[c]
	EPA Method 1311/6010	1.0 mg/L[b]	0.1 mg/L	70-130[c]	±30[c]

Table 2-1. Analytical Performance Requirements for Solid/Other Materials. (3 Pages)

Analyte	Analytical Method	Action Level	RDL Requirement	Accuracy (% Recovery)	Precision (% RPD)
Chromium	EPA Method 6010	100 mg/kg	1.0 mg/kg	70-130[c]	±30[c]
	EPA Method 1311/6010	5.0 mg/L[b]	0.5 mg/L	70-130[c]	±30[c]
Copper	EPA Method 6010	None	1.0 mg/kg	70-130[c]	±30[c]
Lead	EPA Method 6010	100 mg/kg	5 mg/kg	70-130[c]	±30[c]
	EPA Method 1311/6010	5.0 mg/L[b]	0.5 mg/L	70-130[c]	±30[c]
Manganese	EPA Method 6010	None	5 mg/kg	70-130[c]	±30[c]
Mercury	EPA Method 7471	4.0 mg/kg	0.2 mg/kg	70-130[c]	±30[c]
	EPA Method 1311/7471	0.2 mg/L[b]	0.02 mg/L	70-130[c]	±30[c]
Nickel	EPA Method 6010	None[b]	4 mg/kg	70-130[c]	±30[c]
Selenium	EPA Method 6010	20 mg/kg	10 mg/kg	70-130[c]	±30[c]
	EPA Method 1311/6010	1.0 mg/L[b]	0.1 mg/L	70-130[c]	±30[c]
Silver	EPA Method 6010	100 mg/kg	1 mg/kg	70-130[c]	±30[c]
	EPA Method 1311/6010	5.0 mg/L[b]	0.5 mg/L	70-130[c]	±30[c]
Thallium	EPA Method 6010	None[b]	5 mg/kg	70-130[c]	±30[c]
Vanadium	EPA Method 6010	None[b]	2.5 mg/kg	70-130[c]	±30[c]
Total uranium	Uranium by KPA	2 µg/g	1 µg/g	70-130[a]	±30[a]
Nonradiological Constituents – General Inorganics					
Ammonia	EPA Method 350.1, 2, or 3	None	0.5 mg/kg	70-130[c]	±30[c]
Asbestos	PLM	1 wt%	<1 wt%	NA	NA
Cyanide	EPA Method 9010	30 mg/kg	0.5 mg/kg	70-130[c]	±30[c]
Sulfide	EPA Method 9030	None[d]	5 mg/kg	70-130[c]	±30[c]
Organic Compounds					
PAH	EPA Method 8310	Compound-specific[e]	0.015 to 0.10 mg/kg[f]	70-130[g]	±30[g]
PCBs	EPA Method 8082	50 mg/kg	0.017 mg/kg	70-130[g]	±30[g]
Pesticides	EPA Method 8081	Compound-specific[e]	0.005 to 0.020 mg/kg[f]	70-130[g]	±30[g]
Herbicides	EPA Method 8151	Compound-specific[e]	0.020 to 0.50 mg/kg[f]	70-130[g]	±30[g]
Waste Characteristics					
Corrosivity	EPA Method 9045 (pH)	2.0 ≤pH ≤12.5	0.1 pH unit	70-130[c]	±30[c]
Gross alpha	Proportional counting	5 pCi/g	10 pCi/g	70-130[a]	±30[a]
Gross beta	Proportional counting	10 pCi/g	15 pCi/g	70-130[a]	±30[a]
Ignitability (flash point)	EPA Method 1010	<140°F	NA	NA	NA

Table 2-1. Analytical Performance Requirements for Solid/Other Materials. (3 Pages)

Analyte	Analytical Method	Action Level	RDL Requirement	Accuracy (% Recovery)	Precision (% RPD)
SVOAs	EPA Method 8270	Compound-specific[e]	0.33 to 0.85 mg/kg[f]	70-130[g]	±30[g]
TOX	EPA Method 9020	1,000 mg/kg	0.5 mg/kg	70-130[g]	±30[g]
VOAs	EPA Method 8260	Compound-specific[e]	0.005 to 0.05 mg/kg[f]	70-130[g]	±30[g]

[a] Accuracy criteria for associated batch laboratory control sample percent recoveries. With the exception of GEA, additional analysis-specific evaluations also performed for matrix spikes, tracers, and carriers as appropriate to the method. Precision criteria for batch laboratory replicate sample analyses.
[b] Lower action level may be needed to determine land disposal treatment requirements.
[c] Accuracy criteria for associated batch matrix spike percent recoveries. Evaluation based on statistical control of laboratory control samples also performed. Precision criteria for batch laboratory replicate matrix spike sample analyses or replicate sample analyses.
[d] Sulfide concentrations above the reactivity designation levels will be regulated.
[e] No action levels are specified for general groupings of compounds; action levels are compound-specific.
[f] Values shown are "nominal" compound-specific minimums and maximums. Most constituents within the given range. A limited number would have higher detection limits. Individual compounds will be evaluated against established laboratory contractual agreements (based on EPA guidance documents).
[g] Accuracy criteria are the minimum for associated batch laboratory control sample percent recoveries. Laboratories must meet statistically based control if more stringent. Additional analyte-specific evaluations also performed for matrix spikes and surrogates as appropriate to the method. Precision criteria for batch laboratory replicate matrix spike sample analyses.

AEA = alpha energy analysis
EPA = U.S. Environmental Protection Agency, EPA SW-846 (EPA 1986), except for Methods 300.0 and 418.1 (from EPA Method 600/4-79-020 [EPA 1983])
GEA = gamma energy analysis
NA = not applicable
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PLM = polarized light microscopy
RDL = required detection limit
RPD = relative percent difference
SVOA= semivolatile organic analyte
TOX = total organic halogen
VOA = volatile organic analyte

Table 2-2. Analytical Performance Requirements for Liquid Materials. (3 Pages)

Analyte	Analytical Method	Action Level[a]	RDL Requirement	Accuracy (% Recovery)	Precision (% RPD)
Radiological Constituents					
Americium-241	AmAEA	None	1 pCi/L	80-120[b]	±20[b]
Antimony-125	GEA	None	50 pCi/L	80-120[b]	±20[b]
Carbon-14	Liquid scintillation	None	200 pCi/L	80-120[b]	±20[b]
Cesium-137	GEA	None	15 pCi/L	80-120[b]	±20[b]
Cobalt-60	GEA	None	25 pCi/L	80-120[b]	±20[b]
Europium-152	GEA	None	50 pCi/L	80-120[b]	±20[b]
Europium-154	GEA	None	50 pCi/L	80-120[b]	±20[b]
Europium-155	GEA	None	50 pCi/L	80-120[b]	±20[b]
Neptunium-237	NpAEA	None	1 pCi/L	80-120[b]	±20[b]
Nickel-63	Liquid scintillation	None	15 pCi/L	80-120[b]	±20[b]
Plutonium-238	PuAEA	None	1 pCi/L	80-120[b]	±20[b]
Plutonium-239/240	PuAEA	None	1 pCi/L	80-120[b]	±20[b]
Radium-226	EPA Method 903.1	None	1 pCi/L	80-120[b]	±20[b]
Total strontium	Rad-Sr	None	2 pCi/L	80-120[b]	±20[b]
Technetium-99	Proportional counting	None	15 pCi/L	80-120[b]	±20[b]
Thorium-232	ThAEA	None	1 pCi/L	80-120[b]	±20[b]
Tritium	Liquid scintillation	None	400 pCi/L	80-120[b]	±20[b]
Nonradiological Constituents – Metals					
Aluminum	EPA Method 6010	None	50 µg/L	80-120[c]	±20[c]
Antimony	EPA Method 6010	None	60 µg/L	80-120[c]	±20[c]
Arsenic	EPA Method 6010	None	100 µg/L	80-120[c]	±20[c]
Barium	EPA Method 6010	None	20 µg/L	80-120[c]	±20[c]
Beryllium	EPA Method 6010	None	5 µg/L	80-120[c]	±20[c]
Cadmium	EPA Method 6010	None	5 µg/L	80-120[c]	±20[c]
Calcium	EPA Method 6010	None	1,000 µg/L	80-120[c]	±20[c]
Chromium	EPA Method 6010	None	10 µg/L	80-120[c]	±20[c]
Copper	EPA Method 6010	None	10 µg/L	80-120[c]	±20[c]
Iron	EPA Method 6010	None	50 µg/L	80-120[c]	±20[c]
Lead	EPA Method 6010	None	50 µg/L	80-120[c]	±20[c]
Magnesium	EPA Method 6010	None	750 µg/L	80-120[c]	±20[c]
Manganese	EPA Method 6010	None	5 µg/L	80-120[c]	±20[c]
Mercury	EPA Method 7470	None	0.5 µg/L	80-120[c]	±20[c]
Nickel	EPA Method 6010	None	40 µg/L	80-120[c]	±20[c]

Table 2-2. Analytical Performance Requirements for Liquid Materials. (3 Pages)

Analyte	Analytical Method	Action Level[a]	RDL Requirement	Accuracy (% Recovery)	Precision (% RPD)
Potassium	EPA Method 6010	None	4,000 µg/L	80-120[c]	±20[c]
Selenium	EPA Method 6010	None	100 µg/L	80-120[c]	±20[c]
Silicon	EPA Method 6010	None	20 µg/L	80-120[c]	±20[c]
Silver	EPA Method 6010	None	10 µg/L	80-120[c]	±20[c]
Sodium	EPA Method 6010	None	500 µg/L	80-120[c]	±20[c]
Vanadium	EPA Method 6010	None	25 µg/L	80-120[c]	±20[c]
Zinc	EPA Method 6010	None	10 µg/L	80-120[c]	±20[c]
Nonradiological Constituents – General Inorganics					
Ammonia	EPA Method 350.1, 2, or 3	100,000 mg/L	50 µg/kg	80-120[c]	±20[c]
Bromide	EPA Method 300.0	None	250 µg/kg	80-120[c]	±20[c]
Chloride	EPA Method 300.0	None	200 µg/kg	80-120[c]	±20[c]
Cyanide	EPA Method 9010	None	5 µg/kg	80-120[c]	±20[c]
Fluoride	EPA Method 300.0	None	500 µg/kg	80-120[c]	±20[c]
Nitrate	EPA Method 300.0	None	250 µg/kg	80-120[c]	±20[c]
Nitrite	EPA Method 300.0	None	250 µg/kg	80-120[c]	±20[c]
Phosphate	EPA 300.0	None	500 µg/kg	80-120[c]	±20[c]
Sulfide	EPA Method 9030	None	500 µg/kg	80-120[c]	±20[c]
Sulfate	EPA Method 300.0	None	500 µg/kg	80-120[c]	±20[c]
Waste Characteristics					
Conductivity	EPA Method 120.1	None	1 µmho/cm^3	80-120[c]	±20[c]
Corrosivity	EPA Method 150.1 (pH)	0.5 <pH <13.0	0.1 pH unit	80-120[c]	±20[c]
Gross alpha	Proportional counting	None	3 pCi/L	80-120[b]	±20[b]
Gross beta	Proportional counting	None	4 pCi/L	80-120[b]	±20[b]
SVOAs	EPA Method 8270	Compound-specific[d]	10 to 50 µg/L[e]	80-120[f]	±20[f]
TDS	EPA Method 160.1	None	10 mg/L	80-120[c]	±20[c]
TOC	EPA Method 415 or EPA Method 9060	None	1 mg/L	80-120[c]	±20[c]

Table 2-2. Analytical Performance Requirements for Liquid Materials. (3 Pages)

Analyte	Analytical Method	Action Level[a]	RDL Requirement	Accuracy (% Recovery)	Precision (% RPD)
TSS	EPA Method 160.2	None	5 mg/L	80-120[c]	±20[c]
VOAs	EPA Method 8260	Compound-specific[d]	5 to 50 µg/L[e]	80-120[f]	±20[f]

[a] Action levels are based on Effluent Treatment Facility waste acceptance criteria.
[b] Accuracy criteria for associated batch laboratory control sample percent recoveries. With the exception of GEA, additional analysis-specific evaluations also performed for matrix spikes, tracers, and carriers, as appropriate to the method. Precision criteria for batch laboratory replicate sample analyses.
[c] Accuracy criteria for associated batch matrix spike percent recoveries. Evaluation based on statistical control of laboratory control samples also performed. Precision criteria for batch laboratory replicate matrix spike sample analyses or replicate sample analyses.
[d] No action levels are specified for general groupings of compounds; action levels are compound specific.
[e] Values shown are "nominal" compound-specific minimums and maximums. Most constituents will fall within the given range. A limited number would have higher detection limits. Individual compounds will be evaluated against established laboratory contractual agreements (based on EPA guidance documents).
[f] Accuracy criteria are the minimum for associated batch laboratory control sample percent recoveries. Laboratories must meet statistically based control if more stringent. Additional analyte-specific evaluations also performed for matrix spikes and surrogates as appropriate to the method. Precision criteria for batch laboratory replicate matrix spike sample analyses.

AEA = alpha energy analysis
EPA = U.S. Environmental Protection Agency, EPA SW-846 (EPA 1986), except for Methods 300.0 and 418.1 (from EPA Method 600/4-79-020 [EPA 1983])
GEA = gamma energy analysis
RDL = required detection limit
RPD = relative percent difference
SVOA= semivolatile organic analyte
TDS = total dissolved solids
TOC = total organic carbon
TSS = total suspended solids
VOA = volatile organic analyte

Table 2-3. Radiological Survey Instrument Performance Requirements.[a]

Analyte	Analytical Method	Detection Limit	Accuracy Requirement	Precision Requirement
Standard Survey Instruments				
Dose rate	µRem meter or ion chamber	0.1 mR/h	[b]	[b]
Removable alpha	Bench-top scaler for removable alpha Portable radiation detector	20 dpm/100 cm²	[b]	[b]
Total (fixed + removable) alpha		100 dpm/100 cm²		
Removable beta-gamma		1,000 dpm/100 cm²		
Total (fixed + removable) beta-gamma		5,000 dpm/100 cm²		
Advanced Characterization				
Tritium	Liquid scintillation	10,000 dpm/ 100 cm²	[b]	[b]
Removable alpha	Electra Plus survey instrument with DP-8B 600-cm² probe[c]	20 dpm/100 cm²	[b]	[b]
Total (fixed + removable) alpha		100 dpm/100 cm²		
Removable beta-gamma		1,000 dpm/100 cm²		
Total (fixed + removable) beta-gamma		5,000 dpm/100 cm²		
Am-241	Nondestructive assay[d] (ISOCS or equivalent)	2 pCi/g	[b]	[b]
Co-60		10 pCi/g		
Cs-137		10 pCi/g		
Eu-152		10 pCi/g		
Eu-154		10 pCi/g		
Eu-155		2 pCi/g		

[a] Other instrumentation may be available and may be deployed based on the historical information and conditions of the facility.
[b] In accordance with manufacturer specifications.
[c] Written direction will be provided to address the data, procedures, and quality requirements prior to using this equipment for waste designation.
[d] Not all of the radionuclides of interest can be directly measured through gamma spectroscopy; therefore, isotopic ratios or scaling factors must be provided for the nondetectable nuclides.
dpm = disintegrations per minute
ISOCS = In Situ Object Counting System, Canberra Industries, Meriden, Connecticut

2.7.2 Standard Fixed Laboratory Methods

Analytical parameters and methods are listed in Tables 2-1 and 2-2. The QA/QC procedures, detection limit requirements, and documentation for individual methods will be in accordance with the specifications outlined in the *Statement of Work for Environmental and Work Characterization Analytical Services* (RFS 1999). Laboratory-specific standard operating procedures for individual analytical methods also will be implemented.

2.7.3 Standard Fixed Laboratory Quality Control Requirements

The minimum QC sample requirements for the analytical laboratory are identified below. Additional method-specific QC samples are prescribed in the references provided in Section 2.7.1.

Laboratory QC requirements will meet the requirements identified in the *Hanford Analytical Services Quality Assurance Requirements Documents* (DOE-RL 1998). The requirements in this document are implemented through the analytical service statement of work (RFS 1999) and are as follows:

- One laboratory method blank for every 20 samples (5% of all samples), analytical batch, or sample delivery group (whichever is most frequent) will be carried through the complete sample preparation and analytical procedure. The method blank will be used to document contamination resulting from the analytical process.
- One laboratory control sample or blank spike will be performed for every batch of samples for each analytical method criteria to monitor the effectiveness of the sample preparation process. The results from the analysis are used to assess laboratory performance.
- As appropriate, a matrix spike sample will be prepared and analyzed for every 20 samples of the same matrix or sample preparation batch, whichever is most frequent. The matrix spike results are used to document the bias of an analytical process in a given matrix.
- Laboratory duplicates or matrix spike duplicates will be used to assess precision and will be analyzed at the same frequency as the matrix spikes.

2.7.4 Field Quality Control Requirements

Collection and analysis of field duplicate samples is not considered necessary or practical for the sampling activities included in this SAP. Data validation will not be conducted on the sample data collected for this SAP. The potential for adverse impacts to data quality are minimal and, if required, opportunities to resample a particular material due to suspect data will likely exist.

Collection and analysis of equipment blanks and trip blanks is not considered necessary or practical for the sampling activities included in this SAP. Data validation will not be conducted on the sample data collected for this SAP. In addition, assessment of blank samples to determine low levels of potential contaminants is not required for analytical data used for waste characterization where worst-case values and conservative assumptions are normally applied. The potential for adverse impacts to data quality are minimal and, if required, opportunities to resample a particular material due to suspect data will likely exist.

Collection and analysis of split samples is not considered necessary for the sampling activities included in this SAP. Data validation will not be conducted on the sample data collected for this

SAP. Comparison of laboratory precision and accuracy is not considered practical or necessary for this waste designation data.

2.7.5 Inspection/Acceptance Requirements for Supplies and Consumables

Procurement activities will meet current requirements found in BSC-300, *WCH Procurement.* Received items/reagents will be inspected for conformance with specifications set in the procurement requisition. If the items/reagents do not meet specifications, the items/reagents will be dispositioned through the nonconformance system.

2.7.6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

Equipment used in the field or laboratory that directly affects analytical data quality will be subject to preventive maintenance to ensure minimal measurement system downtime.

2.7.7 Instrument Calibration and Frequency

All onsite instruments used for sample analysis shall be calibrated in accordance with ENV-1-2.36, "River Corridor Quality Assurance Program Plans." The results from all instrument calibration activities shall be recorded in a bound logbook in accordance with procedures outlined in ENV-1-2.5, "Field Logbooks," or as specified for radiological surveys. Where applicable, tags will be attached to field screening and onsite analytical instruments to note the date when the instrument was last calibrated and the calibration expiration date.

2.7.8 Data Management

Laboratory data will be managed and stored by the current contractor's sample management organization in accordance with ENV-1-2.10, "Sample Event Coordination."

All analytical data packages shall be subject to final technical review by qualified reviewers before submitting to regulatory agencies or inclusion in reports or technical memoranda, at the direction of the D4 project engineer. Electronic data access, when appropriate, shall be through computerized databases (e.g., Hanford Environmental Information System). Where electronic data are not available, hard copies will be provided in accordance with Section 9.6 of the Tri-Party Agreement (Ecology et al. 1989).

2.8 ASSESSMENT/OVERSIGHT

2.8.1 Assessments and Response Actions

The current contractor quality services group may conduct random surveillance and audits in accordance with QA-1, *Quality Assurance*, QA-1-1.7, "WCH Surveillances – Internal, Subcontractor and Other Hanford Contractors," to verify compliance with requirements outlined in this SAP, project work packages, the current contractor quality management plan, current contractor procedures, and regulatory requirements.

Deficiencies identified by any of these assessments shall be reported in accordance with QA-1-1.5, "Self-Assessment." When appropriate, corrective actions will be taken by the project engineer in accordance with *Hanford Analytical Services Quality Assurance Requirements Documents*, Vol. 1, Section 4.0 (DOE-RL 1998) to minimize recurrence.

2.8.2 Reports to Management

Management shall be made aware of deficiencies identified by assessments or self-assessments. Corrective action required as a result of surveillance reports, nonconformance reports, or audit activities will be documented and dispositioned, as required by QA-1-1.1, "Corrective Action Request." Other measurement systems, procedures, or plan corrections required as a result of routine review processes will be resolved by governing procedures or will be referred to the technical lead for resolution. Findings from audits, surveillance, and assessments will be transmitted to the project manager and the current contractor QA department for program-related tracking and trending. Otherwise, the routine evaluation of data quality described throughout this QAPjP will be documented and filed with the data in the project file.

2.9 DATA VALIDATION AND USABILITY

2.9.1 Data Review, Validation, and Verification Requirements

Data verification and validation are performed on analytical data sets to confirm sampling and chain-of-custody documentation are complete, sample numbers can be tied to the specific sampling location, samples were analyzed within the required holding times, and analyses met the data quality requirements specified in this SAP. Data collected in accordance with this SAP will not be used to determine final closure decisions, and the potential for adverse impacts related to data quality issues is minimal. Therefore, the data will not undergo formal data validation. Routine verification of data packages will be conducted in accordance with ENV-1-2.11, "Sample Documentation Processing."

2.9.2 Data Validation Requirements

Data collected in accordance with this SAP are not intended to be used to determine final closure decisions; therefore, the data will not be required to undergo formal data validation. In addition, assessment of blank samples to determine low levels of potential contaminants is not needed for analytical data used for waste characterization. The potential for adverse impacts to the data quality is minimal and, if needed, opportunities to resample a particular material due to suspect data will likely exist.

2.10 FIELD SAMPLING PROCEDURES

2.10.1 Sample Collection Requirements

Field sampling methodology will be implemented in accordance with the requirements outlined in ENV-1, including the following procedures:

- ENV-1-2.16, "Soil and Sediment Sampling"
- ENV-1-2.19, "Environmental Media Sampling"
- ENV-1-2.20, "Sample Compositing."

2.10.2 Sample Handling, Shipping, and Sample Custody Requirements

Sample handling, shipping, and custody requirements will be implemented in accordance with the requirements outlined in ENV-1, including the following procedures:

- ENV-1-2.13, "Chain of Custody"
- ENV-1-2.14, "Sample Packaging and Shipping"
- ENV-1-2.17, "Sample Storage and Shipping Facility."

The sample handling, shipping, and custody requirements shall consider waste codes listed in the *Resource Conservation and Recovery Act of 1976*. These waste codes shall be recorded on the SAF and the chain-of-custody form.

2.10.3 Sample Volumes, Preservation, Container Requirements, and Holding Times

Sample volumes and bottle types depend on the laboratory and analytical methods used. Sample preservation, container types and sizes, analytical methods, and holding time requirements for the analysis to be performed will be established and documented in the project-specific SAFs in accordance with ENV-1-2.10, "Sample Event Coordination." Bottle types, preservation, and holding times are based wherever possible on established protocols (e.g., EPA SW-846) and/or industry standard practices. The allowable holding times will be identified on the SAF for unique sample events if holding times cannot be met. The reason for not meeting the holding times shall be documented in the field logbook or in the data package from the laboratory.

2.11 SURVEY MEASUREMENT PROCEDURES

Survey activities shall be implemented in accordance with the current version of the applicable contractor procedures.

2.11.1 Scoping Surveys

Characterization scoping surveys will be completed for each facility or group of similar facilities in the scope of this project. The scoping surveys are composed of routine radiological surveys and IH baseline surveys. Scoping surveys will be conducted prior to any major equipment or material removal activities to determine the nature and extent of contamination in the facility. Radiological scoping surveys will be implemented in accordance with RC-200, *Radiological Control Field Procedures*, RC-200-4.2, "Radiological Surveys." The instruments are operated and maintained in accordance with RC-300, *Radiological Control Instrumentation Procedures*, RC-300-2.1, "Performance Checks of Portable Instruments."

The IH scoping surveys will be implemented in accordance with SH-1, *Safety and Health*, SH-1-4.3, "Industrial Hygiene Surveys."

2.11.2 Material Release Surveys for Reuse or Recycle

Material release surveys will be performed in accordance with RC-200-4.4, "Material Release." Instrument calibrations and survey records will be completed in accordance with RC-300-2.1, "Performance Checks of Portable Instruments," and survey records will be completed in accordance with RC-200-4.2, "Radiological Surveys."

3.0 FIELD SAMPLING PLAN

The objective of the field sampling plan is to delineate the field activities, sampling and analysis activities, as well as procedures required to address Step 5 of the DQO summary report (BHI 2003a). The following sections summarize field characterization activities, scoping survey strategies, media sampling strategies, and sampling analysis activities to be implemented in the field.

3.1 OBJECTIVE

A focused (biased) sampling design to estimate worst-case concentrations in media where contamination can be reliably expected to be found is suited to provide characterization information that will meet the objectives identified for this project. Otherwise, statistical sampling designs may be prepared as discussed in Section 3.2.7. Historical information, facility inspections, scoping surveys, and analytical sampling data will be collected to meet the following objectives:

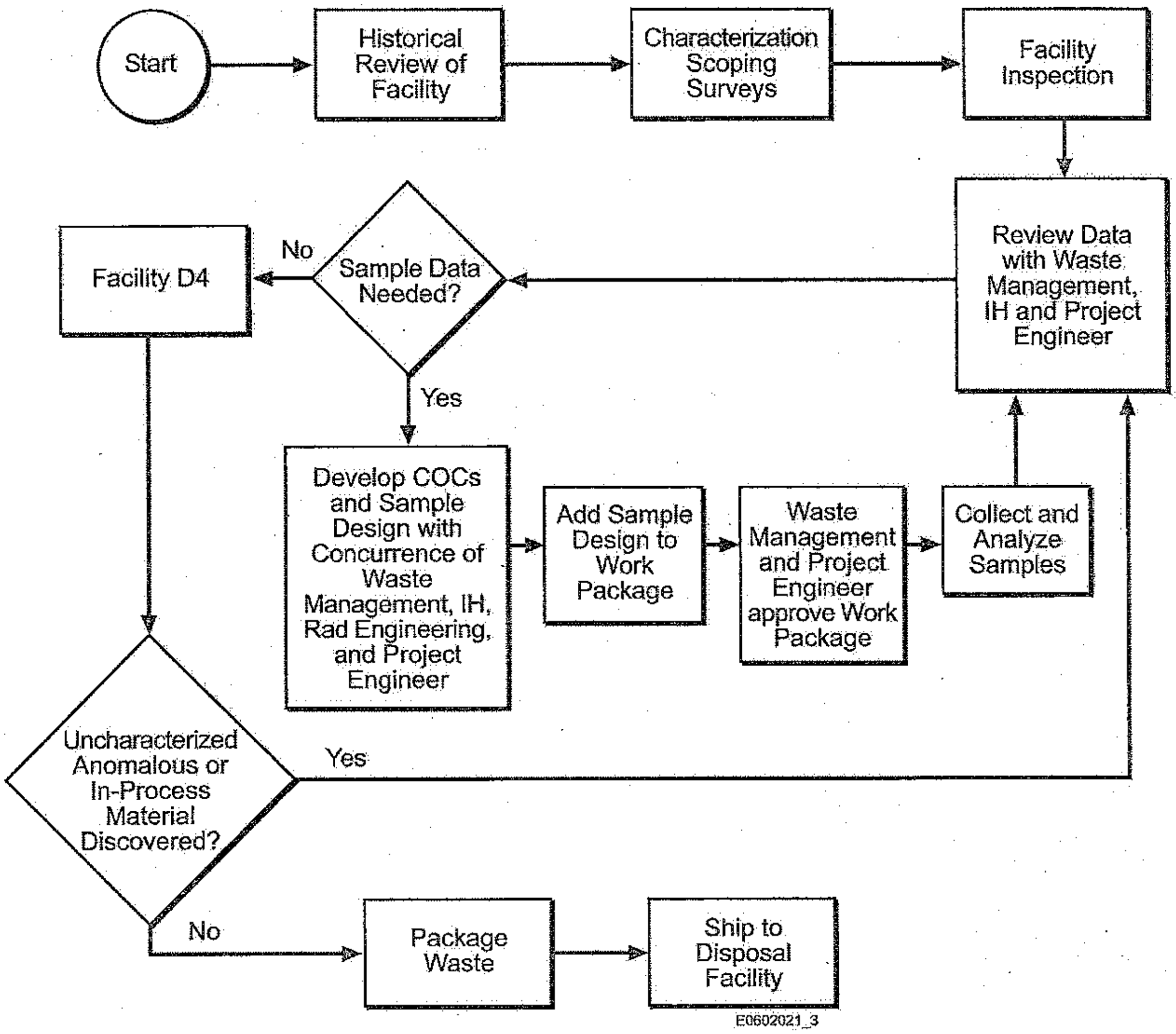
- Establish worst-case, upper bounding estimates of contaminant levels to characterize waste streams associated with each type of facility
- Provide characterization data to support waste management decisions for disposition of materials.

3.2 CHARACTERIZATION DESIGN

Facility-specific sample designs will be developed by the characterization lead using historical information, process knowledge, scoping surveys, and facility walkdowns. The final sample design decisions will be developed with the concurrence of the D4 project team, which will include the project characterization lead and technical specialists (e.g., Waste Operations, Engineering Services, and Radiological Control Engineering).

Figure 3-1 is a flow diagram of the sample design that will be used to characterize waste materials to support 100-N Area D4 activities.

Figure 3-1. Sample Design Flow Diagram.



3.2.1 Pre-Demolition Characterization

Pre-demolition characterization will be conducted for facilities in the scope of this SAP to identify potential hazards, determine health and safety requirements, establish radiological and chemical contamination levels, and determine appropriate waste management requirements. Pre-demolition characterization will include activities described in the following subsections.

3.2.1.1 Historical Site Assessment. Historical information will be identified, reviewed, summarized, and documented for facilities prior to demolition. Information reviewed will include Waste Information Data System and Hanford Environmental Information System databases, facility drawings, historical reports, deactivation files (if available), radiation survey reports, and other pertinent sources.

3.2.1.2 Characterization Scoping Survey. Characterization scoping surveys (CSSs) will be completed for facilities in the scope of this project. The CSS will consist of routine radiation surveys of accessible surfaces of the waste media conducted by the project radiological control technicians. Additional uniformly distributed and/or biased measurements may be collected at the discretion of the project radiological engineer.

The CSS may also include an IH baseline survey of the facility conducted by the project IH technicians. The IH surveys consisting of uniformly distributed and/or biased measurements for specific contaminants (e.g., beryllium dust) may be collected at the discretion of the project IH professional.

All areas within the facilities may not have the same potential for contamination and, therefore, will not require the same level of survey coverage. Facilities may be designated into survey areas to facilitate the CSS. "Survey area" is a general term referring to any portion of a facility. For example, a survey area could be a group of facilities, a single facility, or one or more rooms within a facility. Survey areas will be delineated based on contamination potential, considering historical information and current radiological postings. The project radiological engineer, IH professional, and characterization lead will be responsible for dividing the facilities into appropriate survey areas.

Information from scoping surveys will be used to determine the extent of contamination in the facility and support worker health and safety decisions during D4 activities. The scoping surveys are not intended for waste designation purposes.

3.2.1.3 Facility Inspection. Facilities will be inspected prior to demolition. The inspection will include an assessment of hazardous materials (radiological and chemical) and potentially hazardous materials contained in or in a part of the facility. The inspection should include checking areas of material buildup such as sumps, drains, ventilation ductwork, and other effluent handling systems. Potential media-specific sampling locations may be identified during the inspection. Identification of anomalous materials and conditions is an important part of this activity. Photographs and sketches of the site may be used to support the inspection. Information obtained during the inspection will be used to develop the characterization work package.

3.2.1.4 Characterization Work Package. Based on the results of the facility inspection, an initial characterization plan may be prepared. In some cases, no further information will be needed to support waste management decisions. In these cases no sampling will be required.

When characterization sampling is required, a sample design will be developed with the concurrence of the waste management SME and, as needed, radiological engineering, safety and health, and an IH SME. The sample design will identify the number of samples needed, where the samples should be collected, the required analyses, and any specific sampling requirements. The sample design information will be incorporated into the characterization work package for the specific facility. The facility-specific work package will be approved by the project superintendent, waste management SME, and project engineer. Field sampling will be planned and conducted in accordance with the facility-specific work package.

Additional materials needing characterization may be discovered during deactivation of the facility. The sample design information for any additional characterization will be added to the characterization work package with concurrence from the waste management SME and, as needed, radiological engineering, safety and health, and the IH SME. The facility-specific work package will be approved by the project superintendent, waste management SME, and the project engineer. Field sampling will be planned and conducted in accordance with the work package.

3.2.2 Specific Media Sampling

Existing data and process knowledge will be used to support safety and health and waste management decisions. The goal of specific media sampling is to determine the nature and extent of radiological and/or chemical contaminants to support waste management decisions. The sample data may also be used to support safety and health decisions.

Surface media samples (e.g., paint, flooring material, roofing material, pipe scale, and sediment) will be collected, as needed, to provide focused characterization data if the pre-demolition characterization effort indicates that such samples are warranted. The surface media samples will be collected from biased sampling locations based on the judgment of the project characterization lead, waste management specialist, radiological engineer, and/or other subject matter specialists as appropriate.

If a potential pathway for volumetric contamination exists, and historical information or characterization walkdowns indicate that volumetric sampling is warranted, volumetric samples shall be collected for analysis as part of the biased sampling measurements. Such samples (e.g., concrete or cinderblock boring samples) will be collected in areas where contamination may have migrated into base materials. For example, volumetric samples may be collected in areas that have a history of repeated spills of contaminated liquids. The samples will be collected from worst-case sampling locations based on the judgment of the project characterization lead, waste management SME, radiological engineer, and other subject matter specialists as appropriate. If worst-case sampling locations cannot be reliably determined, then a statistical sampling design may be developed as discussed in Section 3.2.7 of this SAP.

3.2.3 In-Process Media Sampling

Specific media may be sampled to characterize materials for disposal. This may include drummed or bulk liquids, solids, or sludge materials.

A single sample may be used to characterize containerized liquid media provided that a representative profile of the material can be obtained during sampling. If strata are identified in the material, subsampling of identified strata may be required to adequately characterize the material.

Containerized or bulk solids, sediment, or sludge media are generally considered more likely to be heterogeneous than liquid materials. Discrete samples may be obtained from the same source to characterize solids, sediment, or sludge material at locations of high potential contamination. Field radiological measurements and visual observations shall be used to determine biased sampling locations.

The samples will be analyzed for the radiological and chemical COCs identified in the characterization work package. Analytical performance requirements are established in Tables 2-1 and 2-2 of this SAP. Sampling locations, survey records, logbook entries, photographs, and other pertinent information shall be documented in the characterization files.

The laboratory data will be used to confirm contamination levels in each of the materials and determine the appropriate disposition of the waste materials. Containerized aqueous liquids and petroleum products may be evaluated for reuse or recycling.

3.2.4 Profile Verification

Prior to waste shipment, the waste transportation specialist shall ensure that waste meets the ERDF profile and appropriate U.S. Department of Transportation placarding and manifesting requirements. Radiological operations shall ensure that radiological surveys are completed prior to shipment.

3.2.5 Radiological Material Release Surveys for Reuse

Salvageable materials that have no potential for volumetric contamination may be surveyed for release. The material release surveys will involve routine radiation surveys of accessible surfaces of the waste materials conducted by the project radiological control technicians. Survey method, instrument calibration, operation, and documentation requirements are described in Section 2.7 of this SAP.

Additional surveys for offsite release will be conducted, as required, in accordance with appropriate property release requirements.

3.2.6 Anomalous Waste Materials

Anomalous waste materials include any unanticipated material discovered during D4 operations that will require sampling and analysis to support disposition. Sampling and analytical decisions will be made for the materials based on consultation between the project characterization lead, waste management SME, radiological engineer, project environmental lead, and other subject matter specialists, as appropriate. The team will evaluate appropriate historical information, process knowledge, and existing analytical data to determine if additional analytical information is required to support waste management decisions.

3.2.7 Statistical Sample Design

This SAP uses a focused (biased) sample design to provide upper bounding data to support waste management decisions. If a particular waste media or contaminated matrix is encountered that warrants use of a statistical sample design, such a design will be developed during the pre-demolition characterization activities. The statistical sample design will be reviewed and approved by the project and functional representatives as a part of the characterization activities discussed in this section.

4.0 MANAGEMENT OF WASTE

Waste generated as a result of sampling activities will be managed in accordance with the 100-N Ancillary Facilities RAWP (DOE-RL 2006). Unused samples and associated laboratory waste from the analysis will be dispositioned in accordance with the laboratory contract.

Pursuant to 40 CFR 300.440, EPA project manager approval is required before returning unused samples or wastes from laboratories located offsite. Approval of this SAP constitutes EPA project manager approval for shipment of samples and sample waste from the Hanford Site laboratories back to the waste site of origination.

5.0 HEALTH AND SAFETY

All field operations will be performed in accordance with Washington Closure Hanford health and safety requirements, which are outlined in SH-1, *Safety and Health*, and RC-1, *Radiation Protection Procedures*.

Work planning, hazards analysis, and contingency planning will be conducted in accordance with the work control process as described in PAS-2, *Work Management*. The project work packages will include a job hazard analysis, site-specific health and safety plan, and applicable radiological work permits.

The sampling procedures and associated activities will consider exposure reduction and contamination control techniques that will minimize the radiation exposure to the sampling team, as required by QA-1, *Quality Assurance*, and SH-1.

6.0 REFERENCES

10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Waste," *Code of Federal Regulations*, as amended.

40 CFR 268, "Land Disposal Restrictions," *Code of Federal Regulations*, as amended.

40 CFR 300.440, "Procedures for Planning and Implementing Offsite Response Actions," *Code of Federal Regulations*, as amended.

BHI, 2003a, *Data Quality Objectives Summary Report for the 100-N Ancillary Facilities and the 190-DR Building*, BHI-01685, Rev. 0, Bechtel Hanford, Inc., Richland, Washington.

BHI, 2003b, *Environmental Restoration Disposal Facility Waste Acceptance Criteria*, BHI-00139, Rev. 4, Bechtel Hanford, Inc., Richland, Washington

BSC-1, *Business Services and Communications*, Washington Closure Hanford, Richland, Washington.

BSC-300, *WCH Procurement*, Washington Closure Hanford, Richland, Washington.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601, et seq.

DOE-RL, 1998, *Hanford Analytical Services Quality Assurance Requirements Documents*, DOE/RL-96-68, Rev. 2, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 2006, *Removal Action Work Plan for 100-N Ancillary Facilities*, DOE/RL-2002-70, Rev. 2, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, 2 vols., as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

ENV-1, *Environmental Monitoring & Management*, Washington Closure Hanford, Richland, Washington.

EPA, 1983, *Methods for Chemical Analysis of Water and Wastes*, EPA-600/4-79-010, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1986, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, SW-846, 3rd ed., U.S. Environmental Protection Agency, Washington, D.C.

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EPA, 2000, *Guidance for the Data Quality Objectives Process*, EPA QA/G-4, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 2001, *EPA Requirements for Quality Assurance Project Plans*, EPA QA/R-5, Interim Final, dated November 1999, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 2002a, *EPA Guidance for Quality Assurance Project Plans*, EPA QA/G-5, U.S. Environmental Protection Agency, Office of Research and Development, Washington, D.C.

EPA, 2002b, *United States Department of Energy, Hanford Site, EPA ID# WA7 89000 8967, CERCLA Off-Site Acceptability Determination*, Letter dated March 5, 2002, to Joel Hebdon, U.S. Department of Energy, Richland Operations Office, from Richard Albright, EPA Region 10, U.S. Environmental Protection Agency, Region 10, Seattle, Washington.

FH, 2005a, *Hanford Site Liquid Waste Acceptance Criteria*, HNF-3172, Rev. 3, Fluor Hanford, Richland, Washington.

FH, 2005b, *Hanford Site Solid Waste Acceptance Criteria*, HNF-EP-0063, Rev. 12, Fluor Hanford, Richland, Washington.

PAS-2, *Work Management*, Washington Closure Hanford, Richland, Washington.

QA-1, *Quality Assurance*, Washington Closure Hanford, Richland, Washington.

RC-1, *Radiation Protection Procedures,* Washington Closure Hanford, Richland, Washington.

RC-200, *Radiological Control Field Procedures*, Washington Closure Hanford, Richland, Washington.

RC-300, *Radiological Control Instrumentation Procedures*, Washington Closure Hanford, Richland, Washington.

Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, et seq.

RFS, 1999, *Statement of Work for Environmental and Work Characterization Analytical Services*, RFSH-SOW-0003, Rev. 6, Rust Federal Services, Richland, Washington.

SH-1, *Safety and Health*, Washington Closure Hanford, Richland, Washington.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.

APPENDIX A

100-N ANCILLARY FACILITIES AND ASSOCIATED WASTE STREAMS

Table A-1. Miscellaneous Support Facilities. (2 Pages)

Facility Number	Facility Name	Waste Streams																					Historical Data		Pre-Demolition Data Needed?
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Asbestos Data	Radiological Survey Data	
11-N	Change room	X	X								X				X	X		X					4 samples	36 measurements	No
13-N	Storage building	X	X								X				X	X		X					4 samples	49 measurements	No
105-NB	Maintenance shop addition	X	X			X					X	X	X		X	X	X	X		X	X	X	None	None	Yes
105-ND	Remote air intake	X	X																			X	No suspect ACM	None	Yes
119-N	Exhaust air monitoring building	X	X								X				X	X		X					None	None	Yes
119-NA	Stack air monitoring	X	X								X				X	X		X					No suspect ACM	63 measurements	No
151-N	Electrical substation	X	X			X					X	X	X		X	X	X	X		X	X	X	None	None	Yes
153-N	Electrical substation	X	X			X					X	X	X		X	X	X	X		X	X	X	8 samples	None	Yes
181-NA	River pump house guard tower	X	X								X				X	X		X					5 samples	28 measurements	No
181-NC	Sample shack	X	X								X		X		X	X		X					None	None	Yes
1112-N	Document control building	X	X								X	X	X	X	X	X	X	X		X		X	None	None	Yes
1112-NA	Microwave tower	X	X								X	X	X	X	X	X	X	X					None	None	Yes
1120-N	Storage and training building	X	X			X					X	X	X		X	X	X	X		X	X	X	None	None	Yes
1143-N	Carpenter/paint shop	X	X		X	X					X	X	X		X	X	X	X		X		X	None	None	Yes
1330-N	Waste storage facility	X	X								X				X	X		X				X	None	None	Yes
1331-N	Storage structure	X	X								X				X	X		X				X	None	None	Yes
1332-N	Gas bottle storage dock	X	X																				None	None	Yes
1515-N	Fixed multi-craft shop	X	X			X					X		X		X	X		X		X		X	None	None	Yes
1516-N	Carpenter shop	X	X		X						X				X	X		X				X	None	None	Yes
1517-N	Painter shop	X	X		X						X				X	X		X					None	None	Yes
1518-N	Electrical shop	X	X								X				X	X		X					None	None	Yes
1519-N	Pipefitter shop	X	X								X				X	X		X					None	None	Yes
1705-N	Maintenance shop	X	X			X					X		X		X	X	X	X		X		X	None	None	Yes
1705-NA	Maintenance shop annex	X	X								X		X		X	X	X	X		X		X	None	None	Yes
1706-N	Maintenance shop	X	X								X		X		X	X	X	X		X	X	X	None	None	Yes
1712-N	Insulators shop	X	X								X				X	X		X				X	None	None	Yes

Table A-1. Miscellaneous Support Facilities. (2 Pages)

Facility Number	Facility Name	Waste Streams																					Historical Data		Pre-Demolition Data Needed?
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Asbestos Data	Radiological Survey Data	
1714-N	Warehouse	X	X								X			X	X	X	X	X		X		X	None	None	Yes
1714-NA	Warehouse	X	X								X				X	X	X	X		X		X	None	None	Yes
1714-NB	Warehouse	X	X								X				X	X		X				X	No suspect ACM	17 measurements	Yes
1723-N	Warehouse	X	X								X				X	X	X	X		X		X	None	None	Yes
1723-NX	Laydown storage area	X																					None	None	Yes
1724-N	Nitrogen electrical control	X																				X	No suspect ACM	None	Yes
1802-N	Pipe trestle, 109-N to Hanford Generating Plan (HGP) fence	X	X																			X	7% to 90% asbestos	HGP sample data	No

Waste streams:

1 Bulk demolition debris
2 Asbestos-containing material (ACM)
3 Bulk aqueous liquids
4 Bulk solids/sludge
5 Bulk oils, greases, and petroleum products
6 Specialized tank coatings
7 Tank foundation sand
8 Boiler soot
9 Spacer silo residue
10 Refrigerated systems
11 Mercury switches
12 Transformers
13 Lead packing and shielding
14 Fluorescent light ballasts
15 Fluorescent, incandescent, and mercury vapor lights
16 Emergency light batteries
17 Foam insulation
18 Old-style steel siding
19 Exit signs and smoke detectors
20 Salvage material
21 Soil and sediment

Table A-2. Water Supply and Storage Facilities.

Facility Number	Facility Name	Waste Streams																					Historical Data		Pre-Demolition Data Needed?
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Asbestos Data	Radiological Survey Data	
181-N	River pump house	X	X		X	X					X	X	X	X	X	X	X	X		X	X	X	6 samples	47 measurements	Yes
181-NB	No. 3 diesel pump house	X	X		X	X					X	X	X	X	X	X	X	X		X	X		No suspect ACM	None	Yes
182-N	High-lift pump house	X	X	X	X	X					X	X	X	X	X	X	X	X		X	X	X	10 samples	111 measurements	Yes
1900-N	Water supply tanks	X	X	X			X	X														X	23 samples	112 measurements	Yes
190-DR	Pump house at 100-DR Area	X	X	X	X	X					X	X	X	X	X	X	X	X	X	X		X	None	None	Yes

Waste streams:

1 Bulk demolition debris
2 Asbestos-containing material (ACM)
3 Bulk aqueous liquids
4 Bulk solids/sludge
5 Bulk oils, greases, and petroleum products
6 Specialized tank coatings
7 Tank foundation sand
8 Boiler soot
9 Spacer silo residue
10 Refrigerated systems
11 Mercury switches
12 Transformers
13 Lead packing and shielding
14 Fluorescent light ballasts
15 Fluorescent, incandescent, and mercury vapor lights
16 Emergency light batteries
17 Foam insulation
18 Old-style steel siding
19 Exit signs and smoke detectors
20 Salvage material
21 Soil and sediment

Table A-3. Water Treatment and Storage Facilities.

Facility Number	Facility Name	Waste Streams																					Historical Data		Pre-Demolition Data Needed?
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Asbestos Data	Radiological Survey Data	
108-N	Chemical unloading/ storage	X	X	X	X						X		X		X	X		X				X	4 samples	7 measurements	Yes
163-N	Demineralized water treatment plant	X	X	X	X	X	X				X	X	X		X	X	X	X		X	X	X	3 samples	None	Yes
183-N	Water treatment plant	X	X	X	X	X					X	X	X		X	X	X	X		X	X	X	None	None	Yes
183-NA	Pump house	X	X	X	X	X	X						X		X	X		X			X	X	None	None	Yes
183-NB	Clear well	X	X	X	X	X															X	X	None	None	Yes
183-NC	Filter backwash sump	X	X	X	X										X	X		X				X	None	None	Yes

Waste streams:

1 Bulk demolition debris
2 Asbestos-containing material (ACM)
3 Bulk aqueous liquids
4 Bulk solids/sludge
5 Bulk oils, greases, and petroleum products
6 Specialized tank coatings
7 Tank foundation sand
8 Boiler soot
9 Spacer silo residue
10 Refrigerated systems
11 Mercury switches
12 Transformers
13 Lead packing and shielding
14 Fluorescent light ballasts
15 Fluorescent, incandescent, and mercury vapor lights
16 Emergency light batteries
17 Foam insulation
18 Old-style steel siding
19 Exit signs and smoke detectors
20 Salvage material
21 Soil and sediment

Table A-4. Powerhouse and Fuel Storage Facilities.

Facility Number	Facility Name	Waste Streams																					Historical Data		Pre-Demolition Data Needed?
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Asbestos Data	Radiological Survey Data	
166-N	Fuel oil pump house/storage	X	X	X	X	X					X	X	X		X	X	X	X		X	X	X	5 samples	46 measurements	Yes
184-N	Power house	X	X	X	X	X	X		X		X	X	X		X	X	X	X		X	X	X	8 samples	100 measurements	Yes
184-NA	Power house annex (CE boiler)	X	X	X	X	X	X		X		X	X	X		X	X	X	X		X	X	X	2 samples	60 measurements	Yes
184-NB	Air handler main building	X	X	X														X				X	3 samples	None	Yes
184-NC	Air handler, annex building	X	X															X				X	3 samples	30 measurements	No
184-ND	Diesel oil day tanks	X						X														X	No suspect ACM	None	Yes
184-NE	Compressed gas sheds	X	X															X					No suspect ACM	None	Yes
184-NF	Chemical injection pump	X	X	X	X	X					X	X	X		X	X	X	X			X	X	No suspect ACM	44 measurements	Yes
1715-N	Diesel oil storage tanks	X						X														X	No suspect ACM	None	Yes

Waste streams:

1 Bulk demolition debris
2 Asbestos-containing material (ACM)
3 Bulk aqueous liquids
4 Bulk solids/sludge
5 Bulk oils, greases, and petroleum products
6 Specialized tank coatings
7 Tank foundation sand
8 Boiler soot
9 Spacer silo residue
10 Refrigerated systems
11 Mercury switches
12 Transformers
13 Lead packing and shielding
14 Fluorescent light ballasts
15 Fluorescent, incandescent, and mercury vapor lights
16 Emergency light batteries
17 Foam insulation
18 Old-style steel siding
19 Exit signs and smoke detectors
20 Salvage material
21 Soil and sediment

Table A-5. Radioactive Waste Handling Facilities.

Facility Number	Facility Name	Waste Streams																					Historical Data		Pre-Demolition Data Needed?
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Asbestos Data	Radiological Survey Data	
117-NVH	Valve control house	X	X	X										X	X	X		X				X	No suspect ACM	None	Yes
1300-N	Emergency dump basin	X	X	X	X									X								X	No suspect ACM	60 measurements	No
1303-N	Spacer silos	X	X		X					X												X	None	13 measurements	Yes
1304-N	Emergency dump tank	X	X	X	X																	X	Asbestos abatement samples	Westinghouse Hanford Company (WHC) sample data	No
1313-N	Change control building	X	X								X		X	X	X	X	X	X		X		X	No suspect ACM	25 measurements	Yes
1908-N	N Reactor outfall	X	X		X																	X	No suspect ACM	None	Yes

Waste streams:

1 Bulk demolition debris
2 Asbestos-containing material (ACM)
3 Bulk aqueous liquids
4 Bulk solids/sludge
5 Bulk oils, greases, and petroleum products
6 Specialized tank coatings
7 Tank foundation sand
8 Boiler soot
9 Spacer silo residue
10 Refrigerated systems
11 Mercury switches
12 Transformers
13 Lead packing and shielding
14 Fluorescent light ballasts
15 Fluorescent, incandescent, and mercury vapor lights
16 Emergency light batteries
17 Foam insulation
18 Old-style steel siding
19 Exit signs and smoke detectors
20 Salvage material
21 Soil and sediment

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