INTEGRATED DISPOSAL FACILITY
APPENDIX BA
QUALITY ASSURANCE PROJECT PLAN FOR IDF WASTE ANALYSIS
CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number

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APPENDIX BA
QUALITY ASSURANCE PROJECT PLAN FOR IDF WASTE ANALYSIS

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ACRONYMS

ALARA	As Low as Reasonably Achievable
DOE-RL	U.S. Department of Energy, Richland Operations Office
DQO	Data Quality Objective
DWMU	Dangerous Waste Management Unit
Ecology	Washington State Department of Ecology
EQL	Estimated Quantitation Limit
FWS	Field Work Supervisor
IDF	Integrated Disposal Facility
LCS	Laboratory Control Sample
LDR	Land Disposal Restriction
MDL	Method Detection Limit
QA	Quality Assurance
QAPjP	Quality Assurance Project Plan
QC	Quality Control
RCRA	*Resource Conservation and Recovery Act of 1976*
RPD	Relative Percentage Difference
TSD	Treatment, Storage, and Disposal
WAP	Waste Analysis Plan

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BA.1 INTRODUCTION

This Quality Assurance Project Plan (QAPjP) supports the sampling and analysis to be implemented by the Integrated Disposal Facility (IDF) in support of waste stream characterization. The primary objective of this QAPjP is to support the analytical methods described in the Hanford Facility *Resource Conservation and Recovery Act of* 1976 (RCRA) Permit Addendum B, "Waste Analysis Plan" (WAP). This QAPjP will ensure that the data resulting from waste sample analysis activities is of adequate quality and quantity to support the decision-making process for the treatment, storage, and disposal (TSD) of low-level and mixed wastes at IDF. This QAPjP was prepared using guidance provided in the following references:

- EPA/240/R-02/009, *Guidance for Quality Assurance Project Plans* (EPA QA/G-5).
- SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, Third Edition; Final Update VI.

Quality assurance (QA) and quality control (QC) ensure that an activity or project meets a required quality standard. QA is associated with record keeping, tracking, audits, and assessments, and it involves determining the level of quality and setting limits in advance. QC is associated with the controls implemented while an activity is being performed. This QAPjP complies with the QA requirements for analytical services at the Hanford Site.

The Permittee is responsible for ensuring that the QAPjP is maintained at the facility and kept current when the corresponding IDF WAP is revised.

This QAPjP applies to the collection of waste samples performed at IDF and their testing as directed by the IDF WAP. The collection of samples for laboratory analysis may be used to designate, treat, and/or determine the land disposal restriction (LDR) status of waste. The following sections apply to samples subjected to analysis at a laboratory.

BA.2 PROJECT DESCRIPTION

The purpose of the IDF dangerous waste management units (DWMUs) is to treat, store, and dispose of mixed waste. IDF also manages nondangerous low-level waste from Hanford Site operations in accordance with the *Atomic Energy Act of 1954*. Management of radioactive waste is not within the scope of RCRA or Washington Administrative Code (WAC) 173-303, *Dangerous Waste Regulations*. Any information provided in this document for radioactive waste is for informational purposes only. Details regarding the TSD processes at IDF are provided in Addendum C, "Process Information."

IDF manages self-generated waste and a variety of waste streams received from onsite generators, as described in the IDF WAP. Some of these Hanford Site wastes will be sent offsite for treatment and returned to IDF for disposal. This QAPjP describes the quality standards established for mixed waste sample collection performed at IDF for self-generated waste, and subsequent analysis activities.

BA.3 PROJECT MANAGEMENT

This section of the QAPjP addresses project organization and responsibility, special training requirements, documentation and records, and standard operating procedures.

BA.3.1 Project Organization and Responsibility

The U.S. Department of Energy, Richland Operations Office (DOE-RL) is the lead agency for the waste characterization presented in this QAPjP. In terms of waste sampling and characterization, the project organization is described in the following sections and is shown graphically in Figure BA-1. Since waste sampling requires interface between multiple organizations, changes to the project organization, roles, and responsibilities can occur to achieve specific sampling objectives. Individuals with different titles but similar/equivalent positions may fulfill these roles.

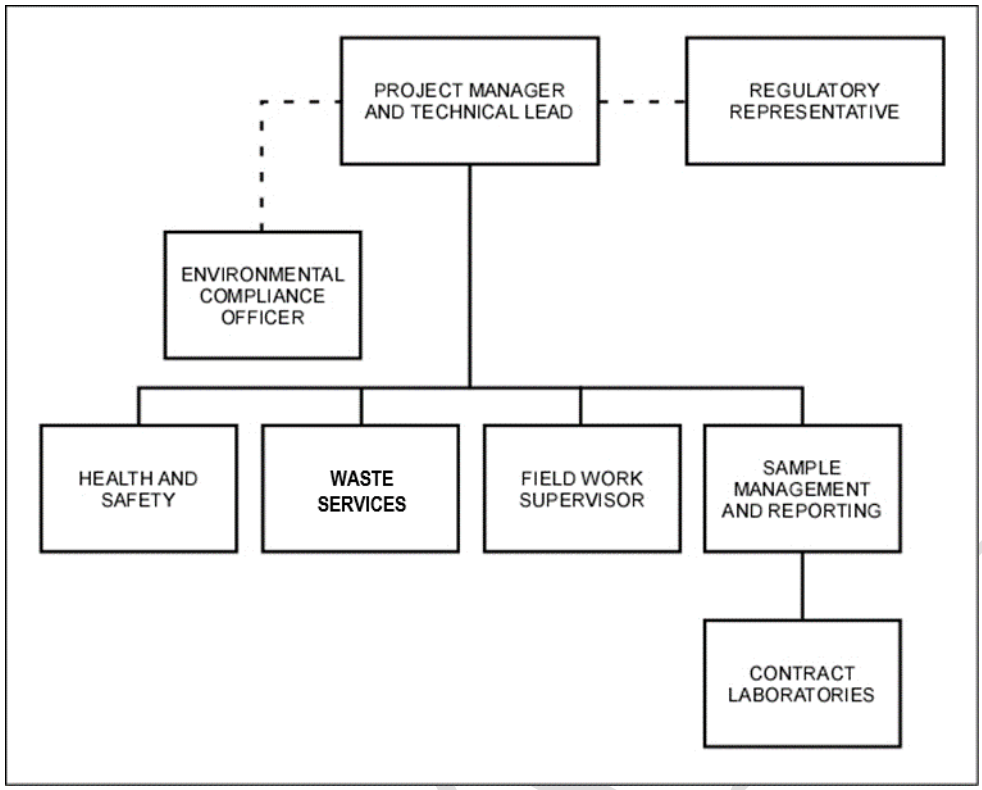

Figure BA-1 Project Organization

BA.3.1.1 Regulatory Representative

The Washington State Department of Ecology (Ecology) Project Manager is responsible for regulatory oversight of the waste stream sampling at IDF.

BA.3.1.2 Project Manager and Technical Lead

The contractor Project Manager provides oversight of sampling activities and coordinates with DOE-RL, Ecology, and contract management.

The Project Manager (or designee) for the IDF waste sampling is responsible for direct management of sampling documents and requirements, field activities, and subcontracted tasks. The Project Manager is responsible for ensuring that project personnel are working to the IDF WAP and for updating field personnel on changes.

The Project Manager works closely with Health and Safety and the Field Work Supervisor (FWS) to integrate these and other lead disciplines in planning and implementing the work scope. The Project Manager also coordinates with DOE-RL and the contractor management on all sampling activities. The Project Manager supports DOE-RL in coordinating sampling activities with the Regulatory Representative. In addition, the contractor Project Manager provides support to the Project Technical Lead to ensure that work is performed safely and cost effectively.

BA.3.1.3 Environmental Compliance Officer

The contractor Environmental Compliance Officer provides technical oversight, direction, and acceptance of project and subcontracted environmental work, and develops appropriate mitigation measures with a goal of minimizing adverse environmental impacts.

BA.3.1.4 Health and Safety

The contractor Health and Safety organization is responsible for coordinating industrial safety and health support within the project, as carried out through health and safety plans, job hazard analyses, and other pertinent safety documents required by federal regulation or internal primary contractor work requirements.

BA.3.1.5 Waste Services

The contractor waste services personnel communicate policies and protocols, and ensure project compliance for storage, transportation, disposal, and waste tracking. Representatives from the waste services organization are responsible for identifying the laboratory analyses necessary to characterize IDF-generated waste streams.

BA.3.1.6 Field Work Supervisor

The contractor FWS is responsible for planning and coordinating field sampling resources. The FWS ensures that samplers are appropriately trained and available. Additional related responsibilities include ensuring that the sampling design is achievable, understood, and can be performed as specified.

The FWS must document all deviations from procedures or other problems pertaining to sample collection, chain-of-custody protocols, analytes, sample analysis, or sample transport. As appropriate, such deviations or problems are documented in nonconformance report forms in accordance with internal corrective action procedures. The FWS is responsible for communicating field corrective actions to the Project Manager and for ensuring that immediate corrective actions are applied to field activities.

BA.3.1.7 Sample Management and Reporting

The contractor's sample management and reporting organization coordinates field sampling as well as laboratory analytical work, ensuring that laboratories conform to the QA requirements for analytical services at the Hanford Site and supplements the contractor's environmental QA program plan. The sampling organization receives the analytical data from the laboratories, enters data into the Hanford Environmental Information System database, and arranges for data validation. The sampling organization is responsible for informing the Project Manager of issues reported by the contract analytical laboratories.

BA.3.1.8 Contract Laboratories

The contract laboratories analyze samples in accordance with established procedures and provide necessary sample reports and explanation of results in support of data validation.

BA.3.2 Special Training Requirements

Individuals involved in sampling, analysis, or data review will be trained and qualified to safely implement the activities addressed in the WAP and this QAPjP. Training will conform to the training requirements specified in WAC 173-303-330, *Personnel training*, and Addendum G, "Personnel Training." Training records will be maintained in accordance with Section BA.3.3.2 of this document.

BA.3.3 Documentation and Records

This section presents the requirements associated with the development, management, and distribution of records, including waste analysis data and associated documents.

BA.3.3.1 Documentation and Records Process

Documents and records developed in support of waste sample collection and analysis will be generated, reviewed, approved, distributed, used, controlled, and revised in accordance with WAC 173-303-380, *Facility recordkeeping*.

BA.3.3.2 Document and Records Storage

Documents and records will be stored and maintained in the Hanford Facility Operating Record (IDF portion), as required by the applicable Permit Conditions of II.I, "Facility Operating Record." Results of waste sample analysis required by WAC 173-303-300, *General waste analysis*, are maintained in accordance with Permit Condition II.I.1.b.

These documents and records will include, but will not be limited to, the following:

- Data report packages.
  - Chain-of-custody forms.
  - Sampling methods.
  - Sampling conditions.
  - Sample descriptions.
  - Sample management records.
  - Analytical methods.
  - Data summary reports.
  - QA/QC reports.
- Assessment reports (including nonconformance and deficiency reports).
- Analytical instrument inspection, maintenance, and calibration logs.
- Records and results of waste analysis, specifically the following:
  - Waste profiles.
  - LDR evaluation.
  - Notification of waste acceptance.
  - Notification of waste nonconformance.
  - Corrective actions.

BA.3.4 Standard Operating Procedures

Standard operating procedures for waste sampling and analysis will be developed before IDF becomes operational. The standard operating procedures will be developed, implemented, and controlled in accordance with the applicable requirements of this QAPjP.

BA.4 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

This section describes the quality specifications identified throughout the systematic planning process, ensuring that data or information obtained is of the needed and expected quality for the desired use.

A data quality objectives (DQO) process was performed in accordance with U.S. Environmental Protection Agency (EPA) guidance, EPA/240/R-02/009. The applicable steps of the DQO process are described in this section. This QAPjP describes the standards of quality required to collect and test samples of mixed waste at the IDF.

BA.4.1 Data Quality Objectives

To safely and compliantly treat, store, and dispose of mixed waste within IDF, quality data regarding the chemical, physical, and/or biological analysis of waste samples is needed.

For collection and analysis of waste samples of IDF-generated waste, the applicable steps of the DQO process are summarized in Table BA-1.

Table BA-1 Systematic Planning for Collection and Analysis of Integrated Disposal Facility Waste Samples

Step 1 – State the Problem
To safely and compliantly treat, store and/or dispose mixed waste within the IDF, quality data regarding the chemical, physical, and/or biological analysis* of waste samples is needed.
Step 2 – Identify the Goals of the Study
To ensure a thorough, documented evaluation of IDF-generated waste streams (WAC 173-303-300, *General waste analysis*), which is necessary to ensure safe, compliant, and compatible TSD operations within the DWMUs.
Step 3 – Identify Information Inputs
Samples of waste are subjected to testing as directed by the IDF WAP, in accordance with the identified analytical methods of SW-846.
Step 4 – Define the Boundaries of the Study
The applicable steps of this data quality objective process apply to waste requiring sampling and analysis for mixed waste characterization at IDF.
Step 5 – Develop the Analytical Approach
Sampling and analysis activities will be performed in accordance with WAC 173-303-110, *Sampling, testing methods, and analyses*, and will follow the analytical approach described in the appropriate analytical methods performed for mixed waste characterization analysis. Analytical methods will be performed in accordance with the most recent version of SW-846.
Step 6 – Specify Performance or Acceptance Criteria
Characteristics of the subject mixed waste will be established according to the scope, application, and performance criteria identified in the method-defined parameters of SW-846 and the specifications of the IDF WAP. Data obtained from the results of analytical methods provide specific information that is evaluated to ensure safe, compliant, and compatible TSD activities.
Step 7 – Develop the Plan for Obtaining Data
Sample collection and analysis activities will support IDF TSD activities and will be performed according to the processes described in the IDF WAP.

Reference: SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, Third Edition; Final Update VI.

*Knowledge is also used to characterize waste, in accordance with the definition provided in WAC 173-303-040, *Definitions*. If available knowledge is not sufficient to characterize newly generated waste, then sampling and analysis will be performed for initial characterization of a waste stream, as allowed by the waste stream characteristics.

DWMU = Dangerous waste management unit
IDF = Integrated Disposal Facility
TSD = Treatment, storage, and disposal
WAP = Waste Analysis Plan

BA.4.2 Data Quality Indicators

This section discusses the following data quality indicators:

- Analytical measurement accuracy.
- Analytical precision.
- Representativeness.

BA.4.2.1 Analytical Measurement Accuracy

Accuracy can be estimated by calculating the percentage recovery of laboratory matrix spike samples using the following equation, described in EPA/600/8-91/004, *Preparation Aids for the Development of Category II Quality Assurance Project Plans*:

$$\%R = \left(\frac{s-u}{C_{sa}}\right) \times 100$$

Where: %R = percentage recovery
s = measured concentration in spiked laboratory aliquot
u = measured concentration in unspiked laboratory aliquot
C_{sa} = actual concentration of spike added

Accuracy can also be estimated by calculating percentage recovery for the use of standard reference materials or surrogates using the following equation, as outlined in EPA/600/8-91/004:

$$\%R = \left(\frac{C_m}{C_{srm}}\right) \times 100$$

Where: C_m = measured concentration of standard reference material or surrogate
C_{srm} = actual concentration of standard reference material or surrogate

Table BA-2 lists the parameters for which accuracy will be estimated.

BA.4.2.2 Analytical Precision

Precision can be estimated by analyzing matrix spikes and matrix spike duplicates. The relative percentage difference (RPD) between the analytical results for the matrix spike samples and the matrix spike duplicate samples will be calculated as outlined in EPA/600/8-91/004:

$$RPD = \frac{|S_{ms} - S_{msd}|}{\left(\frac{S_{ms} + S_{msd}}{2}\right)} \times 100$$

Where: RPD = relative percentage difference
S_{ms} = matrix spike sample
S_{msd} = matrix spike duplicate sample

Table BA-2 Quality Control Parameters for SW-846 Test Methods

Analytes	SW-846 Analytical Method[a]	Liquids			Solids		
		LCS % Recovery[b]	Spike % Recovery[c]	Precision (RPD)	LCS % Recovery[b]	Spike % Recovery[c]	Precision (RPD)
pH	9040 or 9045	ND	ND	ND	ND	ND	ND
Flashpoint	1010 or 1020	ND	ND	ND	ND	ND	ND
Free Liquids	9095	N/A	N/A	N/A	ND	ND	ND
Cyanide	9012 or 9014	80-120%	80-120%	≤20%	80-120%	80-120%	≤35%
Sulfide	9034	80-120%	80-120%	≤20%	80-120%	80-120%	≤35%
Volatile organic compounds	8260	70-130% or statistically derived[d]	70-130% or statistically derived[d]	≤20%	70-130% or statistically derived [d]	70-130% or statistically derived[d]	≤20%

Table BA-2 Quality Control Parameters for SW-846 Test Methods

Analytes	SW-846 Analytical Method[a]	Liquids			Solids		
		LCS % Recovery[b]	Spike % Recovery[c]	Precision (RPD)	LCS % Recovery[b]	Spike % Recovery[c]	Precision (RPD)
Semivolatile organic compounds	8081, 8151, or 8270	70-130% or statistically derived[d]	70-130% or statistically derived[d]	≤20%	70-130% or statistically derived[d]	70-130% or statistically derived[d]	≤30%
Metals (except mercury)	6010 or 6020	80-120%	80-120%	≤20%	80-120%	80-120%	≤35%
Mercury	7470 or 7471	80-120%	80-120%	≤20%	80-120%	80-120%	≤35%
Total organic carbon	9060	80-120%	80-120%	≤20%	80-120%	80-120%	≤35%

Reference: SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, Third Edition; Final Update VI.

[a]For each analytical method, the latest promulgated version will be used.

[b]Accuracy can be calculated using the laboratory control sample.

[c]Accuracy can be calculated using the matrix spike and matrix spike duplicate samples.

[d]Laboratory-determined, statistically derived control limits based on historical data are used here. Control limits are reported with the data.

LCS = Laboratory control sample ND = Not determined

N/A = Not applicable RPD = Relative percent difference

Precision can also be estimated by analyzing duplicate samples. The RPD between the analyte levels measured in these samples will be calculated using the following equation, provided in EPA/600/8-91/004:

$$RPD = \frac{|C_1 - C_2|}{\left(\frac{C_1 + C_2}{2}\right)} \times 100$$

Where: RPD = relative percentage difference

C_1 = larger of the two observed values

C_2 = smaller of the two observed values

Table BA-2 lists the parameters for which precision will be estimated.

BA.4.2.3 Representativeness

Representativeness is a qualitative QA objective that determines the degree to which a sample or group of samples is indicative of the subject being studied. It considers the size and volume of the sample, as well as the times and locations of sampling. The number of samples collected for the characterization of waste streams will be evaluated during the development of standard operating procedures to ensure that sampling is representative of the total waste being sampled.

BA.4.3 Method Detection Limits and Estimated Quantitation Limits

The method detection limits (MDLs) and the estimated quantitation limits (EQL) are established in accordance with the requirements in SW-846. MDLs will be reported to IDF as part of the laboratory analytical results.

The MDL is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte. The MDLs will include sample preparation methods and will be determined by spiking uncontaminated water and solid (typically sand) with known concentrations.

The EQL is defined as the lowest concentration that can reliably be achieved within specified limits of precision and accuracy during routine laboratory operating conditions. The EQL is generally 5 to 10 times the MDL. For many analytes, the EQL analyte concentration is selected as the lowest non-zero standard in the calibration curve. Sample EQLs are highly matrix-dependent.

Certain samples may be reduced in sample size or diluted for waste minimization and to comply with the as low as reasonably achievable (ALARA) philosophy. The SW-846 "method hotline" indicates that sample size is not a method modification unless detection limits are not sufficient for making decisions.

BA.4.4 Reporting Requirements

Data generated from laboratory analyses will be reported to IDF in an organized format that contains the supporting information required in the data report package for the appropriate level of data evaluation and assessment. Refer to Section BA.7 for a discussion of the data report package and to Section BA.8 for a discussion of data evaluation and assessment.

The reported data will identify the concentration units (e.g., milligrams per liter, µg/kg) and appropriate laboratory qualifiers. Data reported as non-detected will be referenced against a stated MDL or instrument detection limit value. Values between the MDL and the EQL will be qualified and documented.
If selected reporting limits are used instead of EQLs or detection limits, the reporting limits will be consistent with the specific data reporting requirements presented throughout the WAP. The MDL will be compared to the minimum reportable quantity to ensure data (non-detection results in particular) are meaningful for regulatory purposes.

BA.5 DATA ACQUISITION AND MEASUREMENT

The following section addresses the QA requirements for data acquisition and measurement.

BA.5.1 Sampling Procedures and Management

Subsections BA.5.1.1 through BA.5.1.4 provide direction on the types of sampling procedures to be implemented and the types of equipment that may be used to support the sampling, as well as guidance on how to manage and document field activities.

BA.5.1.1 Sampling Procedures and Design

The sampling procedures to be implemented for analyzing IDF-generated waste streams are described in the following sections. Proposed analytical methods are identified in the IDF WAP. For samples taken at IDF, standard operating procedures for sample collection will be developed before IDF becomes operational.

BA.5.1.2 Selected Sampling Equipment

Equipment selected to support waste sampling activities will meet the requirements of the specific SW-846 method or other applicable performance-based analytical methods. If modifications of the procedure are needed, they will be requested in accordance with WAC 173-303-110.

When feasible, disposable equipment will be used to collect samples to eliminate the need to decontaminate equipment after use. The process for decontamination of sampling equipment, when necessary, is presented in Section BA.5.1.3.3.

BA.5.1.3 Sample Handling and Shipping

Personnel involved in sampling will be required to read and understand the operating procedures for sampling before implementing sampling activities. The sample preservation, containers, and holding times for each of the types of analyses to be performed are specified in Section BA.5.1.3.2.

Samples collected for waste stream characterization will be collected, packaged, and shipped to the IDF-contracted laboratory. Collection methods, packaging, and shipping instructions will be addressed in the sampling procedures, consistent with SW-846, with allowances for sample size reduction to maintain personnel dose rates ALARA. Care will be taken during sampling to avoid the temporary storage of samples in excessively high or low temperatures. The samples shall be shipped on the same day as sampled whenever possible to meet analytical holding time requirements.

A unique identification number generated by the laboratory information management system will be marked on sample containers before collecting the sample. This number will be recorded on the chain-of-custody form. The sample labeling and chain-of-custody documentation will be checked to ensure the traceability of each of the samples.

BA.5.1.3.1 Chain-of-Custody

Evidence of sample collection, shipment, receipt at the laboratory, and laboratory custody until disposal will be documented using a chain-of-custody form. Samples will always be accompanied by a chain-of-custody form, ensuring accountability of the sample and associated records. The chain-of-custody form will, at a minimum, supply the following information:

- Project name.
- Collector's name(s).
- Unique sample number.
- Date, time, and location (or traceable reference thereto) of sample collection.
- Sample matrix (liquid or solid).
- Preservation method.
- Requested analyses (or reference thereto).
- Number of sample bottles/type per unique sample number.
- Sample characteristics (if any).
- Shipped-to information (i.e., analytical laboratory performing the analysis).
- Chain of possession information (i.e., signatures/printed names of all individuals involved in the transfer of sample custody and storage locations, date/time of receipt and relinquishment).

Additional information regarding the sample and specific analytical instructions may also be documented. Each time the responsibility for the custody of the sample changes, new and previous custodians will sign the record and note the date and time. Chain-of-custody forms will be included in the final data report package. Electronic chain-of-custody forms and electronic signatures may be used.

BA.5.1.3.2 Sample Preservation, Containers, and Holding Time

Table BA-3 lists the suggested sample container, preservation method, and holding time requirements for different types of analyses in accordance with the analytical method specified. The final container types and volumes will be identified on the chain-of-custody form.

Holding time is the elapsed time between sample collection and analysis. Exceeding required holding times could result in changes in constituent concentrations due to volatilization, decomposition, or other alterations. For some samples, preservatives are required. Preservatives may be added to the collection bottles before their use in the field, or it is allowable to add the preservatives immediately after sample collection.

Table BA-3 Waste Sample Preservatives, Containers, and Holding Times

Analysis	SW-846 Method[a]	Container	Preservative	Holding Time
Liquid Samples				
pH	9040	Glass/plastic	None	Analyze as soon as possible
Flashpoint	1010 or 1020	Glass	None	14 days
Cyanide	9012 or 9014	Amber glass	NaOH to pH >12, Cool to 4°C	14 days
Sulfide	9034	Glass/plastic	ZnAc+NaOH to pH >9; ≤6°C	7 days
Volatile organic compounds	8260	Amber glass[b]	HCl or H_2SO_4 to pH <2, Cool to ≤6°C	14 days maximum (preserved)
Semivolatile organic compounds	8081, 8151, or 8270	Amber glass	Cool to ≤6°C	7 days (extraction) 40 days (analysis)
Metals, except mercury	6010/6020	Glass/plastic	HNO_3 to pH <2	6 months
Mercury	7470	Glass/plastic	HNO_3 to pH <2	28 days
Total organic carbon	9060	Amber glass	Cool to ≤6°C	28 days
Solid Samples				
pH	9045	Glass/plastic	None	Analyze as soon as possible
Flashpoint	1010 or 1020	Glass	None	14 days
Free Liquids	9095	Plastic	Cool to ≤6°C	Analyze as soon as possible
Cyanide	9012 or 9014	Amber glass	Cool to ≤6°C	14 days
Sulfide	9034	Glass/plastic	ZnAc+NaOH on surface of solid until moistened, Cool to ≤6°C	7 days
Volatile organic compounds	8260	Amber glass[b]	Cool to ≤6°C	14 days maximum (preserved)
Semivolatile organic compounds	8081, 8151, or 8270	Amber glass	Cool to ≤6°C	14 days (extraction) 40 days (analysis)
Metals, except mercury	6010/6020	Glass/plastic	None	6 months

Table BA-3 Waste Sample Preservatives, Containers, and Holding Times

Analysis	SW-846 Method[a]	Container	Preservative	Holding Time
Mercury	7471	Glass	Cool to ≤6°C	28 days
Total organic carbon	9060	Amber glass	HCl or H_2SO_4 to pH <2, Cool to ≤6°C	28 days

Reference: SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, Third Edition; Final Update VI.

[a]For each analytical method, the latest promulgated version will be used.

[b]Use a Teflon® lined cap with the sample bottle (Teflon is a registered trademark of E. I. du Pont de Nemours and Company, Wilmington, Delaware).

BA.5.1.3.3 Maintaining and Decontaminating Field Equipment

Field equipment used to support waste monitoring and sampling activities will be maintained in accordance with manufacturer guidelines and will be decontaminated prior to use. Disposable sampling equipment will be used whenever possible.

Decontamination of sampling equipment is performed using high-purity water in each step. In general, three rinse cycles – detergent, acid, and water – are performed to decontaminate sampling equipment. During the detergent rinse, the equipment is washed in a phosphate-free detergent solution, followed by rinsing with high-purity water in three sequential containers. After the third high-purity water rinse, stainless steel or glass equipment is rinsed in a 1 M nitric acid solution (pH less than 2). Equipment is then rinsed with high-purity water in three sequential containers (the high-purity water rinses following the acid rinse are conducted in separate water containers that are not used for detergent rinse). Following the decontamination process, a single rinse with hexane is performed to facilitate the drying process. Dry equipment is loaded into a drying oven set at 50°C (122°F) for nonmetal and nonglass items or 100°C (212°F) for metal or glass. Once at temperature, equipment is baked for 20 minutes and then cooled. The equipment is then removed from the oven and wrapped in clean, unused aluminum foil using surgeon's gloves. The wrapped equipment is stored in a custody locked, controlled access area.

BA.5.1.4 Sampling Quality Assurance and Quality Control Procedures

The IDF sampling procedures for characterization of waste streams will be developed in accordance with the requirements of this QAPjP. Revisions to established sampling procedures will be reviewed to determine their possible impacts on data quality and approved by authorized personnel prior to issuance and implementation. Field records and documentation, including field measurements, will be handled and preserved in a manner consistent with Section BA.3.3 of this QAPjP.

Sampling QC procedures may involve the collection of blanks and duplicate samples. The purpose and frequency of collection for each of these samples are presented in Table BA-4 together with sampling QC objectives.

Table BA-4 Field Quality Control Requirements

Sample Type	Frequency	Purpose
Field transfer blank	The frequency will be determined and documented in operating procedures before sampling operations are begun. The minimum frequency shall be once per sampling event.	This will be a water sample that receives the same analysis steps as the sample for the specified procedure. The blank will confirm that the water is not contaminated.
Equipment blank		A sample of analyte-free water used to rinse the sampling equipment. It is used to document adequate decontamination of sampling equipment.* Analysis will be for tests performed for the specified procedure.
Field duplicate		This QC sample is a second aliquot of the collected sample and is used to determine method precision.
Full trip blank	The frequency will be determined and documented in operating procedures before sampling operations are begun. The minimum frequency shall be once per shipping container for samples subject to volatile organic compound analysis.	A sample of analyte-free water that accompanies sample containers to and from the field. These samples are used to detect any contamination or cross-contamination during sample handling and transportation.

*Decontamination will be performed if disposable equipment cannot be used.

QC = Quality control

BA.5.2 Instrument and Equipment Calibration, Testing, Inspection, and Maintenance

The following sections address instrument calibration, testing, inspection, and maintenance requirements for waste analysis.

BA.5.2.1 Instrument Calibration Frequency

Analytical laboratory personnel will be responsible to ensure that instruments are calibrated in accordance with approved procedures. Instrument calibration will comply with applicable QA/QC requirements of the applicable analytical method. Instrument calibration records will be managed in accordance with Section BA.3.3 of this QAPjP.

BA.5.2.2 Instrument and Equipment Testing, Inspection, and Preventive Maintenance Requirements

The analytical laboratory management (or designee) will ensure that laboratory instruments are routinely tested and inspected to confirm that they are in proper working order. Preventive maintenance schedules recommended by the equipment manufacturer will be implemented and documented. Instrument maintenance records will be managed in accordance with Section BA.3.3 of this QAPjP.

BA.5.3 Sample Analytical Methods and Analytical Performance Requirements

The sample analytical methods are identified in Table B-3 of the WAP (Addendum B). The performance requirements (e.g., precision and accuracy) for analyses are summarized in Table BA-2 and are consistent with the requirements specified in SW-846. The practical quantitation limit for each method, analyte, and matrix are established in the analytical laboratory contract. Any applicable analytical method provided in WAC 173-303-110 may be used for analysis. If an analytical method used for regulatory purposes other

than the methods provided in WAC 173-303-110 is proposed, approval of the method will be requested from Ecology according to WAC 173-303-910, *Petitions*, Section (2). The proposed analytical method will not be used for regulatory purposes until Ecology authorizes the method. If modifications to a procedure are needed, they will be requested in accordance with WAC 173-303-110(4). The SW-846 "method hotline" indicates that sample size is not a method modification unless detection limits are not sufficient for making decisions.

BA.5.4 Analytical Laboratory Information Management

Any records generated and submitted as part of the data report package, for mixed waste characterization, will be maintained in the Hanford Facility Operating Record (IDF portion). The contract analytical laboratory is responsible for maintaining, and having available on request:

- Analytical logbooks.
- Raw data and QC sample records.
- Standard reference material and proficiency test sample data.
- Instrument calibration information.

BA.5.5 Analytical Laboratory Quality Control

The analytical laboratory QC procedures will involve the analysis of duplicates, method blanks, and matrix spike samples. QC samples are generally performed at a frequency of once per laboratory analytical batch, or at a frequency established by the contract analytical laboratory. The purpose and frequency for each of these samples are presented in Table BA-5.

BA.6 PERFORMANCE ASSESSMENTS, CORRECTIVE ACTIONS, AND EVALUATIONS

The following subsections address assessment and oversight requirements.

BA.6.1 Routine Analytical Laboratory Assessment and Corrective Actions

The Permittee must ensure that testing laboratories meet the QA/QC requirements of the WAP. Use of Washington State Accredited laboratory specific methods provides such assurance. When such methods are either not accreditable or not accredited at the selected laboratory, the permittees must specify QA/QC requirements through contractor or independent audit(s). Documentation of the specification and confirmation/audit process will be available upon request and maintained in the Hanford Facility Operating Record. Any sample results received from a non-Washington State Accredited laboratory may be subject to a Washington State Department of Ecology assessment and/or inspection.

BA.6.2 Data Reduction and Review

Laboratory data reduction and review will be performed according to the requirements of the current version of SW-846 and other applicable analytical procedures. Evaluation and assessment of analytical data is discussed in Section BA.8.

Table BA-5 Laboratory Quality Control Requirements

Sample Type	Frequency	Purpose
Laboratory sample duplicates	The frequency will be determined and documented in operating procedures before analytical operations are begun. The minimum frequency will be once per sample batch.	This QC sample is a second aliquot of the collected sample and is used to determine method precision.
Method blank		An analyte-free matrix to which reagents are added in the same volumes or proportions as those used in sample processing. It is used to document contamination resulting from the analytical process. This method blank will be carried through the complete sample preparation and analytical procedure.
Matrix spike or matrix spike duplicate		This QC sample is spiked with known quantities of analytes. Matrix spikes and matrix spike duplicate quality control samples are used to assess the accuracy and precision of the analytical method.
Laboratory control sample	The frequency will be determined and documented in operating procedures before analytical operations are begun.	The LCS may be a matrix-matched reference material, or if one is not available, a blank spike that is put through the analytical process. For methods that lack a suitable LCS, or when no sample preparation is required, calibration verification standards (initial calibration verification or continuing calibration verification) or system performance checks may be used to verify analytical accuracy.

LCS = Laboratory control sample QC = Quality control

BA.6.3 Reports to Management

Conditions identified as having an adverse effect on quality, the significance of such conditions, and corrective actions will be documented, reported to the appropriate level of management, and resolved according to approved procedures.

The assessment reports may include the following items, as appropriate:

- Deviations from the requirements specified in this QAPjP.
- Limitations or constraints on the applicability of the resulting analytical data.
- Review of data quality in terms of MDLs, precision, accuracy, and representativeness.

BA.7 DATA REPORT PACKAGES

The data reports received from the contract laboratory will serve as documentation of an analytical project. Reports of analytical data must be in accordance with all applicable reporting requirements of the laboratory contract.

The following are examples of the information contained in data reports documenting environmental support activities:

- Laboratory name and address.
- Sample identifications.
- Holding times, including the following:
  - Sampling date.
  - Date the laboratory received the sample.
  - Extraction or preparation date.
  - Analysis date.
  - Re-extraction or re-analysis dates.
- Analytical parameters.
- QC results, including the following:
  - LCS/standard including percent recovery.
  - Preparation blanks, including identity and concentration of each constituent identified.
  - Sample, duplicate (including RPD), and replicate results.
  - Recovery results of matrix spikes, matrix spike duplicates, or post digestion spikes (if matrix spike not performed).
  - Detection limits.
  - Report uncertainty/counting error for radiochemical analysis.
  - Additional data reporting (i.e., the percent of moisture/solid or correction for equivalent dry weight).
- QA information, including the following:
  - Descriptions of procedures and methods used to generate the results.
  - Deviations from procedures.
  - Analytical anomalies for raw data results, spikes, surrogates, and method blanks.
  - Analytical qualifiers.
  - Calibration and instrument tuning.
  - Corrective actions implemented.
- Raw analytical data.
- Chain-of-custody.
- A case narrative describing the analysis, limitations on the analysis results (including reporting flags), and QA/QC issues associated with the results.

Data reports will be placed into the Hanford Facility Operating Record (IDF portion), as required by Permit Condition II.I (WAC 173-303-380).

BA.8 VERIFICATION AND ASSESSMENT OF ANALYTICAL DATA

A graded approach to data verification and assessment processes will ensure that the data resulting from the selected analytical method are consistent with the requirements specified in this QAPjP. Data validation will be performed when necessary.

BA.8.1 Data Verification

Data verification will be performed on laboratory data packages that support environmental compliance to ensure that their content is complete and in order. A review of the data package will be performed to ensure the following.

- The data package contains the required technical information.
- Deficiencies are identified and documented.
- Identified deficiencies are corrected by the laboratory and the appropriate revisions are made.
- Deficient pages are replaced with the laboratory corrections.
- Data package revisions are tracked.

Completion of data verification activities will be documented by the Permittee.

BA.8.2 Data Evaluation and Assessment

An evaluation and assessment of analytical data will be performed to ensure that the data meets the quality standards specified by the data quality objectives. A review of the data package will be performed to ensure the following data quality indicators are met:

- Precision.
- Accuracy.
- Representativeness.
- Comparability.
- Completeness.
- Sensitivity (detection limits).

Data obtained will be evaluated to determine whether they are of the appropriate type, quality, and quantity to support their intended use.

BA.9 REFERENCES

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