WASTE TREATMENT AND IMMOBILIZATION PLANT
CHAPTER 3B
QUALITY ASSURANCE PROJECT PLAN FOR THE WASTE ANALYSIS PLAN
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
12/11/2025	24590-LAW-PCN-ENV-25-006 (8C.2025.Q4)
11/19/2024	24590-WTP-PCN-ENV-24-002 (8C.2024.Q4)
01/11/2023	24590-WTP-PCN-ENV-22-002 (8C.2023.Q1)
05/26/2022	24590-WTP-PCN-ENV-21-004 (8C.2022.Q2)
06/24/2020	8C.2020.3F
09/05/2017	8C.2017.6F
03/2007	

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CHAPTER 3B
QUALITY ASSURANCE PROJECT PLAN FOR WASTE ANALYSIS PLAN

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TABLES

ACRONYMS

ALARA	As Low As Reasonably Achievable
DFLAW	Direct Feed Low-Activity Waste
DST	Double-Shell Tank
EPA	Environmental Protection Agency
EMF	Effluent Management Facility
EQL	Estimated Quantitation Limit
HLW	High-Level Waste (Facility)
Lab	Analytical Laboratory
LAW	Low-Activity Waste (Facility)
LCS	Laboratory Control Sample
LIMS	Laboratory Information Management System
LOR	Laboratory of Record
MDL	Method Detection Limit
PCB	Polychlorinated Biphenyl
PT	Pretreatment (Facility)
QA	Quality Assurance
QAM	Quality Assurance Manual
QAPjP	Quality Assurance Project Plan for the Waste Analysis Plan
QC	Quality Control
RDQO	Regulatory Data Quality Objectives Optimization Report
RPD	Relative Percentage Difference
TSAP	Tank Sampling and Analysis Plan
USDOE	United States Department of Energy
WAC	Washington Administrative Code
WAP	Waste Analysis Plan
WTP	Waste Treatment and Immobilization Plant

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3B.1 INTRODUCTION

This Quality Assurance Project Plan (herein referred to as "this QAPjP") supports the sampling and analysis to be implemented by the Hanford Tank Waste Treatment and Immobilization Plant (WTP), particularly in support of the characterization of the waste feed and the characterization of secondary waste streams. This QAPjP will ensure that the quality and quantity of data resulting from these sampling and analysis activities can support the decision-making process for the management of WTP wastes. This QAPjP was prepared using guidance provided in the following references:

- *Guidance for Quality Assurance Project Plans* (Environmental Protection Agency [EPA] EPA QA/G-5, EPA/240/R-02/009).
- *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, SW-846.
- 24590-WTP-QAM-QA-06-001, *Quality Assurance Manual* (herein referred to as QAM).
- 24590-WTP-QAM-RAQA-QA-0001, *Commissioning and Operations Quality Assurance Manual.*

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 desired level of quality, setting limits in advance, and documenting any anomalies. QC is associated with the controls implemented while an activity is being performed. This QAPjP complies with the applicable requirements of the QAM and becomes effective at the commencement of laboratory operations.

The QAPjP will be maintained in the Unit Specific Operating Record.

3B.2 PROJECT DESCRIPTION

The U.S. Department of Energy (USDOE) will select an alternate contractor to operate the WTP. The WTP will store and treat mixed waste currently stored in the Hanford Double-Shell Tank (DST) System unit, operated by the Tank Operations Contractor. The WTP has been designed to operate under two operating configurations. In the baseline configuration, DST waste will first be processed through the WTP Pretreatment (PT) Facility, and then sent on for vitrification at the Low-Activity Waste (LAW) Facility and the High-Level Waste (HLW) Facility.

The WTP will commence initial operations by processing waste pretreated by the Tank Operations Contractor and fed directly to the LAW Facility. This configuration is referred to as Direct Feed Low-Activity Waste (DFLAW) configuration. In this configuration, the LAW Facility and Analytical Radiological Laboratory (Lab) will be commissioned to operate while the PT Facility and HLW Facility construction is completed. Upon the completion of construction and successful commissioning of the PT and HLW facilities, the WTP will switch to the baseline configuration. The portion of DST waste not subject to direct feed processing (e.g., not pretreated before transferred to WTP) will be treated in the baseline configuration with the PT, LAW, and HLW facilities. The Tank Operations Contractor will conduct sampling and facilitate shipment for analysis and will provide results to the WTP for assessment against the waste acceptance criteria prior to waste receipt at the WTP. The WTP's secondary waste will also be sampled and analyzed if process knowledge is insufficient to properly designate the secondary waste. Analysis of samples for regulatory compliance purposes will be performed by a qualified outsourced analytical laboratory subject to the provisions of this QAPjP.

3B.3 CHARACTERIZATION OF THE WASTE FEED

Chapter 3A, "Waste Analysis Plan for the Baseline Configuration" (Baseline WAP), and Chapter 3C, "Waste Analysis Plan for the DFLAW Configuration" (DFLAW WAP), identify the sampling locations and associated constituents for characterization of the waste feed. Waste acceptance criteria for regulatory characterization are to be met prior to waste processing by the WTP. The waste characterization parameters for the Baseline configuration are as follows:

- Total organic carbon.
- Polychlorinated biphenyls (PCB).
- pH.
- Compatibility.
- Resource Conservation and Recovery Act (RCRA) metals.
- Mercury.
- Selected organic compounds.
- Selected anions.
- Ammonia.
- Cyanide.

The waste characterization parameters for the DFLAW configuration are as follows:

- TOC.
- PCB.
- pH.
- Compatibility.
- RCRA metals.
- Mercury.
- Selected anions.
- Ammonia.

The waste acceptance criteria for regulatory characterization of the waste feed for the Baseline configuration are described in 24590-WTP-RPT-MGT-04-001, Rev. 0, *Regulatory Data Quality Objectives Optimization Report*[1] (RDQO Optimization Report). The waste acceptance criteria for regulatory characterization of the waste feed for the DFLAW configuration are described in 24590-LAW-RPT-PENG-16-003, *Integrated DFLAW Feed Qualification Data Quality Objects* (DFLAW DQO Report). These reports describe the constituents of regulatory concern and analytical methods appropriate for the characterization of the waste feed. The DQO Reports are designed to address the regulatory needs of the WTP and will be re-evaluated as a result of the environmental risk assessment, which is currently under development. The Pre-Demonstration Test Risk Assessment (24590-WTP-RPT-ENV-18-001) has been completed. The final risk assessment will be completed following the Environmental Performance Demonstration Test (EPDT). The RDQO Optimization Report and the DFLAW DQO Report's processes are subject to periodic evaluation and may affect the list of analytes, selection of analytical methods, and associated QA/QC requirements.

[1]The RDQO Optimization Report, Section 9.6, Quality Assurance, specifies compliance with American Society of Mechanical Engineers (ASME) NQA-1-1989; however, the QAM updates this requirement and requires compliance with ASME NQA-1-2000, *Quality Assurance Requirements for Nuclear Facility Applications*.

3B.4 PROJECT MANAGEMENT

This section of the QAPjP addresses the following requirements:

- Project organization and responsibility.
- Special training requirements.
- Documentation and records.
- Standard operating procedures.

3B.4.1 Project Organization and Responsibility

The Manager of Quality reports directly to the WTP Project Director. The Manager of Quality (or designee) will provide independent QA oversight to ensure that on-site and subcontracted sampling and analytical laboratory activities are performed in accordance with this QAPjP.

The Nuclear Facility Managers (or designees), supported by the Lab Technical Point of Contact, will coordinate the execution of sampling and analysis activities in their respective facilities and ensure compliance with this QAPjP.

The Lab Technical Point of Contact will coordinate with the Tank Operations Contractor to arrange for any required collection of tank waste samples, their packaging, and shipment to the analytical facility, including ensuring the requirements of this QAPjP, as they apply, are implemented by the Tank Operations Contractor. The Lab Technical Point of Contact will ensure that analysis is conducted in accordance with this QAPjP, will oversee the WTP on-site laboratory, and will be responsible for the coordination and technical oversight of any subcontracted analytical laboratory activities are being performed in accordance with this QAPjP.

Subcontracted analytical laboratory managers will be responsible for ensuring that this QAPjP is implemented in their respective laboratories.

3B.4.2 Documentation and Records

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

3B.4.2.1 Documentation and Records Procedures

Documents and records developed as part of the waste analysis program will be generated, reviewed, approved, distributed, used, controlled, and revised in accordance with approved procedures. These procedures will comply with applicable requirements of the QAM.

Organizations that generate or use data in an electronic format are responsible for complying with applicable software quality requirements specified in the QAM to ensure that data input (and changes to data input) is complete and accurate, and that security and integrity of the data is maintained.

3B.4.2.2 Document and Records Storage

Documents and records will be stored and maintained according to approved procedures consistent with applicable requirements of the QAM. These documents and records will include, but will not be limited to, the following:

- Training.
- 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 non-conformance and deficiency reports).
- Analytical instrument inspection, maintenance, and calibration logs.
- Records and results of waste analysis, specifically the following:
  - Waste profiles.
  - Land Disposal Restrictions evaluation.
  - Notification of waste acceptance.
  - Notification of waste nonconformance.
  - Corrective actions.
  - Waste feed characterization.
  - Secondary waste characterization.

3B.4.3 Technical Operating Procedures

Standard operating procedures for waste sampling and analysis will be developed after the system design has been completed and before waste is received for processing. Standard operating procedures will be developed, implemented, and controlled in accordance with applicable requirements of the QAM.

3B.5 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

3B.5.1 Data Quality Objectives

The data quality objectives for the WTP and for the characterization of the Hanford tank waste are addressed in the following subsections. Where analytical methods or standards are referenced, the most current acceptable version of each will be implemented.

3B.5.1.1 Data Quality Objectives for the Waste Treatment Plant

Using the data quality objectives process ensures that the data collected are of adequate quality and quantity to support the decision-making process.

3B.5.1.2 Regulatory Data Quality Objectives Optimization for Hanford Tank Waste Characterization

Characterization of the Hanford waste feed will be performed in conformance with the process in the RDQO Optimization Report for the Baseline configuration and the DFLAW DQO Report for the DFLAW configuration. These processes establish sample preparation and analytical methods suitable for determining the concentration of selected constituents of concern at Method Detection Limits (MDL) sufficient for regulatory requirements. The DQO process is an ongoing activity and may affect the set of analytes and analytical methods, and associated QA/QC requirements.

3B.5.2 Data Quality Indicators

This section discusses the following data quality indicators:

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

3B.5.2.1 Analytical Measurement Accuracy

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

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

Where

%R = percentage recovery
s = measured concentration in spiked laboratory aliquot
u = measured concentration in un-spiked 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 *Preparation Aids for the Development of Category II Quality Assurance Project Plans* (EPA/600/8-91/004):

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

Where

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

Table 3B-1 lists the parameters for which accuracy will be estimated.

3B.5.2.2 Analytical Precision

Precision can be estimated by analyzing matrix spikes and matrix spike duplicates (MSD). The relative percentage difference (RPD) between the analytical results for the matrix spike samples and the MSD samples will be calculated as outlined in *Preparation Aids for the Development of Category II Quality Assurance Project Plans* (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

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 *Preparation Aids for the Development of Category II Quality Assurance Project Plans* (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 3B-1 lists the parameters for which precision will be estimated.

3B.5.2.3 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 takes into account 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 feed and secondary waste streams will be evaluated during the development of standard operating procedures to ensure that sampling is representative of the total waste being sampled. Sample requirements will be periodically re-evaluated as characterization data from previous treatment campaigns and additional process knowledge becomes available.

Liquid samples taken within the WTP will be obtained from agitated vessels or piping systems to ensure that the sample taken represents the vessel contents.

3B.5.3 Method Detection Limits and Estimated Quantitation Limits

The MDLs and the Estimated Quantitation Limits (EQL) supporting waste characterization analysis have been established in the RDQO Optimization Report (24590-WTP-RPT-MGT-04-001) and limits are reported based on the appropriate Waste Analysis Plan (WAP). For other analyses supporting environmental decision-making, the laboratory will establish the MDLs and EQLs in conformance with SW-846 or other guidance such as 40 Code of Federal Regulations (CFR) Appendix B to Part 136.

The MDL is defined as the minimum concentration of a substance that can be measured and reported with 99 percent 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 EQLs are 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.

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 affected by the following:

- Sample matrix.
- Sample volume or mass used.
- Final concentrate volume or final digestate volume from sample preparation.
- Amount introduced into the instrument for quantitation.
- Use of dry or wet weight for reporting solids.

The SW-846 methods stress that the EQL will differ by matrix and should be evaluated by matrix.

Certain samples may be reduced in sample size or diluted for waste minimization and to comply with the As Low As Reasonably Achievable philosophy, referred to as "ALARA." The SW-846 "method hotline" indicates that sample size is not a method modification unless detection limits are not sufficient for making decisions. Additional guidelines and acceptable minor modifications for radioactive samples have been established and agreed to as documented in the RDQO Optimization Report (24590-WTP-RPT-MGT-04-001), Section 9.8.4.

Section 3B.6.3, and Table 3B-2 present the Project-specific analytical performance requirements.

3B.5.4 Reporting Requirements

Data generated from laboratory analyses will be reported to Bechtel National, Inc. (BNI) or the Tank Operations Contractor 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 3B.7.2 for a discussion of the data report package and to Section 3B.7 for a discussion of data evaluation and assessment.

The reported data will identify the concentration units (e.g., milligrams per liter) 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. Target Minimum Reportable Quantity (MRQ) ranges have been established in the RDQO Optimization Report. The MDL will be compared to the minimum reportable quantity to ensure data (non-detection results in particular) are meaningful for regulatory purposes.

3B.6 DATA ACQUISITION AND MEASUREMENT

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

3B.6.1 Sampling Procedures and Management

Subsections 3B.6.1.1 through 3B.6.1.4 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.

Secondary waste characterization samples are samples of waste and byproducts generated by WTP processes or support activities (e.g., liquid waste, glass) that require characterization for regulatory compliance. These samples are subject to the same quality assurance and quality control provisions outlined in this QAPjP.

3B.6.1.1 Sampling Procedures and Design

The sampling procedures to be implemented for analyzing waste feed from the DST System unit to support characterization of the waste feed and the characterization of secondary waste streams are described in the following sections. For each feed staged for transfer to the WTP, a description of the regulatory compliance sampling activities and analytical requirements will be provided in Tank Sampling and Analysis Plans (TSAP). For secondary waste characterization, sampling activities and method-specific requirements (including preservation and holding times) will be established in applicable procedures and/or secondary waste sampling instructions issued by WTP. For samples taken at WTP, procedures for sample collection will be developed after the system design is complete and before waste is received for processing.

3B.6.1.2 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 Washington Administrative Code (WAC) 173-303-110, Dangerous Waste Regulations – *Sampling, testing methods, and analyses*.

When feasible, disposable equipment will be used to collect samples to obviate the need to decontaminate equipment after use. The process for decontamination of sampling equipment, when necessary, is presented in Section 3B.6.1.3.3.

3B.6.1.3 Sample Handling and Shipping

Personnel involved in sampling will be trained and qualified on the operating procedures for sampling before implementing sampling activities.

Storage conditions will be evaluated to ensure that the samples remain representative. Waste feed characterization samples will be collected, packaged, and shipped by the Tank Operations Contractor to a WTP contracted laboratory. Collection methods, packaging, and shipping instructions will be addressed in the TSAP and will be governed by Tank Operations Contractor procedures consistent with SW-846, where applicable, with allowances for sample size reduction to maintain personnel dose rates ALARA. The specific description of sample collection activities will be included in the TSAPs for each WTP feed compliance sampling event.

Waste feed characterization samples will not be chemically or thermally preserved during transfer or shipment to the WTP contracted laboratory (these preservation techniques react with the tank waste). 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.

Secondary waste characterization samples shall be preserved, contained, and temperature-controlled in accordance with the applicable analytical method requirements (e.g., SW-846, Standard Methods, or other approved performance-based methods), including chemical and/or thermal preservation, container type, and holding times. Where method-specified immediate preservation is required, preservatives shall be added at the time of collection or as soon as practicable in a radiologically controlled area when worker protection or ALARA considerations necessitate delayed addition. In all cases, preservation shall occur within the time frame specified by the method. Secondary waste samples shall be packaged and shipped in a manner that maintains the required preservation conditions for the duration of transport to the Laboratory of Record (LOR).

A unique identification number generated by the Laboratory Information Management System (LIMS) will be marked on each sample container 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.

3B.6.1.3.1 Chain-of-Custody

The ability to demonstrate that samples were obtained from the locations specified in the applicable WAP and that they reached the laboratory without alteration are key considerations for data resulting from laboratory analysis. Evidence of collection, shipment, receipt at the laboratory, and laboratory custody until disposal will be documented using a chain-of-custody form. The chain-of-custody form will, as a minimum, supply the following information:

- Sample identification number.
- Sample volume.
- Number of sample bottles/type.

- Method of sampling.
- Sampling date and time.
- Sampling location.
- Name of the contact person.
- Shipping date.
- Analyses to be performed.
- Preservation method.
- Sample characteristics (if any).

A sample will be considered to be in custody when it is under any of the following conditions:

- In a person's possession.
- In view, after having been in a person's physical possession.
- Locked so that it cannot be tampered with, after having been in a person's physical custody.
- Sealed with tamper-proof seal.
- In a secured area, restricted to authorized personnel only.

Chain-of-custody forms will be included in the final data report package. Electronic chain-of-custody forms and electronic signatures may be used.

The chain-of-custody practices and procedures for the WTP will address the following general requirements for custody records:

- Sample management planning and procedures will identify responsibilities, including interfaces between organizations for documenting possession of a sample from collection and identification through handling, preservation, shipment, transfer, analysis, storage, and final disposition.
- Sample traceability will ensure that it can be tracked from its collection through final disposition.
- Sample identification will be documented and checked before the sample is released.
- If individual samples have specific custody requirements, as required by documents such as the WAP, TSAP, test plans, study plans or job packages, these requirements will be implemented.
- For samples with limited use or storage life, methods will be established that preclude using an out-of-date sample.

Implementing documents will identify those representative samples that need to be archived.

3B.6.1.3.2 Sample Preservation, Containers, and Holding Time

Table 3B-3 lists the sample container, preservation method, and holding time requirements for different types of analyses.

3B.6.1.3.3 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 due to the high concentrations of radionuclides in the waste materials to be sampled.

Equipment decontamination will be performed according to approved procedures and consistent with guidance provided in the following references or by the manufacturer:

- SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*.
- *A Compendium of Superfund Field Operations Methods* (EPA/540/P-87/001).

3B.6.1.4 Sampling Quality Assurance and Quality Control Procedures

The QA audits and surveillances of sampling activities will be conducted by the Manager of Quality (or designee) to verify the implementation of QAPjP requirements. Management assessments will also be performed by the Lab Technical Point of Contact (or designee) to ensure that the waste sampling program is adequate and effective. 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 3B.4.2 of this QAPjP. The QA surveillances and audits, management assessments, corrective actions, and root cause analyses will be implemented as described in Section 3B.7 of this QAPjP.

3B.6.2 Instrument and Equipment Calibration, Testing, Inspection, and Maintenance

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

3B.6.2.1 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 3B.4.2 of this QAPjP.

3B.6.2.2 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 3B.4.2 of this QAPjP.

3B.6.3 Sample Preparation Methods, Analytical Methods, and Analytical Performance Requirements

The sample preparation methods, analytical methods, and performance requirements (e.g., limits, precision, and accuracy) for analyses are summarized in Table 3B-3 and Table 3B-2, and are consistent with the requirements specified in SW-846 and in conformance with the appropriate WAP. 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 are proposed, approval of the method will be requested from Department of Ecology (Ecology) according to WAC 173-303-910(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.

3B.6.4 Analytical Laboratory Information Management

The LIMS is part of the Plant Information Network (PIN) system. Sample and QC data generated by the analytical laboratory will be stored in the LIMS database. At a minimum, this database will hold the sample number, sample collection date, analysis date, analytical methods employed, analytical results, and qualifiers. In the event of a LIMS system failure, this information will be recorded in paper form and entered into LIMS when the system is operating.

3B.6.5 Analytical Laboratory Quality Control

The analytical laboratory QC procedures will involve the analysis of duplicates, method blanks, laboratory control samples and matrix spike samples. Lab QA parameters will be described in the commercial laboratory QAM/QAPjP and placed in the operating record. State accredited laboratories will be used where possible and where not possible, BNI will provide all necessary information for the State of Washington to determine the validity of the analytical data. Testing laboratories that are not state accredited still must meet the QA/QC requirements of the WAP and documentation of the specification and conformation/audit process will be available upon request and maintained in the operating record.

3B.7 PERFORMANCE ASSESSMENTS, CORRECTIVE ACTIONS, AND EVALUATIONS

The following subsections address assessment and oversight requirements.

3B.7.1 Routine Analytical Laboratory Assessment and Corrective Actions

The Lab Technical Point of Contact (or designee) will conduct periodic assessments to verify that laboratory procedures meet the requirements of this QAPjP. The QA surveillances and audits will be conducted by the Manager of Quality (or designee) to ensure that laboratory activities comply with applicable QA requirements. Management assessments will also be performed by the Lab Technical Point of Contact (or designee) to ensure that the laboratory program is adequate and effective.

Management assessments, QA surveillances and audits, corrective action, and root cause analyses will be conducted according to approved procedures.

3B.7.2 Data Reduction and Review

Data reduction and review procedures will be developed for data generated for environmental compliance according to the requirements of the current version of SW-846 or other applicable guidance such as *Guidance for Quality Assurance Project Plans* (EPA QA/G-5, EPA/240/R-02/009), prior to the operation of the analytical laboratory.

3B.7.3 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.
- Results of QA surveillances and audits of the waste analysis program.
- Management assessments of data quality in terms of MDLs, precision, accuracy, and representativeness. The quantitative performance indicators for precision and accuracy are given in Table 3B-1.

3B.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.

3B.8.1 Data Verification

The primary data reporting will be via electronic data systems. 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.
- A copy of the completed verification report is placed in the data file.

3B.8.2 Data Evaluation and Assessment

The data reports received from the laboratory will serve as documentation of an analytical project. The primary data reporting will be by electronic systems. The following are examples of the information contained in data reports documenting environmental support activities:

- 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, including the following:
  - Laboratory control sample (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, MSDs, or post digestion spikes (if matrix spike not performed).
  - Detection limits.
  - Report uncertainty/counting error for radiochemical analysis.
  - Additional data reporting (that is, the percent of moisture/solid or correction for equivalent dry weight).
- QA, 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.

Table 3B-1 Quality Control Parameters for SW-846 Test Methods

Analytes	Method	QC Acceptance Criteria			
		LCS % Recovery	Spike % Recovery	MSD/ Duplicate RPD	Replicate % Relative Standard Deviation
Metals, except Mercury	6010D or 6020B	80-120%	75-125%	≤ 20%	≤ 20%
Mercury	7470A or 7471B	80-120%	75-125%	≤ 20%	≤ 20%
pH	9040C	±0.1 pH unit	N/A	N/A	N/A
Volatile organic compounds[1]	8260B	70-130%	50-150%	≤ 30%	≤ 30%
Semivolatile organic compounds[1]	8270E	70-130%	50-150%	≤ 30%	≤ 30%
Organochlorine pesticides[1]	8081B	70-130%	50-150%	≤ 30%	≤ 30%
PCBs	8082A	70-130%	50-150%	≤ 30%	≤ 30%
Inorganic anions	9056A	80-120%	75-125%	< 20%	< 20%
Cyanide[1]	Method 9010C/9014 or 9012B	80-120%	75-125%	< 20%	< 20%
Ammonia	SM 4500-NH_3 F or Method 350.1 or Method 350.3	80-120%	75-125%	< 20%	< 20%

[1]These constituents are specific to the Baseline configuration.

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Table 3B-2 Analytical Method Requirements for Tank Waste Acceptance Samples

Constituent	Limit	Analytical Method[1]	
		Solid	Liquid
TOC	TOC < 10% percent weight (wt)	Method 9060A	Method 9060A
PCBs	PCBs < 50 parts per million (ppm)	8082A	8082A
pH	pH > 12	9040C	9040C
Compatibility	Acceptable temperature change < ± 20°C No viscosity change adversely affecting waste processing	N/A	ASTM D5058-12
Metals, except mercury	per Permit Condition Table III.10.H.D	6010D or 6020B	6010D or 6020D
Mercury	Hg < 1.4E-05 mol/mol sodium	7471B	7470A
Volatile organic compounds[2]	Not applicable	8260B	8260B
Semivolatile organic compounds[2]	Not applicable	8270E	8270E

Table 3B-2 Analytical Method Requirements for Tank Waste Acceptance Samples

Constituent	Limit	Analytical Method[1]	
		Solid	Liquid
Organochlorine pesticides[2]	Not applicable	8081B	8081B
Inorganic anions – Ratio to Sodium (Cl, F, SO4)[3]	Cl < 3.7E-2 mol/mol sodium F < 9.1E-2 mol/mol sodium SO4 < 7.0E-2 mol/mol sodium	Method 300.0/9056A or ASTM D3987-85/ 9056A	9056A
Cyanide[2]	Not applicable	9010C/9014 or 9012B	9010C/9014 or 9012B
Ammonia	Ammonia/Ammonium < 0.04 M	Not Applicable	SM 4500-NH_3-F or, Method 350.1 or Method 350.3

[1]The latest update version of the method will be used for testing, unless specified otherwise.

[2]These constituents are specific to the Baseline configuration.

[3]Nitrate, Nitrite, Bromide, and Phosphate Acceptance Criteria limits will be added when the WAP is updated for Baseline operations.

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Table 3B-3 Sample Preservatives, Containers, and Holding Times for Tank Waste Acceptance Samples

Analysis	Container[a]	Preservative[b]	Holding Time
Liquid Samples			
TOC	Plastic	None	28 days
PCB compounds	Glass with Teflon-lined screw cap	None	14 days (extraction) 40 days (analysis)
pH	Plastic	None	Analyze as soon as possible
Compatibility	Plastic	None	Analyze as soon as possible
Inorganic anions	Plastic	None	7 days
Ammonia	Glass with Teflon-lined screw cap	None	28 days
Metals, except mercury	Plastic	None	6 months
Mercury	Plastic	None	28 days
Cyanide	Glass with Teflon-lined screw cap	None	14 days
Volatile organic compounds	Glass with Teflon-lined screw cap	None	14 days
Semivolatile organic compounds	Amber glass	None	14 days (extraction) 40 days (analysis)
Organic acids	Glass with Teflon-lined screw cap	None	14 days

Table 3B-3 Sample Preservatives, Containers, and Holding Times for Tank Waste Acceptance Samples

Analysis	Container[a]	Preservative[b]	Holding Time
Pesticides	Glass with Teflon-lined screw cap	None	14 days (extraction) 40 days (analysis)
Solid Samples			
TOC	Plastic	None	28 days
PCB compounds	Glass with Teflon-lined screw cap	None	14 days (extraction) 40 days (analysis)
pH	Plastic	None	Analyze as soon as possible
Compatibility	Plastic	None	Analyze as soon as possible
Metals, except mercury	Glass	None	6 months
Mercury	Glass	None	28 days
Cyanide	Glass with Teflon-lined screw cap	None	14 days
Volatile organic compounds	Glass with Teflon-lined screw cap	None	14 days
Semivolatile organic compounds	Glass	None	14 day (extraction) 40 days (analysis)
Organic acids	Glass with Teflon-lined screw cap	None	14 days
Inorganic anions	Plastic	None	28 days (extraction) 7 days (analysis)
Pesticides	Glass with Teflon-lined screw cap	None	14 days (extraction) 40 days (analysis)

[a]Collection of samples is in accordance with ALARA requirements for contamination control and to minimize sampler exposure. The RDQO Optimization Report (24590-WTP-RPT-MGT-04-001) specified a minimum 350 g of sludge solids (if present in the tank) and 500 mL of liquid to complete the regulatory compliance testing for each WTP feed tank, however, it is anticipated that 300 mL slurry containing at least 30 g of solids per HLW sample, and 170 mL of supernatant liquid per sample shall be sufficient. Per the sampling event requirements described in the RDQO Optimization Report, the specific sample volume and number of samples to be collected are to be specified in the TSAP for the corresponding staged feed. The sample material is collected in the field, and then sub-aliquoted (and centrifuged, if necessary) in the laboratory under controlled conditions to further reduce exposures. Per the Performance Based Measurement System approach and safe handling procedures required to limit radiological dose, sample sizes may be reduced from those recommended in the analytical methods identified in Table 3B-1 and Table 3B-2.

[b]Methodologies may be modified per requirements of the RDQO Optimization Report.

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