Effective Date: 4/12/06

WP 02-EC.05
Revision 4

Quality Assurance Project Plan for WIPP Site Effluent and Hazardous Materials Sampling

Cognizant Section: Site Environmental Compliance

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ACRONYMS AND ABBREVIATIONS

ASME	American Society of Mechanical Engineers
DQO	Data Quality Objective
EPA	U.S. Environmental Protection Agency
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NQA	Nuclear Quality Assurance
PCB	polychlorinated biphenyl
ppb	parts per billion
QA	Quality Assurance
QAPD	Quality Assurance Program Description
QAPjP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
QSL	Qualified Suppliers List
RCRA	Resource Conservation and Recovery Act
SEC	Site Environmental Compliance
STC	Sampling Team Coordinator
µg/L	micrograms per liter
WIPP	Waste Isolation Pilot Plant
WTS	Washington TRU Solutions LLC

1.0 INTRODUCTION [1]

1.1 Project Description

This Quality Assurance Project Plan (QAPjP) states the quality assurance (QA) requirements for the Waste Isolation Pilot Plant (WIPP) Site Effluent and Hazardous Materials Sampling Program, which is established in WP 02-EC.06, WIPP Site Effluent and Hazardous Materials Sampling Plan. Throughout the rest of this document, the WIPP Site Effluent and Hazardous Materials Sampling Plan will be referred to as the "sampling plan."

The sampling plan outlines the processes for sampling and analyzing various media at the WIPP site. For the purpose of this plan, the WIPP site is defined as the area within the fenced boundary, the underground, the 16 sections as defined by the Land Withdrawal Act, the Skeen-Whitlock Building offices, and any additional U.S. Department of Energy leased property used for the operation of WIPP.

This plan applies to nonroutine sampling that is not specified by an established monitoring procedure. The scope of this plan includes the following environmental data operations, as defined in WP 13-1, Washington TRU Solutions LLC Quality Assurance Program Description (the WTS QAPD):

- Underground Storage Tank Leaks
- Hazardous and Mixed Waste Characterization
- Site Effluent
- Spill Response
- Contaminated Soil
- Contaminated Debris
- Site Investigation
- Site Remediation
- Waste Handling Building Sumps

This plan satisfies the requirement for planning and managing these activities in accordance with an approved QAPjP.

1.2 Sampling Team

The WIPP Sampling Team is responsible for performing sampling activities in accordance with the sampling plan and this QAPjP. The team consists of a Sampling Team Coordinator (STC) and sampling technicians. The STC is responsible for evaluating sampling situations and media that may be encountered, and to determine the sampling technique, container, preservative, and analyses of the sample to be taken, in accordance with the sampling plan or after consultation with appropriate groups on site. The STC does not always have to be present for the actual sampling activity. Once the sampling activity has been coordinated, the sampling technicians may complete the sampling and shipping process.

The sampling team will perform any applicable field parameter tests, such as pH, temperature and conductivity during sample collection to help determine the required analyses and preservatives. The members of the sampling team will have applicable training, if necessary, to perform these tests.

The members of the sampling team will be trained in accordance with the Resource Conservation and Recovery Act (RCRA), and either ST-01, Sampling Team Qualification Card, or STA-01, Sampling Team Assistant Qualification Card, and will be part of the RCRA training matrix. It is recommended that sampling team members attend a U.S. Environmental Protection Agency (EPA) approved, or equivalent, sampling course that includes proper sampling techniques and sampling quality control management.

The development and management of the contract with the analytical laboratory will be the responsibility of the STC. The STC will also review the analytical results and provide a final report of the sampling activity to cognizant personnel, if necessary.

In the event of a spill, qualified sampling team members may be called out to support the Emergency Response Team. The Facility Shift Manager will make the determination to activate the sampling team per the significance of the event. In the event of a TRU waste spill, the sampling team shall be available to take samples of the spill area after the area has been decontaminated. These samples may be analyzed for total metals, total semivolatiles, total volatiles, beryllium, PCBs (polychlorinated biphenyls), or other parameters as determined by the STC to verify that cleanup has been effectively completed.

1.2.1 Site Environmental Compliance

The Site Environmental Compliance (SEC) Section will be responsible for providing regulatory oversight of sampling programs and for providing interpretation of regulatory changes that could impact sampling programs.

1.2.2 Industrial Safety and Hygiene

The Industrial Safety and Hygiene Section will be responsible for determining the type of personal protective equipment to be used for sampling or in the event of spill cleanup.

1.2.3 Transportation Operations

Transportation Operations shall assist in the shipment of any hazardous samples to ensure that the proper U.S. Department of Transportation regulations for packaging and shipping are met.

1.2.4 Quality Assurance

The QA Department is responsible for conducting independent assessments of the sampling and analysis program, in accordance with the WTS QAPD. QA uses a graded approach to determine the frequency of assessments based on program risk. QA will also ensure that the proposed contract laboratory meets the requirements for the Qualified Suppliers List (QSL).

1.2.5 Business Management

The Procurement section is responsible for placement of the analytical laboratory contract and the administration of contract activities.

1.2.6 Warehouse

The Warehouse is responsible for processing the shipping authorization, generating carrier paperwork (e.g., carrier waybill documentation), and receiving custody of the samples from sampling team members.

1.2.7 Contract Laboratory

The contract laboratory will be responsible for performing the analyses of the samples, reporting the results, and having an analytical Quality Assurance/Quality Control (QA/QC) program in place, as specified in the statement of work for the contract laboratory.

2.0 TECHNICAL SPECIFICATIONS

2.1 Project Data Quality Objectives

As required by the WTS QAPD, the following criteria for data quality are established.

2.1.1 Data Quality Objectives for Precision, Accuracy, and Lower Limits of Detection

The specifications for precision, accuracy, and lower limits of detection for each analyte are in accordance with SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. The Data Quality Objectives (DQOs) established by the EPA Contract Laboratory Program Statement of Work will be incorporated as part of the statement of work for the contract with the analytical laboratory.

The accuracy and precision recovery ranges, required reporting limits, and the completeness percent required for groundwater and soil/sediment media are found in the test methods as presented in SW-846. Sample media does not always include groundwater or soil/sediment. Due to the diverse media sampled under the sampling plan, a graded approach to QA/QC of the data quality objectives is taken based on the

users determination of tolerable error in the results. The estimated method reporting limits or quantitation limits listed in SW-846 provide guidance and may not always be achievable in all sample media due to matrix interference. A graded approach to QA/QC bases the level of managerial controls applied to an item or work according to the intended use of the results and the degree of confidence needed in the quality of the results.

2.1.2 DQO for Representativeness

The sampling plan identifies the guidelines for ensuring that representative samples are collected. A random grid method or other techniques, as specified by SW-846, will be used whenever necessary.

2.1.3 DQO for Completeness

The sampling team will, in all cases, ensure that all documentation associated with sampling is complete. SEC and QA will review the program periodically to ensure that sampling activities fulfill the QA requirements established in this plan.

2.1.4 DQO for Comparability

To ensure comparability with other WIPP activities, units for reporting analyte concentrations are to be expressed in mg/L, µg/L, mg/kg, or ppb, or as appropriate.

2.2 Sampling Procedures

2.2.1 Effluent, Discharge, or Spill Sampling Procedures

If nonemergency sampling is required, the sampling team will collect samples as required by the sampling plan.

The sampling methods and tools for sampling different media and situations are discussed in the sampling plan. This sampling will be performed on an "as needed" basis. The sampling plan is designed to provide general guidelines for sampling situations not identified in specific procedures. The sampling plan presents suggested methods and tools for sampling different media, but the STC will make the determination of which method will be utilized according to the situation.

The type of preservative method and the containers used are defined in the sampling plan. It is necessary to ensure that the correct preservative methods are used for the analyses to be performed. Table 1 of the sampling plan, Containers, Preservatives, and Holding Times, outlines the preservative methods. The analytical laboratory will aid in the selection of preservatives if a situation arises where the preservative method is not included in Table 1 of the sampling plan. Preservatives are to be kept in appropriate storage facilities, in accordance with applicable WIPP procedures, when not in use.

The maximum hold times and storage specifications for each sample type are defined in Table 1 of the sampling plan.

The sampling plan lists recommended analyses for different sample types in Table 2. In the event that the minimum analyses are not sufficient, it is the responsibility of the sampling team coordinator, in consultation with other applicable groups, to determine which analyses are needed. If additional analyses are to be performed, it will be the responsibility of the sampling team to state these analyses on the Request for Analysis Form.

The data packages produced from sample analyses will be reviewed, as appropriate, by the following groups:

- SEC
- Environmental Monitoring and Hydrology
- QA

The review process is outlined in the sampling plan.

2.2.2 Solid Waste Characterization Sampling Procedures

Sampling for the characterization of solid waste will be performed according to the sampling plan unless the material can be characterized using generator knowledge. The sampling team coordinator or cognizant individual will determine the sampling method, container, preservative, and analyses to be performed, in accordance with the sampling plan and in consultation with other applicable groups.

Verification of the effectiveness of the removal of hazardous materials from a spill shall be obtained by collecting samples and sending them to the contract laboratory for analysis. Analytical results shall provide the necessary documentation that any residual contamination from a spill of TRU-mixed waste has been effectively removed.

Samples taken from the sumps in the Waste Handling Building shall be analyzed for hazardous constituents, gross alpha, and gross beta/gamma, if necessary, based on process knowledge. For unidentifiable materials, the sampling containers, amounts, and preservatives are specified in Table 1 of the sampling plan.

2.3 Sample Documentation, Handling, and Shipping

Shipping of samples will be performed through the Warehouse per WIPP shipping procedures. Upon review of the shipping authorization request, Transportation Operations will determine if the sample meets the definition of a hazardous material as defined by the U. S. Department of Transportation. If the sample is a determined to be a hazardous material, Transportation Operations shall provide packaging, labeling, and required documentation in accordance with the applicable WIPP procedures. Samples

determined to be nonhazardous by Transportation Operations shall be packaged for shipping by the Sampling Team.

Transportation of all samples not physically transported to the contract laboratory by sampling team members shall be arranged by the Warehouse.

2.4 Sample Custody

Chain-of-Custody and Request for Analysis forms specified by the sampling plan will be used to document sample custody. The forms have provisions for maintaining positive identification of the sample from collection through analysis. The carrier is not required to sign for custody of the sample. The shipping documents tendered with the shipment will document their custody.

2.5 Equipment Calibration and Maintenance

The instrumentation used for field parameter testing by the sampling team will be under the control of the WIPP Metrology Office as part of the Monitoring and Data Collection Recall System. Calibration/comparison checks of field equipment are part of the specific procedures for the field equipment. The calibration of all instruments used for field measurements will be verified before each use. All field measurement equipment will be calibrated by a QSL certified calibration laboratory according to manufacturer's specifications. The STC will verify that the standards have not expired prior to use.

Calibration and maintenance of analytical equipment used by the contract laboratory is addressed by the laboratory contract.

2.6 Analytical Methods

Acceptable analytical methods for each constituent shall conform to the test methods as described in SW-846, when available. The contract laboratory may deviate from SW-846 if the laboratory method is at least as accurate as the suggested SW-846 method. The contract laboratory will be responsible for specifying analytical methods and for justifying deviations from SW-846 methods in the contract quotation.

2.7 Data Reduction, Validation, and Reporting

Laboratory results are to be reviewed against previously specified DQOs. The primary responsibility of drawing conclusions from the analyses and compiling the report belongs to SEC and the sampling team coordinator, although the data may go through a review cycle designated in the sampling plan.

If any discrepancies are found in the analytical results, the laboratory shall be contacted by the STC or a designated representative to obtain any additional information that could resolve these discrepancies. No discrepancies shall remain unresolved; use the guidance of EPA 540/R-99/008, *USEPA Contract Laboratory Program National*

Functional Guidelines for Organic Data Review; EPA540-R-00-006, *USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review*; and EPA 540/R-01-008, USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, as applicable, to determine data acceptability. Use the appropriate data qualifiers for data that is not fully compliant. A description of the reasons for data qualification and the qualification that is applied to the data shall be documented on Attachment 1 of WP 02-EC1001, Characterization Sampling, Shipping, and Documentation.

2.8 Internal Quality Control Checks

Field duplicates will be collected and analyzed for every matrix in a batch, or a frequency of one duplicate per every ten samples whenever appropriate. Compliance type sampling will require blanks and duplicates, whereas characterization sampling may not require blanks and duplicates. The collection and analysis of blanks and duplicates for characterization samples will be determined by the sampling team coordinator.

In the event that samples must be stored overnight before shipment, the process procedure will be followed:

- Samples will be maintained in a locked, temperature-controlled area.
- Access will be restricted to authorized personnel only.

2.9 Performance and System Audit Requirements

The successful bidders of the analytical laboratory contracts for the sample analyses are required to be included on the QSL for analytical services. The laboratory's QA program must be reviewed and approved in accordance with applicable WIPP procedures in order to be included on the WTS QSL. After the bid is awarded, an additional surveillance or source inspection may be performed by SEC and QA personnel while analytical work is in progress.

2.10 Preventive Maintenance

Most analyses are performed by a contract analytical laboratory. The preventive maintenance records for equipment used by the contract laboratory will be addressed in the statement of work for the contract laboratory.

2.11 Corrective Action

In cases where deviations from accepted practices are determined, the contract laboratory shall follow all requirements of WIPP procedures addressing Corrective Action Programs.

2.12 QA Reports to Management

Assessments of the Site Effluent and Hazardous Materials Sampling Program will be conducted and reported to SEC management by the WTS QA Department. Scheduling of these assessments will be determined by the QA Department.

2.13 Specific Routine Procedures Used to Assess Data Quality

The quality of the contract analyses will be determined by comparing the duplicate analysis in each batch of ten samples to the previously established limit for precision in the DQOs. Accuracy will be determined by the submission of a calibration check for each analyte against a known standard concentration of the analyte (laboratory control standard, matrix spike, or matrix spike duplicate on a submitted sample that is designated as the matrix spike sample) within the range of analysis by the contract laboratory.

2.14 Disposition of Nonconforming Samples

Samples collected by the sampling team are normally intended for waste characterization prior to disposal rather than for compliance related monitoring. In the unusual event that a sample is identified by the contract laboratory as a nonconforming sample (e.g., a sample has exceeded the holding time for a specific test or has lost identity), another sample shall be collected and submitted to the contract laboratory for analysis. If another sample cannot be collected, discussions between the lab manager and the STC may be held indicating that the test be run on the sample as received. Any impact on the test results shall be noted and the discussion shall be documented and included as part of the analytical file.

3.0 DEFINITIONS

Accuracy - The degree of agreement of a measurement (or, an average of measurements of the same thing), X, with an accepted reference or true value, T, usually expressed as the difference between the two values, X-T, or the difference as a percentage of the reference or true value, 100(X-T)/T, and sometimes expressed as a ratio, X/T. Accuracy is a measure of the bias in a system.

Assessment/Verification - The act of reviewing, inspecting, testing, checking, conducting surveillances, auditing, or otherwise determining and documenting whether items, processes, or services meet specified requirements. The terms "assessment" and "verification," as used in the WTS QAPD, are synonymous; their use is determined by who is performing the work. Assessments are performed by or for senior management. Verifications are performed by the line organization.

Audit - A planned and documented activity performed to determine by investigation, examination, or evaluation of the objective evidence, the adequacy of, and compliance with, established procedures, instructions, drawings, manuals, specifications, codes,

and standards or other applicable requirements, and the effectiveness of implementation.

Comparability - Expresses the confidence with which one data set can be compared to another.

Completeness - For determination of data quality, a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions.

Complete Record - A document is considered a complete record when the record is stamped, initialed, signed, and dated, or otherwise validated.

Data Validation - A systematic process for reviewing a body of data against a set of criteria to provide assurance that the data are adequate for their intended use.

Data Quality Objective - The totality of features and characteristics of data that bears on the data's ability to satisfy a given purpose. The characteristics of major importance are accuracy, precision, completeness, representativeness, and comparability.

Document - Recorded information that describes, defines, specifies, reports, certifies, requires, or provides data or results.

Environmental Data Operations - Compliance activities associated with collection and analysis of environmental samples, including data reduction, handling, reporting, and records management.

Inspection - An examination or measurement to verify whether an item or process meets specified requirements.

Major Measurement Parameter - Datum point or set of data collected or reported for environmental compliance, and specified in a DQO.

Monitoring and Data Collection Equipment - Devices, systems, or equipment used for collection of data or control of processes.

Nonconformance - A deficiency in characteristic or record that renders the quality of an item or sample unacceptable or indeterminate.

Precision - A measure of agreement between comparable data gathered or developed under similar conditions expressed in terms of a standard deviation.

Procurement Document - Purchase requisitions, purchase orders, drawings, contracts, specifications, or instructions used to define requirements for purchase.

QA Record - A completed and validated document that furnishes objective evidence of the quality of items or activities affecting quality.

Quality - The degree to which an item or process meets or exceeds the user's requirements and expectations.

Quality Assurance - Actions that provide confidence that quality is achieved. Comprises all planned or systematic actions necessary to provide adequate confidence that a component, system, structure, or facility will perform satisfactorily in service; or the total integrated program for ensuring the reliability of monitoring and measurement data.

Quality Assurance Plan - Subtier QA implementation documents that are limited in scope and that usually contain more detail than the QAPD. QAPjPs are examples of QA plans.

Quality Assurance Program Description - A description of the overall program established by WTS to implement QA requirements and guidance, such as American Society of Mechanical Engineers (ASME) Nuclear Quality Assurance (NQA)-1-1989, *Quality Assurance Program Requirements for Nuclear Facilities;* EPA QA/G-5, *Guidance for Quality Assurance Project Plans*; and Title 10 *Code of Federal Regulations* Part 71, "Packaging and Transportation of Radioactive Material, Subpart H, Quality Assurance. The QAPD assigns responsibilities and authorities, defines policies and requirements, and provides for the performance and assessment of work.

Quality Control - Comprises all those QA actions related to the physical characteristics of components, systems, or structures that provide a means to control and measure the quality of a component, system, or structure to predetermined requirements.

Records Management - The systematic control over the creation, maintenance, retention, protection, and preservation of records.

Representativeness - The degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or environmental condition.

Supplier - Any individual or organization that furnishes items or services in accordance with a procurement document. An all-inclusive term used in place of any of the following: vendor, seller, contractor, fabricator, consultant, and their subtier levels.

Surveillance - The act of monitoring, observing, or witnessing to verify whether an item or activity conforms to specified requirements.

Temporary Storage - For records, temporary storage is accomplished in accordance with ASME NQA-1-1989, Supplemental Requirement 17S-1, Section 4.4.3. Temporary storage is required for managing active records prior to the submittal to the records holding facilities.

Validation - An activity that demonstrates that an item, process, or set of data satisfies specified requirements of the user. For records, to certify the content of a document as authentic and complete (certification of document validity is indicated by the date and signature or initials of authorized individuals).

4.0 REFERENCES

ASME NQA-1-1989, *Quality Assurance Program Requirements for Nuclear Facilities*

EPA 540/R-99/008, *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*

EPA 540-R-00-006, *USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review*

EPA 540-R-01-008, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*

SW 846, *Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods*, Third Ed.

WP 02-EC.06, WIPP Site Effluent and Hazardous Materials Sampling Plan

WP 02-EC1001, Characterization Sampling, Shipping, and Documentation

WP 13-1, Washington TRU Solutions LLC Quality Assurance Program Description