

STATEMENT OF WORK  
LOW-LEVEL RADIOACTIVE,  
ORGANIC/INORGANIC/RADIONUCLIDE  
ANALYTICAL SERVICES  
MBH-SVV-069262

March 5, 1992

APPROVALS:

*J. H. Kessner*  
\_\_\_\_\_  
J. H. Kessner, Manager, Office of Sample Management march 5, 1992  
Date

*M.R. Adams*  
\_\_\_\_\_  
M. R. Adams, Manager, Environmental Engineering Date

*D. G. Farwick*  
\_\_\_\_\_  
D. G. Farwick, Manager, Environmental Quality Assurance 3/5/92  
Date



## STATEMENT OF WORK

### LOW-LEVEL RADIOACTIVE, ORGANIC/INORGANIC/RADIONUCLIDE ANALYTICAL SERVICES

#### 1.0 SERVICES REQUIRED

This Statement of Work (SOW) defines the nature of analytical laboratory support services to be performed for Westinghouse Hanford Company (WHC) by the Seller. Analytical services include sample receipt, handling and storage of samples, analysis, submittal of deliverables, and sample return to WHC. Organic and inorganic analyses are required for the sample matrices defined in Section 2.0. Analyses for these sample matrices will include those performed in accordance with current promulgated versions of: 1) USEPA Contract Laboratory Program (CLP) protocol, 2) USEPA SW-846 Test Methods for Evaluating Solid Waste, 3) USEPA-600/4-79-020 Methods for Chemical Analysis of Water and Wastes, and 4) other methods specified on the Service Price List. The specific analyses along with required matrices and methodologies are listed in the Purchase Order Service Price List.

The Seller shall provide analytical services for the determination of various radioactive contaminants in various matrices, including water, soil, milk, vegetation, nonaqueous liquids, and other matrices. Analytical techniques shall include gross alpha determination, gross beta determination, gamma spectroscopic analysis, alpha spectroscopic analysis, low-background alpha/beta counting, and laser fluorimetry (for total uranium). Specific required analytes, WHC recommended methods, and associated matrices are described in Section 4.0 and listed in the Service Price List. The Seller shall maintain an NRC or Agreement State license appropriate to possess radioactive materials found in WHC samples.

The Seller shall adhere to and perform analysis in accordance with requirements specified in the 3/90 revision of the CLP Statement of Work (ILMO2.0 & OLM01.8), EPA SW-846 (3rd edition, Update 1) Methods, and other methods required by WHC. Any modification of these methods shall be considered as a major modification and therefore subject to approval by WHC as an alternate test method. The Seller shall also adhere to all quality assurance protocols contained in these documents. New revisions to these documents (see list on page 5) must be implemented by the Seller, in accordance with a submitted and approved implementation schedule to WHC.

The Seller shall supply all facilities, personnel, equipment and materials necessary for the proper performance of the work as specified in this SOW. The Seller shall have a Safety Plan describing the laboratory's compliance with all laboratory safety requirements, especially those specified

by the Occupational Safety and Health Administration in 29 CFR 1910. If the Seller chooses to employ any subcontractors including those possessing the same corporate name in the performance of work under this SOW, prior approval of the subcontractor shall be obtained through the WHC Office of Sample Management (OSM). Subcontractors to the Seller shall comply with all requirements of this SOW.

WHC anticipates that all data and documentation generated under this SOW may be subjected to intense regulatory and public scrutiny. All data and documentation may also be discoverable in any resulting legal proceedings. The Seller is requested to address in the technical proposal in particular how it intends to maintain and demonstrate the security and integrity of WHC samples, data, and documentation.

## 2.0 SAMPLE MANAGEMENT

Sample matrices to be analyzed under this SOW include those listed in Table 2-1

TABLE 2-1

- water
- aqueous waste and other liquids
- soil/sediment
- solid waste
- Others including, but not necessarily limited to; sludge, oil, gas, concrete, vegetation, biota, as well as special request matrices as analytical capabilities permit.

### 2.1 Sample Scheduling and Collection

WHC shall assure samples are collected, preserved, and shipped according to protocols appropriate to the specific analytical methods requested. The Seller shall provide to WHC the necessary information for sample collection to assure sufficient sample size is attained for specified analyses and methods. The Seller will be notified by the WHC in the event that minimum sample size requirements cannot be met. WHC shall survey each sample container to assure that the contact exposure rate is less than 10 millirem per hour and no removable contamination is detected.

All sample containers will be labeled and identified as belonging to WHC. Each label will specify a unique sample identification number, user identification, and the required analysis. WHC shall complete a chain of custody form, necessary shipping documentation, and sample analysis request forms (SAR) for each sample shipment.

The Seller shall provide a point of contact during the Sellers normal business hours (7:30 am to 5:00 pm on regular business days except legal holidays) and a point of contact to address emergency situations during all off hours.

Westinghouse Hanford Company's OSM serves as the contact point for the Seller for communications associated with sample scheduling, shipment, receipt, analysis, and return to WHC. All sample delivery to the Seller will be the responsibility of WHC. WHC will make every effort to ship samples in a timely manner. Samples received by the Seller at greater than four days from date of sample collection require notification to WHC OSM. WHC realizes that analyses having maximum holding times of less than 48 hours from the time of sampling may arrive at the Seller with insufficient time remaining to complete those analyses within the required holding time. WHC accepts that these analyses will be flagged as exceeding hold time but still expects that the analyses be completed in a timely fashion. It is otherwise expected that analyses will be analyzed within applicable hold time requirements. If the Seller receives samples under circumstances that may jeopardize their ability

to perform analyses within the applicable holding time requirements, sample analyses shall be started. WHC OSM must be notified of this concern as soon as possible, not to exceed one business day from sample receipt. WHC OSM will confirm continuation or cancellation of the jeopardized analyses.

Routine protocols (as identified in Section 3.4) for sample spiking and analysis in duplicate shall apply unless otherwise specified by WHC. In special cases, WHC will identify (on the Chain of Custody or Sample Analysis request form) which samples are to be spiked with matrix spike analytes and which samples are to be analyzed in duplicate.

## 2.2 Sample Handling and Storage

The Seller shall provide confirmation to OSM within 24 hours of sample receipt. The seller will verify preservation, shipping, handling, and integrity of the samples. To verify preservation of water and aqueous waste samples, the pH shall be determined prior to sample analysis unless it would compromise sample integrity (e.g. opening VOA bottles before analysis voids sample), and the results will be included with the completed data package.

At the time of sample receipt for chemical analysis a calibrated thermometer reading of the sample cooler temperature shall be taken and recorded. The Seller shall provide by facsimile copies of the Chain-of-Custody, shipping documentation, sample analysis request (SAR), and WHC Sample Receipt Form (if used) to the OSM within 24 hours of sample receipt.

This SOW and the Service Price List describes the total analytical support capability to be provided by the Seller to WHC. The specific analytical needs of individual WHC sampling and analysis programs shall be described in Task Agreements (TAs) approved by WHC and issued under this SOW.

The Seller shall assure the integrity and security of all samples (initial and unused portions) and sample extracts using Chain-of-Custody protocol. The Seller shall utilize applicable portions of the 3/90 editions of EPA CLP Chain-of-Custody protocols (ILMO2.0 or OLM01.8 Appendix F) to document all phases of sample handling from receipt to final analysis. A copy of the laboratory's chain-of-custody procedures shall be supplied to WHC OSM by the Seller for review by WHC.

The Seller shall reasonably assure that any sample aliquot removed from a sample is representative of the entire sample. The Seller shall store and preserve the integrity of the unused portion of samples and sample extracts in accordance with applicable portions of the EPA protocols and good laboratory practices. Sixty days after receipt of the completed data package by WHC OSM, the Seller shall submit to the WHC Purchasing organization a written request to dispose/return unused sample portions to WHC. The Seller shall have the written approval of WHC OSM prior to disposal or return of the residuals of all WHC samples. The Seller shall meet all U. S. Department of Transportation packaging and shipping requirements for return of sample materials to WHC. Sample return is the responsibility of the Seller.

### 3.0 REQUIREMENTS FOR ORGANIC/INORGANIC ANALYSES

The Seller shall comply with analytical methods and holding times as specified in the applicable analytical protocols/methods. The analytical protocols to be followed are contained in but not limited to the current promulgated versions of the following documents:

- USEPA CLP OLM01.8, Statement of Work for Organic Analysis
- USEPA CLP ILM02.0, Statement of Work for Inorganic Analysis
- USEPA SW-846, 3rd Edition, Update 1, Test Methods for Evaluating Solid Waste
- USEPA 600/4-79-020, Revision 3/83, Methods for Chemical Analysis of Water and Wastes

Analytical services include, but are not limited to identification and quantification of volatile and semi-volatile organics, pesticides, herbicides, PCBs, total petroleum hydrocarbons, oil and grease, cyanide, metals, anions, cations, water quality parameters, and Toxicity Characteristic Leaching Procedure (TCLP) including the RCRA analyte list, ignitability, corrosivity, and reactivity. The analysis for the specific chemical components will be performed by ion chromatography, gas chromatography; gas chromatography/mass spectrometry; flame, furnace, and cold vapor atomic absorption; inductively coupled plasma; and infra-red spectroscopy. Included in the EPA SW-846 methods are the recently finalized methods for metals: 7081, 7211, 7381, 7461, 7761, and 7951. Other required techniques are colorimetric, distillation, and gravimetric methods for physical characteristics; total organic halide (TOX) determination; and total organic carbon (TOC) determination.

There will be two turnaround times for samples included in this SOW: Regular and Priority. All requested work on "Regular" samples including a completed data package shall be received by WHC OSM within 35 days from the Verified Time of Sample Receipt (VTSR). The preliminary data package for "Priority" sample analysis shall be received by WHC OSM within 10 days from VTSR except for TCLP analysis. Priority turnaround times for complete TCLP (VOA, Semi-VOA, TCLP metals) analysis shall be 15 days. Priority turnaround data packages shall include Chain-of-Custody and summary results of analytical data. The completed data package for "Priority" samples shall be received within 35 days and shall contain deliverables as outlined in Section 3.3.

The Seller shall perform data checks of previously reported results as requested by WHC OSM within seven business days after receipt of written request by OSM. Data checks may consist of a review of calculations, sample size, dilution factors, extraction and analysis methods, and other data pertinent to the reported analytical data. The Seller may also have to review the results of quality control samples as well as the results of other samples processed in the same batch. The quality control sample results and the data check evaluations shall be delivered in writing to WHC OSM within the allotted seven days.

The Seller shall perform analytical tests on the reserved portion of the sample extract (re-analysis), if requested by WHC OSM. If a CLP analysis is found to have a quality control parameter outside the CLP defined QA/QC limits, then the mandatory re-extraction followed by re-analysis must be accomplished within applicable holding times. These CLP quality control parameters include GC/MS surrogate recoveries; GC/MS internal standards, and excessive contamination in the blanks as defined by the CLP SOWs. For example, the Seller is obligated to reanalyze the CLP GC/MS VOA samples within 10 days if surrogate recoveries, internal standard areas, or blank contaminations breach the CLP defined QC acceptance limits. Similarly, the Seller is obligated to re-extract and re-analyze the CLP GC/MS semi-volatile samples (analysis started within 5 days of VTSR for water or completed within 10 days of VTSR for soil) if any QC parameters are found to be outside the accepted CLP limits. Note that the CLP Pesticide/PCB samples need not be re-analyzed if surrogate sample recoveries are outside the QC limits. A completed data package containing all required deliverables for reanalysis must be received by WHC OSM within 35 days of receipt of written request.

In the case of non-CLP analyses, required data checks of previously reported results and re-analysis on the reserved portion of sample extracts will be defined by WHC on a case-by-case basis.

The Seller shall report the results of sample reanalysis in accordance with the specifications in the 3/90 edition of the CLP Statement of Work if applicable, or as specified in Section 3.3 of this SOW. An implementation schedule for new revisions to the CLP Statements of Work, SW-846, or EPA 600/4-79-020 manuals will be negotiated with the Seller as they are promulgated. Procedural deviations from these protocols will not be allowed without prior written authorization by WHC.

### 3.1 Analytical Methods

The seller shall provide both CLP and EPA SW-846 methodologies for organic, inorganic, and chemical parameters for: water, soil, sludge, and aqueous and solid waste matrices. EPA-600/4-79-020 Rev. 3/83 methods will be used to analyze chemical water quality parameters for water and wastes. A complete list of specific method numbers is contained in the Service Price List. The Seller shall submit a letter to WHC, prior to performing analyses, identifying which of the required methods listed in the Service Price List are used as written and without modification. In the case of modified methods, the Seller shall submit a copy of the method to WHC OSM for WHC review prior to performing analyses. The Seller shall clearly indicate how the method is modified and the potential impacts on accuracy and precision. Methods to be used for analyses appearing in the Service Price List for which no method is specified shall be submitted to WHC OSM for WHC review prior to use. The Seller should not use a modified method for WHC sample testing until it receives written authorization from WHC. If a method must be modified during analysis to allow completion of analysis on a sample/batch, the modifications must be documented and communicated to WHC. Authorization to continue use of the modification is required before starting analysis on other samples.

### 3.2 Detection Limits

Prior to performing sample analysis, the Seller shall submit to WHC a statement with all supporting data to analytically justify that the instrument detection limits (IDL), practical quantitation limits (PQL), method detection limits (MDL), or contact required quantitation limits (CRQL) can be achieved in a minimum of water and soil (if applicable) matrices. This statement shall be submitted initially prior to receiving samples for analysis under this statement of work and semi-annually, thereafter. The semi-annual statements are due on January 31 and July 31 while this SOW remains active. Instrument detection limits shall be determined in accordance with methodologies defined by the protocols of the analysis requested (e.g. CLP, SW-846).

### 3.3 Reporting and Deliverable Requirements

Communications of analytical results by the Seller shall be made only to WHC OSM. In no case will reports, results, or data be released to a third party without the prior written permission of the WHC.

The Seller shall provide required deliverables to WHC in a timely manner according to the deliverable schedule established by WHC. Data shall be presented in a concise format that has been agreed upon by both Seller and WHC. Data submitted to WHC in a manner that does not conform to these criteria shall be returned to the Seller for correction and resubmission.

The Seller shall provide to WHC Procurement and OSM, a Monthly Status Report containing the following information:

- Date and time of sample receipt (VTSR)
- Project Number
- Laboratory Identification Number
- WHC TA Number
- TA Sample Numbers
- Cumulative Authorized Amount
- Scheduled TA Completion Date
- Date TA Completed
- Date Invoiced
- Invoice Number
- Invoice Amount

The Seller may be requested to provide additional status reports to other organizations (e.g. WHC OSM) containing additional information than that specified above.

### 3.3.1 CLP Analytical Results

Deliverables and reports for CLP analyses shall be prepared in accordance with the requirements specified in the 3/90 revision of the CLP Statement of Work (ILMO2.0 & OLM01.8).

### 3.3.2 Non-CLP Analytical Results

Deliverables for non-CLP methodologies shall be prepared in accordance with applicable EPA or standard protocols and the requirements of this section. The following information shall be provided for all data packages in the following format:

- Westinghouse identifier code (Buyer supplied)
- Sample identification number (Buyer supplied)
- The location of laboratory performing analyses
- Data package checklist
- Case Narrative: This document shall be clearly labeled "Case Narrative" and shall contain:
  - Laboratory name
  - Case number
  - Sample numbers in the case
  - Differentiation between initial analyses and re-analyses
  - Detailed documentation of any quality control, sample, shipment and/or analytical problems encountered in processing the samples reported in the data package.
  - Verbatim statement "I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature."
    - Signature: The above verbatim statement shall be directly followed by signature of the Laboratory Manager or his designee with a typed line below it containing the signer's name and title and the date of signature.
- Chain of Custody
  - A copy of the Chain of Custody or Sample Traffic Reports for all samples in the case.
- QC Organic Summary

- Surrogate percent recovery summary to include compound name or abbreviation, sample number, and percent recovery.
- Matrix spike/matrix spike duplicate summary to include compound name or abbreviation, Sample number, spike added (ug/L), sample concentration, matrix spike (MS) sample concentration, percent recovery of MS, matrix spike duplicate (MSD) concentration, percent recovery of MSD and the %RPD, the Relative Percent Difference.
- GC/MS tuning and mass calibration to include the chronological order and the instrument identification.

GC/MS Sample Data Package

- Reporting analytes will only be accomplished subsequent to employing authentic standards of those analytes in the continuing calibration. Other analytes may be reported but are required to be clearly identified as tentatively identified compounds (TIC).
- A form containing all target compound list (TCL) analytes names and Chemical Abstract Numbers (CAS) which were used in calibration. In this form, if the TCL analyte was detected then report the concentration determined. If the TCL analyte was not detected then report the < method detection limit (MDL).
- The reconstructed total ion chromatogram (RIC) for each sample or sample extract. The RIC must be normalized to the largest non-solvent component, and must contain the following header information (sample Number, date and time of analysis, GC/MS instrument identification, laboratory file identification). The internal standard and surrogate spiking compounds are to be labeled with the names of compounds.
- The complete data system report (quantitation report) must be included in all sample data packages, in addition to the RIC.
- For each sample, by each compound identified: Copies of raw spectra and copies of background-subtracted mass spectra of the target compound that are identified in the sample and corresponding background-subtracted TCL standard mass spectra. Spectra must be labeled with Sample number, lab file ID, date and time of analysis and GC/MS instrument ID; compound names must be clearly marked on all spectra.
- Copies of mass spectra of non-surrogate organic compounds and non-TCL compounds, i.e. Tentatively Identified Compounds with associated best-match spectra (three best matches), labeled as above.

GC Sample Data Package

- A form containing all TCL analytes names and CAS numbers which were used in calibration. In this form, if the TCL analyte was detected, report the concentration determined. If the TCL analyte was not detected then report the < MDL.

- The GC chromatogram for each sample or sample extract. Each GC chromatogram must contain the following header information (sample number, date and time of analysis, GC instrument identification, laboratory file identification, GC column and conditions). Any TCL compound detected in the chromatogram must be clearly labeled.
- The complete data system report (quantitation report) must be included in all sample data packages.

#### Standards Data

- Initial calibration data must include the TCL analyte name, the concentration of each TCL analyte, the detector response (peak height or peak area) or a response factor (RF) for each TCL analyte and the TCL analyte retention times at each GC column.
- The GC chromatograms and quantitation reports must be labeled as above.
- The working calibration curve, calibration factor or RF must be presented in a clear and organized manner.
- All initial calibration data must be included, regardless of when it was performed and for which case. When more than one initial calibration is performed, the data must be put in chronological order, and by instrument.
- Establish the ability to generate acceptable accuracy and precision by performing the required quality control procedures in each method. The analyte name in the QC check sample, the concentration, the recovery and the standard deviation should be presented in a clear and organized manner. The associated GC chromatograms with quantitation reports must be included in the deliverable and labeled as above.

#### Raw QC Data

- GC/MS tune compounds calibration require the corresponding bar graph spectrum and mass listings.
- Blank data in chronological order require a form to be reported in a similar manner as sample results. This form shall also contain reconstructed ion chromatograms (RICs) and quantitation reports, labeled as above. The raw and enhanced TCL spectra of analytes found in the blank along with the laboratory generated TCL standard spectra.
- Matrix spike data shall be reported in a similar manner as the sample results and shall include the RICs and quantitation reports. The spectra of TCL identified compounds is not required.

#### Inorganic Data

- Standards data package must include the instrument standardization, as well as, all samples analysis results.
- Raw data must contain all instrument readouts used for the sample results. All AA and ICP instruments must provide a

legible hard copy of the direct real-time instrument readout (i.e. strip charts, printer tapes, etc.) A photocopy of the instruments direct sequential readout must be included. A hard copy of the instrument's direct instrument readout, such as cyanide, must be included if the instrumentation has the capability.

- The order of raw data in the data package shall be: ICP, Flame AA, Furnace AA, Mercury, Cyanide and miscellaneous assays.
- All data must be labeled with sample number and with the appropriate codes (e.g. D=Duplicate, M=Matrix Spike, etc.) to allow unequivocal identification.
- Calibration standards information including the source, expiration date, certification identification, and preparation and dilution calculations.
- Raw data for all associated Blanks (Initial and continuing calibration and preparation blanks)
- Raw data for all diluted and undiluted samples
- Raw data for all duplicates and spikes
- Instrument used, any instrument adjustments, data corrections or other apparent anomalies on the measurement record, including all data voided or data not used to obtain reported values and a brief written explanation.
- All information for furnace analysis clearly and sequentially identified on the raw data, including sample number, sample and analytical spike data, percent recovery, coefficient of variation, full Matrix Spike Addition (MSA) data, MSA correlation coefficient, slope and intercepts of linear fit, final sample concentration (standard addition concentration), and type of background correction used: BS for Smith Heiftje, BD for Deuterium Arc, or BZ for Zeeman.
- Time and date of each analysis. Instrument run logs can be submitted if they contain this information.
- Integration times for AA analyses.
- Digestion and distillation Logs: Logs shall be submitted in the following order: digestion logs for ICP, flame AA, furnace AA, mercury preparation, followed by a copy of the distillation log for cyanide. These logs must include (1) data (2) sample weights and volumes, (3) sufficient information to unequivocally identify which QC samples correspond to each batch digested, (4) comments describing any significant samples changes or reactions which occur during preparation, and (5) indication of pH < 2 or > 12 as applicable.

• Shipping documentation.

Diskette deliverable for all CLP results shall be prepared using Format A from the 3/90 edition of the CLP Statement of Work (ILMO2.0 & OLM01.8). Diskette deliverables for all "Regular" and "Priority" samples shall be included as part of the final data package. Diskette deliverables for all

non-CLP results shall be entered using the Laboratory Analytical Services (LAS) data file format, or equivalent determined by WHC. Diskette deliverables shall be sent to WHC OSM.

Transmission of preliminary data packages for "Priority" samples via facsimile machine is acceptable as long as the completed data packages including the diskette deliverables are received within 35 days from sample receipt.

### 3.3.3 Case-file Maintenance and Record Turnover

The Seller shall maintain any original records of all data and other technical information generated in the performance of the services described in this SOW for a period of 365 days from sample VTSR. These records shall be maintained in a one hour rated, Class "C" file container meeting requirements of NFPA 232-1975. The Seller shall after 365 days, or upon request, provide to WHC the case-file purge of all WHC project data. This data will be provided to WHC OSM within seven days of receipt of written request from the WHC OSM. Case-file purge material may include but is not limited to:

- Sample Tags
- Chain-of-Custody Records
- Copies of Sample Tracking Records
- Copies of Analysts' Logbook Pages
- Copies of Instrument Logbook Pages (including instrument conditions)
- Bench Sheets
- Instrument Readout Records
- Computer Printouts
- Chromatographic Charts
- Raw Data Summaries
- Correspondence Memos
- Document Inventory
- 9-Track GC/MS Tapes

The Seller may be requested to provide duplicate copies of all laboratory records not previously submitted as part of the sample data packages 140 days after submission of the sample data package to WHC OSM.

### 3.3.4 Notification of Lost Samples, Reporting Error, Out of Control Samples or Loss of Capability

The Seller shall notify the WHC OSM via facsimile machine (with confirmation by Seller of facsimile receipt by WHC) within 24 hours of lost or inadvertently destroyed samples, any discrepancies, errors in reporting, or the loss of a capability which may adversely affect analytical test results or the delivery of analytical test reports within the times specified herein.

Written confirmation with an Action Plan (if requested by WHC) for mitigating the effects of the situation shall be provided within 5 business days of the oral report. Whenever the Seller determines that a correction should be made to a previously reported result, the correct result and reason for the correction shall be reported via facsimile machine (with confirmation by Seller of facsimile receipt by WHC) within 24 hours to the WHC OSM and confirmed in writing within 5 business days.

### 3.4 Quality Assurance/Quality Control (QA/QC)

The Seller shall assure the integrity and validity of test results through implementation of an internal quality control program and the following:

- Seller's QA program must also describe their management system, including planning, scheduling, and cost control considerations.
- Seller personnel training shall include continued training to ensure that job proficiency is maintained.
- Seller's QA program shall include provisions for the review, approval, and revision of documents/records in accordance with Seller approved instructions. Also, record types shall be specified.
- The Seller's QA program shall ensure that procurement of items and services will meet established requirements and that they are performed as specified. Prospective suppliers shall be evaluated and selected on the basis of specific criteria. The Seller shall ensure that approved suppliers can continue to provide acceptable items and services.

The program shall meet the criteria specified by the applicable protocol (e.g. CLP, SW-846, EPA 600/4-79-020). All appropriate quality control requirements will be required for all sample types, whether "Regular" or "Priority." In addition the following quality control criteria shall be met:

- Analysis of a combination of either a matrix spike/matrix spike duplicate or a matrix spike and duplicate shall be performed on a minimum of one for each laboratory batch number. If a batch contains more than one sample matrix type, the specified QC analyses shall be performed for each matrix type.

- The Seller shall submit to WHC for review a copy of its Quality Assurance Program Plan (QAPP) prior to initiation of work. Deviations from the QAPP must be approved in advance by WHC and documented in the data package summary.
- The Seller shall submit to WHC for review the Standard Operating Procedures that implement the requirements specified in the 3/90 edition of the CLP Statement of Work (ILMO2.0 & OLM01.8), if applicable. If an analysis is to be performed by methods other than the CLP standard operating methods, these requirements, including QA/QC requirements, shall be submitted to Westinghouse for review prior to initiation of work. Standard Operating Procedures include, but are not limited to, the following areas:
  - Sample receipt and log-in,
  - Chain of custody procedures,
  - Sample storage and security,
  - Prevention of sample contamination,
  - Sample tracking; receipt to disposition,
  - Facility security,
  - Acceptance criteria (e.g. QC limits, calibrations, etc.) of non-CLP data,
  - Data reduction, verification, reporting,
  - Document control and disposition,
  - Data package assembly,
  - Shipment of deliverables,
  - Records disposition,
  - Preparation and traceability of standards,
  - Equipment maintenance and calibration,
  - Glassware cleaning,
  - Qualifications of personnel and training.
- The Seller shall require its subcontractors, including those possessing the same corporate name (and their subcontractors) to submit to Westinghouse for review the Standard Operating Procedures that implement the applicable requirements specified in the above bullets.
- The Seller shall submit to Westinghouse, for review, procedures for QA/QC oversight/review of data received from its subcontractors or their subcontractors, as required.
- The Seller agrees to participate in and fulfill the requirements of the WHC Performance Evaluation Program.
- The Seller shall establish laboratory certification for the State of Washington. Objective evidence of intent towards certification (e.g. copies of application information) must be provided before initiation of work. The Seller must provide WHC with monthly status of efforts until full certification is established.

- The Seller shall promptly provide all performance results of ongoing interlaboratory comparison and round-robin activities that assure ongoing laboratory achievement of quality analytical chemistry processes.
- Standard materials used for analysis under this SOW, shall be traceable to a National Standard if available. The seller shall verify that different and independent sources standards are employed for initial and continuing calibration purposes. If no nationally recognized standard exists, the basis for calibration shall be documented.
- Prior to use of software, the Seller shall submit for Westinghouse review, Technical QA requirements and procedures for software documentation, software testing, software control, security of software, software change control, and software program or usage error control.
- The Seller is subject to Westinghouse Quality Assurance audit(s) and surveillance(s). Westinghouse has the authority to stop work under conditions of noncompliance, quality-affecting activities. Westinghouse shall be granted access to facilities, quality affecting processes and equipment, files, documents and records associated with the specified work for QA audit and surveillance purposes. Westinghouse at its option can accompany Seller on its audits and surveillances of its contractors and their contractors.

#### 4.0 REQUIREMENTS FOR RADIOCHEMICAL ANALYSES

The Seller shall provide the radiochemical analyses for the analytes shown in Table 4-1 and sample matrices shown in Table 2-1. Specific analysis needs are listed the Purchase Order Service Price List.

The "Specific Radionuclide Identification" category of analytes for solids and liquid matrices include analysis for the following radionuclides; Strontium 89/90, Tritium, Radium-226/228, Plutonium-239/240, Thorium 230/232, Uranium-233/234/235/238, Americium-241, Neptunium-237, and Curium-244.

The Seller shall assist Westinghouse in minimizing the volume of sample and the number of sample containers necessary to perform required analytical tests and still achieve specified detection limits. WHC will normally submit a sample of sufficient mass/volume for analysis of the sample in duplicate plus required QA/QC samples. The sample volume/mass provided by Westinghouse Hanford Company shall be at least the Seller specified minimum aliquot size.

There will be two turnaround times for samples included in this SOW: Regular and Priority. All requested work on "Regular" samples including a completed data package shall be received by WHC OSM within 60 days from the Verified Time of Sample Receipt (VTSR). The preliminary data package for "Priority" sample analysis shall be received by WHC OSM within 30 days from VTSR except for total alpha, total beta, and direct gamma scan analysis. These analyses shall have a priority turnaround time of 10 days from VTSR. Priority data packages shall include Chain-of-Custody and summary results of analytical data. The completed data package for "Priority" samples shall be received within 60 days and shall contain deliverables as outlined in Section 4.4.

The Seller shall perform data re-checks of previously reported results as ordered by WHC OSM within seven business days after receipt of written request. Data re-checks may consist of a review of calculations, aliquot size, yield, and other data pertinent to the reported analytical result. The Seller may also review the results of quality control samples as well as the results of other samples processed in the same batch. The quality control sample results and the results of the Seller data re-check evaluations shall be delivered in writing to Westinghouse OSM within the allotted seven days.

The Seller shall perform analytical tests on the preserved unused portions of samples (i.e., re-analysis), if ordered by the Westinghouse OSM. A completed data packet for reanalysis shall be received within 60 days of receipt of written request by WHC OSM. The report of reanalysis results shall follow the format provided in section 4.4.

**TABLE 4-1. REQUIRED RADIOCHEMICAL ANALYSES**

ANALYTE	COMMENTS
GROSS ALPHA	
GROSS BETA	
GAMMA EMITTING RADIO.	GAMMA SPEC.
SPEC. RADIO. IDENT.	
TECHNETIUM-99	
CESIUM-137	GAMMA SPEC.
COBALT-60	GAMMA SPEC.
STRONTIUM-89/90	
RADIUM TOTAL	
RADIUM-226	
RADIUM-228	
TRITIUM	
TOTAL URANIUM (MASS)	CHEMICAL MEASUREMENT (Laser Fluorimetry)
ISOTOPIC URANIUM	ALPHA SPECTROSCOPY
CARBON-14	
IODINE-129	
IODINE-131	
PLUTONIUM-238/239/240/242	ALPHA SPECTROSCOPY
PLUTONIUM-241	
AMERICIUM-241	ALPHA SPECTROSCOPY
CURIUM-244	ALPHA SPECTROSCOPY
NICKEL-59	
NICKEL-63	
NEPTUNIUM-237	
THORIUM-230, 232	
LEAD-210	

#### 4.1 Holding Times

The holding time for all radiochemical analyses will be defined as equal to 5 times the half-life of the shortest lived analyte or 6 months from the date of sample collection, whichever is less.

#### 4.2 Analytical Methods

WHC has identified specific analytical methods that it recommends to the Seller. The WHC-recommended methods are shown in Table 4-2. Non-standard methods consist of new, unvalidated methods, or recommended methods that have been modified in some way. The Seller shall submit a letter to WHC, prior to performing analyses, identifying which of the methods listed in the Service Price List are WHC-recommended methods and are used as written and without modification. In the case of modified methods, the Seller shall submit copies of the method to WHC OSM for WHC review prior to performing analyses. The Seller shall clearly indicate how the method is modified and the potential impacts on accuracy and precision.

#### 4.3 Detection Limits

Specific method detection limits shall be determined on a project by project basis. The Seller shall meet or exceed the required detection limits requirements for each analysis. In addition, the Seller shall submit to WHC a statement of achievable instrument minimum detectable activities (MDAs) for each instrument used to perform sample analysis under this SOW. This statement shall be submitted initially prior to receiving samples and semi-annually, thereafter. The semi-annual statements are due on January 31 and July 31 for each year this SOW remains active. Instrument MDAs shall be determined in accordance with EPA methodologies. Other methods for determining MDAs shall be submitted to WHC OSM for WHC review prior to performance of analysis.

#### 4.4 Reporting Requirements

Communications of analytical results by the Seller shall be made only to Westinghouse OSM. In no case will reports, results, or data be released to a third party without the prior written permission of the WHC OSM. The Seller shall maintain records of data and other technical information generated in the performance of the services described in this Statement of Work.

TABLE 4-2 WHC RECOMMENDED RADIOCHEMICAL METHODS

ANALYSIS	MATRIX	METHOD
GROSS ALPHA	WATER	ASTM <sup>1</sup> D-1943-90; EPA <sup>2</sup> 900.0
GROSS BETA	WATER	ASTM D-1890-90; EPA 900.0
GAMMA EMITTERS	WATER; SOIL; VEGETATION	ASTM 3649-85; EPA 901.1
CESIUM 137	SOIL; VEGETATION	HASL <sup>3</sup> 300/CS-01
TECHNETIUM 99	WATER; VEGETATION	HASL <sup>4</sup> 300/TC-01
STRONTIUM 89/90	WATER; SOIL; VEGETATION	HASL <sup>3</sup> 300/SR-01, -02
IODINE-131	WATER	ASTM 4785-88
RADIUM ALPHA ACTIVITY	WATER	EPA 903.0; ASTM 2460-90
TRITIUM	WATER	EPA 906.0; ASTM 2476-81
TRITIUM	VEGETATION	HASL <sup>3</sup> 300/H-03
URANIUM -TOTAL	WATER	EPA 908.1; ASTM 2907-83
URANIUM -TOTAL	SOIL; VEGETATION	HASL <sup>3</sup> 300/U-04
URANIUM -TOTAL ACTIVITY	WATER	EPA 908.0
URANIUM ISOTOPES	WATER	ASTM 3972-90
URANIUM ISOTOPES	SOIL; VEGETATION	HASL <sup>3</sup> 300/U-02
AMERICIUM ISOTOPES	SOIL	HASL <sup>3</sup> 300/AM-02
AMERICIUM ISOTOPES	WATER, TISSUE	HASL <sup>3</sup> 300/AM-03
PLUTONIUM-238/239/240	SOIL	HASL <sup>3</sup> 300/PU-02
PLUTONIUM-238/239/240	WATER	ASTM 3865-90
PLUTONIUM-238/239/340	TISSUE; VEGETATION	HASL <sup>3</sup> 300/PU-08

- <sup>1</sup> American Society for Testing and Materials, Annual Book of ASTM Standards, Water and Environmental Technology, Volume 11.02, 1991 .
- <sup>2</sup> U.S. Environmental Protection Agency, Prescribed Procedures for Measurement of Radioactivity in Drinking Water, EPA-600/4-80-032, August 1980.
- <sup>3</sup> U.S. Department of Energy Environmental Measurements Laboratory, EML Procedures Manual, HASL-300-Ed.25, 1982.
- <sup>4</sup> U.S. Department of Energy Environmental Measurements Laboratory, EML Procedures Manual, HASL-300-Ed.27, 1990.

The Seller shall provide to WHC Procurement and OSM a Monthly Status Report containing the following information:

- Date and time of sample receipt (VTSR)
- Project Number
- Laboratory Identification Number
- WHC TA Number
- TA Sample Numbers
- Cumulative Authorized Amounts
- Scheduled TA Completion Date
- Date TA Completed
- Date Invoiced
- Invoice Number
- Invoice Amount

#### 4.4.1 Analytical Results

The radiochemical results may be transmitted as a separate data package from the organic and inorganic analysis described in this Statement of Work.

If transmitted separately, the following information shall be provided for each test result reported as part of the radiochemical analysis data package:

- All Chain-of-Custody documentation (air bills, traffic reports, packing lists, Chain-of-Custody, etc.)
- Case Narrative
- Data Package Summary including QC results. In addition, each test result reported shall include the following:
  - Westinghouse identifier code (Buyer supplied)
  - Sample identification number (Buyer supplied)
  - The sites and/or locations of laboratory(s) performing analyses
  - Certification statement signed by authorized representative of the laboratory that the analysis was performed in accordance with requirements of the purchase document.
- Raw technical data.
  - Evidence of Initial Instrument Calibration for each detector.
  - Results from Continuing Instrument Calibration
  - Copies of Instrument Control Charts
  - Copies of Laboratory notebook/worksheet pages showing aliquot calculations for samples, standards, carriers, spikes, and tracers
- Raw QC data, including instrument printouts, spectra, and copies of laboratory notebook pages.

- Standards data
  - NIST Certification
  - Activity
  - Dilution Calculations
  - Decay Corrections
- Sample data
  - Data reduction algorithms and calculations (including chemical tracer/carrier yields)
  - Instrument printouts, spectra, and copies of laboratory notebook pages/worksheets.

Data shall be presented in a concise and logical sequence. The Seller shall include in the data package any additional information, beyond the requirements stated in this SOW, necessary to validate the analytical results according to the criteria found in Attachment 2. Furthermore, the Seller shall provide WHC, upon written request, any additional information required to validate the data in the data package. Such information may include (but is not limited to) radiochemical methods, explanation of data package items, definition of terms or variables, and copies of other pertinent technical information.

#### **4.4.2 Case-file Maintenance and Record Turnover**

The requirements for case-file maintenance and record turnover for radiochemical analysis are identical to those for organic/inorganic analysis (section 3.3.3)

#### **4.4.3 Notification of Lost Samples, Reporting Error, or Loss of Capability**

The requirements for notification of lost samples, reporting error, or loss of capability are identical to those for organic/inorganic analysis (section 3.3.4).

#### **4.4.4 Data Package Deliverables**

Data packages for all "Regular" processed analytical samples shall be received by Westinghouse OSM within 60 days from the VTSR. In the case of "Priority" processed analytical samples, the reported results for analytical and QC samples shall be received by Westinghouse OSM within 10 days from VTSR. The remainder of the data package requirements shall be received before the 60 day time limit.

All information stored on magnetic media (i.e. diskettes) shall be entered using Laboratory Analytical Services (LAS) data file format, or equivalent determined by WHC. Diskette deliverables for a specific sample shall be included as a part of the data package, whether sample is "Regular" or "Priority" sample. Transmission of data for "Priority" samples via

facsimile machine is acceptable as long as the remainder of the data package requirements, including the diskette deliverables, are received within 60 days from VTSR.

#### 4.5 Quality Assurance/Quality Control (QA/QC)

The Seller shall assure the integrity and validity of test results through implementation of an internal quality control program. The program shall meet the criteria specified in all applicable regulations and the following:

- Seller's QA program must also describe their management system, including planning, scheduling, and cost control considerations.
- Seller personnel training shall include continued training to ensure that job proficiency is maintained.
- Seller's QA program shall include provisions for the review, approval, and revision of documents/records in accordance with Seller approved instructions. Also, record types shall be specified.
- The Seller's QA program shall ensure that procurement of items and services will meet established requirements and that they are performed as specified. Prospective suppliers shall be evaluated and selected on the basis of specific criteria. The Seller shall ensure that approved suppliers can continue to provide acceptable items and services.

The quality control program shall assure that analytical method accuracy, precision, and analyte recovery meet the criteria specified in the Data Validation Procedure for Radiological Analyses (Attachment 1) in addition to other regulatory requirements. This assurance is achieved through the analysis of QC samples comprised of the following:

Method Blanks: Method Blanks shall contain all laboratory reagents used in preparing a sample for counting. One method blank shall be analyzed for each analytical batch or sample delivery group (SDG) as a minimum.

Duplicates: Duplicate samples must be performed at a frequency rate of one in ten, once per batch, or once per SDG, whichever is greater.

Matrix Spikes: Matrix spike samples shall be performed at a frequency rate of; a) one in twenty, b) once per batch, or c) once per SDG, whichever is greater. If a batch contains more than one sample matrix type, the specified QC analyses shall be performed for each matrix type. For methods that rely on the use of a tracer or carrier to determine chemical yield, use of additional matrix spike/matrix spike duplicates is

not required. Matrix spikes are not required for gross alpha, gross beta, or direct gamma counting analyses. Matrix spikes are required for liquid scintillation counting corrections.

### Laboratory Control

Samples: Laboratory Control Samples used to determine the accuracy of the analytical method. At least one Laboratory Control Sample shall be processed and analyzed with each analytical batch or SDG.

All quality control requirements will be required for all sample types, whether "Regular" or "Priority". In addition the following quality control criteria shall be met:

- The Seller shall submit for Westinghouse Hanford Company review the standard operating procedures implementing its Laboratory Quality Assurance Program, including, but not limited to the following:
  - Sample receipt and log-in,
  - Chain of custody procedures,
  - Sample storage and security,
  - Prevention of sample contamination,
  - Sample tracking; receipt to disposition,
  - Facility security,
  - Acceptance criteria (e.g. QC limits, calibrations, etc.) of non-CLP data,
  - Data reduction, verification, reporting,
  - Document control and disposition,
  - Data package assembly,
  - Shipment of deliverables,
  - Records disposition,
  - Preparation and traceability of standards,
  - Equipment maintenance and calibration,
  - Glassware cleaning,
  - Qualifications of personnel and training.
- The Seller shall require its subcontractors including those possessing the same corporate name and their subcontractors to submit to Westinghouse for review the standard operating procedures that implement the applicable requirement specified in the first bullet above.
- The Seller shall submit to Westinghouse, for review, procedures for QA/QC oversight/review of data received from its subcontractors or their subcontractors, as required.
- The Seller agrees to participate in and fulfill the requirements of the WHC Performance Evaluation Program.

- The Seller shall provide performance results of ongoing interlaboratory comparison and round-robin activities that assure ongoing laboratory achievement of quality analytical chemistry processes.
- Standard materials used for analysis under this SOW, shall be traceable to a National Standard if available. The Seller shall verify that different and independent sources for standards are employed, if they are available, for initial calibration and continuing calibration purposes.
- Prior to use of software, the Seller shall submit for Westinghouse review, Technical QA requirements and procedures for software documentation, software testing, software control, security of software, software change control, and software program or usage error control.
- The Seller is subject to Westinghouse Quality Assurance audit(s) and surveillance(s). Westinghouse has the authority to stop work under conditions of noncompliance quality-affecting activities. Westinghouse shall be granted access to facilities, quality affecting processes and equipment, files, documents and records associated with the specified work for QA audit and surveillance purposes. Westinghouse at its option can accompany Seller on its audits and surveillances of its contractors and their contractors.