



**STATEMENT OF WORK
FOR
GENERAL SAMPLING
ACTIVITIES
MODULE AS01-A**

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By: Roger S. Cichorz U/NU

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**REQUIREMENTS
FOR
GENERAL SAMPLING ACTIVITIES**

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GENERAL SAMPLING ACTIVITIES

INTRODUCTION

The Rocky Flats Environmental Technology Site (Site) Statement of Work (SOW) for General Sampling Activities defines the requirements necessary for the sampling of radioactive and non-radioactive materials. This SOW also includes information on Standard Operating Procedures (SOPs) and other operating documents necessary to perform sampling events, as well as other associated responsibilities in the area of sampling.

The following Exhibits and Appendices are required for General Sampling activities under this subcontract:

EXHIBIT A

SUMMARY OF REQUIREMENTS

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GENERAL SAMPLING ACTIVITIES

SUMMARY OF REQUIREMENTS

1. INFORMATION

When Site personnel (customer) are in need of laboratory analyses for either radioactive or non-radioactive liquid or solid samples, the Analytical Projects Office (APO) is contacted to initiate a sampling event. A sampling event includes all pre-sampling activities, the collecting of the samples for laboratory analyses, sample labeling and packaging, and transportation of the samples to the laboratory. The sampling personnel must abide by all safety rules and site and building specific regulations.

APO personnel and the customer work together to generate an APO Sample Analysis Request Form. When all applicable information has been entered, the Sample Analysis Request Form will be forwarded to the subcontractor (Sample Team management) who will further review it. If the information contained is complete and understood, the sampling event will be scheduled with the customer.

Sampling in radiological controlled areas require that a specific Radiological Work Permit (RWP) be obtained and strictly followed. The customer, as part of their pre-sampling responsibilities, will obtain the RWP prior to the sampling event.

Whether the sampling event involves the collecting of radiological or non-radiological samples, Standard Operating Procedures (SOPs) provide for the following information:

- method of collection/sampling equipment
- bottle/equipment decontamination and disposal
- field parameters and measurements
- sampling parameters
- sample collection, bottling, and preservation
- sample disposal
- quality assurance/quality control (QA/QC)
- documentation and data management

Samples shall be transported to the Laboratory for analyses using the *On-Site Transportation of Hazardous and Radioactive Materials Manual* as guidance. This manual implements the requirements of the Site Transportation Policy as related to on-site transportation and applies to all aspects of the identification, handling, packaging, transfer, and transportation of hazardous and radioactive materials at the Rocky Flats Environmental Restoration Site.

Documentation of the transport and delivery of the sample to the Laboratory is verified through a sample Chain of Custody (COC).

2. GENERAL REQUIREMENTS

- 2.1. **SOW Compliance:** Sampling activities shall meet all the requirements specified in this Statement of Work (SOW). If necessary, the subcontractor shall modify their standard methods to comply in all respects to the SOW requirements and submit the modified methods for approval when requested by the CTR. All work performed under this SOW shall be done by the subcontractor under the guidance of the CTR, or if applicable, by designated agents in accordance with contractual agreements.
- 2.2. **Terms and Acronyms:** Exhibit G is a glossary of terms and acronyms. The subcontractor shall use the glossary meaning when a term is used in the text without definition.
- 2.3. **Key Identifiers:** The term *Report Identification Number (RIN)* is key to this SOW. Exhibit G gives a precise definition of this term.
- 2.4. **Potential Hazards Advisement:** The samples to be collected by the subcontractor are from the Rocky Flats Environmental Technology Site and may contain potentially hazardous radioactive, chemical and/or biological materials. The subcontractor should be aware of the potential hazards associated with the handling of these samples.
- 2.5. **Timelines:** Timelines given in terms of days are to be interpreted as calendar days throughout this SOW unless otherwise noted.
- 2.6. **Sample Size:** The Laboratories contracted by the Site shall specify the amount of sample (weight or volume) required to perform analytical determinations. The subcontractor shall comply with required weights or volumes at all times. Deviations may occur only with a written statement from the CTR.
- 2.7. **Sample Containers:** The subcontractor shall provide sufficient quantities of sampling vials/bottles and labels at the site to ensure availability for all users. This includes containers for customers who routinely take their own samples or who have radioactive material that requires special handling and safety issues.
- 2.8. **Sample Shipments:** Sample shipments to the Laboratory will be scheduled and coordinated by the sub-contractor. The subcontractor shall communicate with the Laboratory Shipping/Receiving Officer by telephone or fax using appropriate documentation as necessary throughout the process of sample scheduling and shipment to ensure that samples are properly processed.
 - 2.8.1. Transfer of samples to the laboratory will be the responsibility of the subcontractor.
 - 2.8.2. If there are problems with samples (e.g., broken or leaking containers) or sample documentation/paperwork (e.g., missing, incomplete, or conflicting COC forms) when received by the Laboratory, the CTR who will contact the subcontractor for immediate resolution.
- 2.9. **Multiple Phased Samples:** A sample may consist of more than one phase (e.g., water miscible, non-water miscible, and solid) contained inside appropriate receptacles. More than one container may be used for a single sample.

- 2.10. **Building Rules and Regulations:** The sampling process is complex and complicated and can vary from building to building or even between similar sampling events within the PA. Therefore, the subcontractor shall become familiar with each building's rules regarding entry requirements since each building within the PA has specific and sometimes differing requirements.
- 2.11. **New Method Evaluation:** The subcontractor shall evaluate new sampling methods that becomes available and determine the applicability to Site sampling. Request for new method approval shall be done in writing to the CTR.
- 2.12. **QA/QC Requirements:** All QA/QC procedures prescribed in Exhibit E of this module shall be strictly adhered to by the subcontractor.
- 2.13. **Technical Audits:** The subcontractor shall be subject to routine, on-site technical audits as described in Exhibit E of this module.
- 2.14. **Information Release:** Communication by subcontractor personnel of sampling information or similar matters shall be performed in accordance with procedures established in this module. In no case shall information be released to a third party without prior written approval of the CTR.
- 2.15. **Equipment and Materials:** The subcontractor shall have sufficient instrumentation, equipment, and materials to meet all requirements of the SOW. The subcontractor shall be responsible for the lease of the vehicles required for sampling activities.
- 2.16. **Emergency Response:** The sampling team is an integral part of the emergency response team at the Site. Two sample team members shall be on call at all times to provide sampling in emergency response activities. The subcontractor shall supply a weekly list of the on call personnel with phone numbers, pager numbers, or any other information necessary to contact personnel during off shift emergencies.
- 2.17. **Spill Response:** Spill response and unknown identification activities are usually unplanned events.
- 2.18. **Process Knowledge:** Generator process knowledge will be provided for each stream, spill, or sampling event to include location, identification number and description. Specific analysis parameters have been previously identified through the RCRA permit and will vary with each waste stream, spill, or sampling event.
- 2.19. **Sampling Priority:** Routine sampling is done on a priority specified by the Analytical Projects Office (APO) and is unique for each waste stream.
- 2.20. **Personal Protective Equipment:** Proper protective clothing and equipment must be worn by the individuals who are involved in sampling activities. This may include company-provided clothing, safety shoes, chemical resistant gloves, full-face respirator and safety glasses.
- 2.21. **Vehicles**
- vehicle leases shall be the responsibility of the subcontractor
 - vehicles used in the transportation of fissile material have a 200 gram limit for fissile material

- vehicles are approved for 1-gallon cans only
- cans must be transported in a one-layer planar array

2.22. Organizational and Key Position Requirements

The subcontractor's organization must be clearly structured with well-defined responsibilities for each individual in the management system. This system shall ensure that sufficient resources are maintained to perform the requirements of the SOW. Specifically, all key positions listed below shall be assigned to individuals. The subcontractor shall maintain a chart or diagram illustrating the subcontractor's organizational structure and all key position assignments. The subcontractor shall provide this chart and key personnel resumes to the CTR prior to contract award and within seven days following changes in key personnel. Résumés shall include position description, title, education (pertinent to the duties performed for this SOW), number of years of experience (pertinent to the duties performed for this SOW), month and year hired, previous experience, and publications.

Unless otherwise noted, the following technically relevant experience may be substituted for educational requirements, such that:

- A Bachelor's degree equals:
 - ◊ An Associate's degree and four years of experience, which equals
 - ◊ A High School diploma and eight years of experience.

2.22.1. Key positions are identified below. A qualifying individual may fill more than one key position unless stated otherwise. Failure to identify individuals for each Key Position may result in a **SUBCONTRACT TERMINATION**.

2.22.1.1. Technical Supervisor

Responsibility: Responsible for all technical efforts of sampling team personnel.

Academic Training: A bachelor's degree (or equivalent) in a science discipline.

Experience: A minimum of three years of sampling experience, with at least one year of experience in a supervisory position and one year of laboratory experience.

2.22.1.2. Project Manager

Responsibility: Responsible for overall aspects of this SOW (from sample request to sample receipt by the Laboratory), and serves as the primary contact for the CTR.

Academic Training: A bachelor's degree (or equivalent) in a science discipline.

Experience: A minimum of two years of sampling experience and one year of laboratory experience.

2.22.1.3. Quality Assurance Officer

The Quality Assurance Officer (QAO) must be a full-time specific position. The QAO shall have direct access to management at a level where appropriate action can be effected.

- Responsibility: Responsible for assuring the subcontractor's QA Program meets all requirements of this SOW. Reports directly to upper management.
- Academic Training: A bachelor's degree (or equivalent) in a science discipline.
- Experience: A minimum of 3 years of sampling experience, including at least one years of applied experience with QA principles and practices in sampling and one year's laboratory experience.

2.22.1.4. Health and Safety Officer

- Responsibility: Responsible for overseeing the Health and Safety Program including personnel monitoring activities for hazardous, chemical, and radiological (if applicable) contaminants.
- Academic Training: A bachelor's degree (or equivalent) in a science discipline and the academic training to include radiation health courses.
- Experience: A minimum of four years of experience in chemical and radiological safety, including at least two years of applied experience with sampling health and safety practices.

2.22.1.5. Shipping/Receiving Officer

- Responsibility: Responsible for all packaging and shipments to and from the laboratory facilities.
- Academic Training: Certification as a "Hazmat" Employee in accordance with 49 CFR 172 and the packaging and shipment of radioactive materials.
- Experience: A minimum of one year of experience in the transportation of hazardous materials.

2.23. **Personnel Requirements:**

- 2.23.1. Subcontractor sampling personnel shall have extensive experience in the handling of and working with radioactive fissile materials (i.e., plutonium, americium, etc.).
- 2.23.2. Subcontractor sampling personnel shall have experience in working in radioactively-contaminated gloveboxes and shall be well trained in all safeguards necessary for the prevention of a nuclear criticality.
- 2.23.3. Subcontractor sampling personnel are required to possess a "Q" security clearance granted by the Department of Energy (DOE). The "Q" clearance is necessary for access to most areas in the Protected Area (PA). This includes access to a RMMA, RMA, CA, HCA, RCA. Without a "Q" clearance, personnel are restricted from entering certain areas and will not be allowed to perform sampling events.
- 2.23.4. Subcontractor sampling personnel must be designated as Material Handlers as well as Material Transporters which means that through training and experience in working

with and handling radioactive materials they are qualified to handle and transport radioactive materials. This designation is evident by the placement of a distinct marking on the “Q” clearance security badge.

2.24. **Training Requirements:** Subcontractor sampling personnel are required to successfully complete and pass the following Rocky Flats specific training courses before being allowed to participate in sampling events. For those courses requiring annual refreshers, the subcontractor shall ensure that the annual training is complete prior to training expiration date. Number in parenthesis are course numbers:

- ALARMS AND SOUNDS (012-273-01) (Annual)
- ASBESTOS AWARENESS (056-352-01) (Annual)
- BERYLLIUM OPERATIONS (056-286-01) (Biennial)
- COMPUTER SECURITY USER (079-595-01) (Annual)
- CONDUCT OF OPERATIONS - GENERAL (012-864-01) (1 Time)
- CONFINED SPACE ENTRY (068-741-01) (Annual)
- DEPARTMENT OF ENERGY EM-561 HAZARDOUS MATERIALS TRAINING (023-434-02) - (Biennial)
- DEPARTMENT OF TRANSPORTATION (DOT) AWARENESS (023-434-01) (Biennial)
- DOT TRANSPORTATION OF RADIOACTIVE MATERIALS
- FALL PROTECTION (025-976-01) (Biennial)
- GENERAL EMPLOYEE TRAINING (GET) (019-235-01) (1 Time)
- GENERAL EMPLOYEE RADIATION TRAINING (GERT) (019-278-02) (Biennial)
- GLOVEBAGS (027-938-01) (Biennial)
- GLOVEBOX CASUAL USER (027-436-01) (Biennial)
- HAZARDOUS COMMUNICATIONS (019-750-01) (Biennial)
- HAZARDOUS WASTE OPERATIONS - 40 Hr. OSHA (018-691-11) (1 Time with annual 8 hour refresher course)
- LADDER SAFETY AWARENESS (025-985-01) (Biennial)
- LEAD IN THE WORKPLACE (019-574-01) (Annual)
- LOCKOUT/TAGOUT (019-395-07) (Biennial)
- NUCLEAR CRITICALITY SAFETY (023-415-01) (Biennial)
- NUCLEAR MATERIAL HANDLING AND TRANSPORTING (038-588-01) (Annual)
- NUCLEAR MATERIAL SAFEGUARD (038-597-01) (Biennial)
- PCB AWARENESS (068-124-01) (1 Time)
- PREMAIRE REPIRATOR: INITIAL TRAINING (012-931-01) (1 Time)
- RADIOLOGICAL WORKER ENVIRONMENTAL RESTORATION PRACTICAL FACTORS (023-487-00) (1 Time)

- RADIOLOGICAL WORKER INTERACTIVE VIDEO DISC (IVD): ACADEMIC INITIAL TRAINING (023-489-01) (1 Time)
 - RADIATION WORKER LEVEL 2 PRACTICAL FACTORS (023-484-00) (Biennial)
 - RCRA COMPLIANCE (023-435-01) (Annual)
 - RESPIRATOR INDOCTRINATION (056-284-01) (Annual)
 - SCBA (SELF CONTAINED BREATHING AIR) (019-170-01) (1 Time)
 - SCBA (SELF CONTAINED BREATHING AIR) REFRESHER (019-171-01) (Annual)
 - SITE SAFETY ENVELOPE TRAINING (057-277-01) (Biennial)
 - TAMPER INDICATION DEVICE (TID) APPLICATOR/WITNESS (061-350-01) (Annual)
 - WASTE GENERATOR ALL AREAS INITIAL QUALIFICATION (067-577-01) (1 Time)
 - WASTE GENERATOR ALL AREAS REQUALIFICATION (067-577-02) (Biennial)
- 2.25. **On-The-Job-Training Program:** The Subcontractor shall develop and administer an On-The-Job-Training Program which covers all aspects of sampling hazardous and radioactive materials. An On-The-Job-Training-Checklist shall be completed for each of the sample team personnel and maintained in the permanent personnel records.
- 2.26. **Oral and Written Examinations:** The subcontractor shall develop and administer written and oral examinations to all sample team employees. Results of the examinations shall be maintained in the employees' permanent records. The examinations shall be administered annually as part of the sampler recertification program. At a minimum, the exams shall cover
- Custody Seals
 - Sample container labels and the information they contain
 - Chain of Custody forms
 - Sample Analysis Plan (SAP)
 - Sample collection
 - Field measurements:
 - Transportation of samples
 - Storage of Samples
 - Presampling activities
 - Equipment decontamination
 - Sample packaging
 - Health and Safety
 - Radcon Manual
 - Nuclear Material Safeguards

- Emergency procedures including, but not limited to, chemical burn, chemical spill, container breaks, fire in a glovebox, fire in the sampling area, glovebox criticality limits exceeded, loss of room airflow, loss of supplied air flow; loss of glovebox airflow; and pressurized container rupture.

2.27. **Analytical Services Sample Tracking System (ASST):**

- 2.27.1. The subcontractor shall be trained on the Analytical Services Toolkit (AST) system.
- 2.27.2. All sampling paperwork including but not limited to the Sample worksheet, the COC and the labels shall be generated by the subcontractor utilizing the AST.
- 2.27.3. Information shall be entered into the AST by the subcontractor as indicated on the attached flow diagrams.

2.28. **Chemical Hygiene/Hazard Communication Program**

- 2.28.1. The subcontractor shall have a documented Chemical Hygiene/Hazard Communication Program reflecting actual process operations.
- 2.28.2. The subcontractor shall ensure that protective apparel and safety equipment are available and compatible with the degree of protection required for the substances handled.
- 2.28.3. The subcontractor shall maintain and document fume hood operation in compliance with ANSI/AIHA Z9.5-1992 (Laboratory Fume Hood Section) and ANSI/ASHRAE 110-1195 procedures.
- 2.28.4. The subcontractor shall meet Federal and State regulations for performing these requirements.
- 2.28.5. The subcontractor shall develop and implement a spill control policy consistent with Site spill procedures. This policy must address spill containment, cleanup, reporting, and emergency procedures.
- 2.28.6. The subcontractor shall clearly mark or label all chemicals not in their original container.
- 2.28.7. The subcontractor shall have Material Safety Data Sheets (MSDSs) for all chemicals used. MSDSs shall be readily accessible to employees.

2.29. **Waste Management**

- 2.29.1. The subcontractor shall develop, implement, and maintain a Waste Management Program documenting procedures for the disposal of all waste created by the subcontractor away from the sampling site in accordance with Federal, State, and local laws and regulations.
- 2.29.2. Unless directed otherwise by the CTR, the subcontractor shall be responsible for the proper disposal of all waste generated at the subcontractor's facility and in the transport vehicles.
- 2.29.3. Evidence of improper waste disposition or documentation may result in a **SUBCONTRACT TERMINATION**.

- 2.29.4. The subcontractor shall certify the disposition and disposal location of waste generated at the subcontractor's facility and/or from the transport vehicles and shall maintain records as required by any applicable federal, state, and/or local laws. These records shall be available for inspection upon request.

3. SAMPLING REQUIREMENTS

3.1. Non-radioactive Analytical Samples

For the purpose of identifying non-radioactive analytical samples at the Rocky Flats Environmental Technology Site, a material, including waste, may be considered to be non-radioactive only if it complies with the criteria in items (a), (b) and (c) below:

- (a) No bulk or volume of radioactivity has been added to a material which was never considered to be radioactive
- (b) The material is in compliance with DOE Order 5400.5, **Radiation Protection of the Public and the Environment**, which is to establish standards and requirements for operations of the Department of Energy (DOE) and the Department of Defense (DOD) contractors and subcontractors with respect to the public and the environment against undue risk from radiation
- (c) Samples are less than 5000 dpm (83 Becquerels or 2 nanocuries) direct count as determined by a Radiological Control Technician (RCT)

- 3.1.1. The subcontractor is required to label, package and transport non-radioactive analytical samples according to Site and DOT requirements:

3.2. Radioactive Analytical Samples

The subcontractor is also required to label, package, transport and ship radioactive analytical samples. For the purpose of identifying radioactive analytical samples at the Rocky Flats Environmental site, a material, including waste, is considered to be radioactive if its direct count is greater than or equal to 5000 dpm (83 Becquerels or 2 nanocuries) but less than 150,000 dpm (2500 Becquerels or 60 nanocuries) as determined by a Radiological Control Technician (RCT).

If the direct count is greater than 150,000 dpm as determined by a Radiological Control Technician (RCT), work is to be stopped immediately and the subcontractor notified immediately.

Radioactive analytical samples are also defined as those that are suspect of being radioactive by the fact that they were initiated in a radiological area or are of unknown origin.

All radioactive material, hazardous materials, hazardous substances, hazardous waste shall be packaged, marked, labeled, handled, transported and shipped in approved containers using methods and procedures that will assure compliance with all applicable site requirements and government regulations.

- 3.3. The subcontractor shall:

- Have trained and certified personnel in accordance with 49CFR 172.704.

- Comply with the requirements of the *Rocky Flats Transportation Safety Manuals*.
- Ensure that the material to be transferred, which meets the definition of a Department of Transportation (DOT) Hazard Class or a Radioactive Material (See 1-T91-Traffic-100, Section 4), is properly identified, packaged, marked, labeled, stored incident to transfer, and transferred
- Comply with the requirements of 1-P73-HSP-18.10, *Radioactive Material Transfer and Unrestricted Release of Property and Waste*.

4. Customer Responsibility for A Sampling Event

To ensure compliance to all building rules and to assure minimum impact to building operations, the customer responsibilities include but are not limited to:

- 4.1. **Pre-Evolutionary Briefing:** Schedule a pre-evolutionary briefing with everyone involved with the sampling event. This could include RCTs, pipefitters, carpenters, electricians, process specialists, a Subject Matter Expert (SME), or any of the maintenance/crafts personnel
- 4.2. **Pre-Sample Visit:** Schedule a pre-sample visit by Sample Team personnel if requested
- 4.3. **Plan of the Day (POD):** Get the Sampling Event on the Plan of the Day
- 4.4. **Radiological Work Permit (RWP):** Arrange for a Radiological Work Permit that addresses the specific sampling event
- 4.5. **Radiological Control Technician (RCT):** Arrange for a Radiological Control Technician to be available at the end of the sampling event with a calibrated gamma/neutron counter.
- 4.6. **Waste Disposal:** Arrange for waste disposal which may require the initiation of a NON-ROUTINE WASTE DISPOSAL LOG (NRWDL)
- 4.7. **Sample Return:** Customer must be able to take back unadulterated excess samples
- 4.8. **Tamper Indication Device (TID):** Notify Nuclear Material Safeguards (NMS) for a TAMPER INDICATION DEVICE (TID) and a NUCLEAR MATERIAL DRUM TRANSFER REQUEST (NMDTR) if the material being moved is accountable

Failure to comply with any of the above listed requirements will result in the subcontractor not being able to complete the sampling event.

EXHIBIT B

REPORTING AND DELIVERABLES

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1. INTRODUCTION

This Exhibit contains reporting and deliverable requirements applicable to sampling events defined in Exhibit A. Four tables further define some of the deliverables.

Table 1 Schedule for Sampling Deliverables

Table 2 Sampling Event Deliverables

Table 3 Schedule for Other Deliverables

Table 4 Support Documentation

These tables define major components as *Deliverable Sections* which are each assigned titles. Text accompanying the tables provides structural and content requirements.

2. REPORTING AND DELIVERABLES REQUIREMENTS

- 2.1. SOW Reporting and Deliverables Requirements are summarized in Table B-1 and B-2. These tables include the schedules and distribution (recipient) for each deliverable. All days listed are as calendar days. The *Reference* column in these tables contains designators that refer to Exhibits and Sections where more detail may be found. This column is provided as an aid in locating requirements but may not be all-inclusive.

TABLE B-1 SAMPLE EVENT TURNAROUND TIME

| SAMPLE PROCESSING | SAMPLE EVENT TURNAROUND |
|--|---|
| ROUTINE (31 Days for return of analytical data) | 5 DAYS FOLLOWING APO RECEIPT OF REQUEST |
| PRIORITY (21 days for return of analytical data) | 3 DAYS FOLLOWING APO RECEIPT OF REQUEST |
| RUSH (7 days for return of analytical data) | 24 HOURS FOLLOWING APO RECEIPT OF REQUEST |
| RAPID (24 hours for return of analytical data) | 1 HOUR FOLLOWING APO RECEIPT OF REQUEST |

TABLE B-2 SCHEDULE FOR SAMPLING EVENT DELIVERABLES

| Item | Schedule | Recipient | Reference Exhibit/Section |
|--|--|------------------|--------------------------------------|
| Signed copy of COCs and discrepancy reports | Relayed by FAX within 24 hours following sampling | APO | Exhibit F/Section 2 |
| APO sample Receipt | Delivered to customer at time of sampling | Customer | Exhibit F/Section 7 |
| Original completed paperwork | 24 hours following sampling | APO | Exhibit B/Section 4 |
| Notification of accidental loss, damage, theft, or malicious mischief of samples | Written notification within 24 hours of loss or damage | CTR | Exhibit F/Section 2 |
| QC Sample Information | 24 hours following sampling | APO | Exhibit E/Section 7 |
| IW Report | 24 hours following sampling | APO | Exhibit B/Section 4 |

TABLE B-3 SCHEDULE FOR OTHER DELIVERABLES

| Item | Schedule | Recipient | Reference Exhibit/Section |
|---|--|-----------------------------|--------------------------------------|
| Emergency Response Call list | Every Monday | CTR | Exhibit A/Section 2 |
| Notification of problems or conditions that affect timeliness of a sampling event | Immediate telephone notification, written confirmation and explanation within 24 hours | CTR | Exhibit B/Section 3 |
| List of SOPs | At contract award and within 14 days of the addition of new or amended SOP(s) | CTR | Exhibit F/Section 4 |
| Requested SOP(s) | 3 days from request | CTR | Exhibit F/Section 4 |
| QA Plan | At contract award and upon request | CTR | Exhibit E/Section 3 |
| QA training | Available upon request | CTR | Exhibit E/Section 3 |
| Organizational chart/diagram | At contract award and 7 days following change in key personnel | CTR | Exhibit A/Section 2 |
| Key personnel resume | At contract and 7 days of assigning new personnel to a key position | CTR | Exhibit A/Section 2 |
| Audit corrective response | As determined during audit debriefing | CTR | Exhibit E/Section 10 |
| Thermometer certifications | Available upon request | Maintained by Subcontractor | Exhibit E/Section 5 |
| Automatic pipette documentation | Available upon request | Maintained by Subcontractor | Exhibit E/Section 5 |
| Refrigerator temperature documentation | Available upon request | Maintained by Subcontractor | Exhibit E/Section 5 |
| Instrument maintenance/repair documentation | Available upon request | Maintained by Subcontractor | Exhibit E/Section 5 |
| Internal Audit Reports | Available during audits and upon request | Maintained by Subcontractor | Exhibit E/Section 9 |
| Sample vials/bottles/shipping containers | Available at all times | Maintained by Subcontractor | Exhibit A/Section 2 |
| Logbooks | Available upon request | Maintained by Subcontractor | Exhibit B/Section 4 |

3. REQUIREMENTS FOR ALL DELIVERABLES

- 3.1. **Compliance:** All hard copy and other submittals not conforming with requirements shall be considered incomplete. Subcontractor will be required to resubmit such documentation with deficiencies corrected.
- 3.2. **Notification Requirements for Late Sampling Events:** The subcontractor shall notify the CTR immediately of any problems or conditions that affect the timeliness of the sampling event

and consequently data reporting if the sampling event involves Incidental Waters. In particular, the subcontractor shall notify the CTR in advance, if possible, regarding a delay in the sampling event and shall reschedule the sampling event with the customer.

- 3.3. **Document Control:** Document Control Requirements of Exhibit F, Section 3 must be applied to all deliverables. The subcontractor shall ensure that all documents are compiled in one location where possible and identified by a Report Identification Number (RIN).
- 3.4. **Labeling Requirements:**
 - 3.4.1. All reports and documentation prepared for the Site shall be identified with the RIN, where applicable.
 - 3.4.2. All submittals shall be clearly labeled, legible, and completed in accordance with instructions in Exhibit B, Section 3.

4. SAMPLING EVENT DELIVERABLES REQUIREMENTS

- 4.1. **Sampling Event Deliverable Components:** The schedule for the required components for Sampling Event deliverables is listed in Table B2. The *Reference* column in Table B2 contains designators that refer to Exhibits and Sections that contain additional information. This reference column is intended as an aid in locating requirements, but is not expected to be all-inclusive.
- 4.2. **Original Documents:** All components of sampling event deliverables shall consist of all original documents where possible. Photocopies of original documents may also be submitted if the original data were previously submitted under another RIN.
- 4.3. **RINs and Sampling Events:** Each sampling event shall be identified by a RIN supplied by the APO. Several analysis requests may be coupled under one RIN provided it is for the same customer
- 4.4. **Sampling Event Deliverables Requirements**
 - 4.4.1. Chain of Custody (COC)

The signed and completed original COC shall be delivered with the sample to the Laboratory. See Exhibit F, Section 2 for more details regarding COCs.
 - 4.4.2. APO Sample Request Form

The APO Sample Request Form, which consists of pages 1 and 2, contains all the information supplied by the customer to the CTR and the subcontractor. The original is delivered with the sample to the laboratory and photocopies are returned to the APO and the subcontractor.
 - 4.4.3. **Original Paperwork**
 - 4.4.3.1. APO Sample Request Worksheet

This worksheet, which is part of the APO Sample Request Form, is filled out in the field by the subcontractor and returned to the CTR. This Form contains the following items which shall be answered:

- Comments/Problems encountered during sampling
- Location description
- Other ID
- Sample Appearance
- Sampling Device
- Sample Date
- Sample Time
- Rad Screen Sample Date
- Was generator notified to receive sample?
- Samplers' Signatures
- Employee Number
- Field parameters (if applicable)

4.4.3.2. Incidental Waters Report Form

The subcontractor shall include all raw data for Incidental Water (IW) analyses on the IW report form. Instrument raw data must include all of the following:

- Analysis date and time
- Sample identifications (RIN)
- Analyst's initials
-

4.4.3.3. Customer Check-off Form

All applicable entries on the Check-off Form shall be completed by the customer, signed and delivered to the subcontractor. The check-off form lists the following:

- Plan of the Day (POD): Get the Sampling Event on the Plan of the Day.
- Radiological Work Permit (RWP): Arrange for a Radiological Work Permit that addresses the specific sampling event.
- Integrated Work Control Package (IWCP): Arrange for a IWCP if the crafts and/or maintenance will be involved in the sampling event.
- Radiological Control Technician (RCT) support: Arrange for a RCT to be available at the sampling event if required. The RCT must also have a calibrated gamma/neutron instrument available since the magenta-colored **MATERIAL TRANSFER TAG (RF-47470)** requires that this information be filled in.
- Industrial Hygiene (IH) assistance: Arrange for IH personnel to be present if the sampling event involves hazardous chemicals (i.e., beryllium, asbestos, etc.) or if there is a health safety concern.

- Subject Matter Expert (SME): Arrange for a SME to be present at the sampling event.
- Pre-evolutionary briefing: Schedule a Pre-evolutionary briefing with everyone present who will have anything to do with the sampling event (i.e., pipefitters, plumbers, carpenters, process specialists, electricians, etc.).
- Arrange for waste disposal: Arrange for waste disposal which may require the initiation of a **NON-ROUTINE WASTE DISPOSAL LOG (NRWDL)**.
- Nuclear Materials Safeguards (NMS) notification for accountable material: Notify NMS if the sampling event involves the movement of accountable fissile material. NMS will deliver to the customer a) **TAMPER INDICATION DEVICE (TID)** and a **NUCLEAR MATERIAL DRUM TRANSFER REQUEST (NMDTR)**.

4.4.3.4. Required instrument performance demonstrations shall be performed for each instrument used to generate data for the RIN under this SOW.

4.4.4. Logbooks

Documentation of all sampling events shall be recorded in a standard laboratory logbook. Each transport vehicle shall have a logbook assigned specifically to it. Subcontractor shall be instructed to document all sampling event activities and shall enter the following information:

- Sampling event date and time
- Sampling event location
- RIN for sampling event
- Deviations to the Sample Analysis Plan (SAP)
- Any other deviations to a planned sampling event

4.4.5. QC sample results shall be submitted with the Field Parameter data on the same form under the same RIN.

5. SUPPORTING DOCUMENTATION REQUIREMENTS

The Supporting Documentation is an ordered compilation of sampling activity information relevant to all aspects of data integrity for a single RIN. Much of this information is included by reference to subcontractor document storage locations.

5.1. Supporting Documentation Components:

Required components for support packages are listed in Table B4. Paragraphs following the table contain minimum requirements for these deliverable sections. The "Reference" column in Table B4 refers to the document, Exhibit and Section where more details may be found. The information in this column is intended as an aid in locating requirements; additional requirements will be found in Exhibits B, E, and F

TABLE B-4 SUPPORT PACKAGE

| Deliverables Section Title | Reference Exhibit/Section |
|--|--|
| Document Inventory | Exhibit B/Section 5 |
| Sample Storage, Tracking, and Internal COC records | Exhibit B/Section 4 Exhibit F/Section 2 |
| Copy of APO Sample Request Form | Exhibit B/Section 4 |
| Original Log Logbooks | Exhibit F/Section 3 |
| Standard Operating Procedures | Exhibit F/Section 4 |

5.2. Support Package Schedules and Maintenance

- 5.2.1. All items listed in Table B4 shall be maintained by the subcontractor and be available for review during an on-site inspection and within seven calendar days of CTR request.
- 5.2.2. Support documentation shall be traceable to individual RIN's.
- 5.2.3. The support documentation shall be well organized for convenient retrieval and reproduction of all items.

5.3. **Document Inventory:** The document inventory for the support documentation shall include a list of all documents in the file and the locations of all required documents that are not physically in the file.. All items listed in the document inventory shall be titled exactly as given under the "Deliverable Section Title" column of Table B4. Documents shall appear in the order listed on the document inventory.

6. DATA ACCEPTANCE AND RESUBMISSIONS

- 6.1. The subcontractor shall respond to resubmission requests for re-sampling within five calendar days after the resubmission request is received.
- 6.2. For RUSH deliverables, the subcontractor shall respond to resubmission requests within one business day of the request. For RAPID deliverables, the subcontractor shall respond to resubmission requests within one calendar day of request.
- 6.3. **Preliminary Use of Data**
 - 6.3.1. Some data may be used prior to actual acceptance due to stringent reporting requirements imposed on the Site by oversight and regulatory agencies.
 - 6.3.2. Preliminary use of data does not constitute acceptance.
- 6.4. **Criteria for Unacceptable Data:** Data may be classified as unacceptable for one or more of the following reasons:
 - 6.4.1. Data cannot be validated as a result of the subcontractor's actions (e.g., not correcting an instrumentation nonconformance, improper sampling technique, samples exceeding holding time prior to delivery to laboratory, etc.).

- 6.4.2. Reported data detection limits exceed the required detection limits (unless approval from the CTR was received prior to data submission).
- 6.4.3. QC samples fail to meet acceptance criteria.

7. REPORTING LIMITS AND REQUIREMENTS

7.1. Reporting Limits

- 7.1.1. **Required Detection Limits:** Required upper and lower detection limits for demonstrated method performance are specified in the applicable SOP by listing Required Detection Limits (RDLs). RDLs represent the range of acceptable values for Incidental Waters (IW) detection performance measures.
- 7.1.2. **IDL Reporting Requirements:** Subcontractor shall submit Instrument Detection Limits (IDLs) for field parameters. These deliverables shall be documented and shall be available upon request.

7.2. Sample Dilutions

- 7.2.1. Sample dilutions are allowed when necessary to quantify a requested analysis; all required methods of analyses must meet the required detection limits unless otherwise stated in the SOP.
- 7.2.2. When dilutions are required due to off-scale responses, the subcontractor shall dilute the sample as necessary. Results shall not be diluted below the required detection limits.
- 7.2.3. When dilutions are required due to interferences, the subcontractor shall use the least dilution necessary to eliminate the interference or reduce the interference to acceptable levels. If the dilution brings the results to below the reporting limits, the subcontractor shall contact the CTR and submit proof that intermediate dilutions could not eliminate the interference.

7.3. Reanalysis

- 7.3.1. When reanalysis is performed due to QA failure, the subcontractor shall report a single final result.
- 7.3.2. Reanalysis shall be brought to the attention of the customer.
- 7.3.3. Certain reanalyses are considered separate sample analyses for which the Laboratory will be paid.

EXHIBIT C

SAMPLING EVENT FUNCTIONS

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| 2. TABLES OF SAMPLING EVENT FUNCTIONS | C-3 |

SAMPLING EVENT FUNCTIONS

1. INTRODUCTION

This Exhibit lists the following tables which specify various sampling event functions:

Tables C-1 and C-2 provide Line Item Codes for sampling events and field analyses. Line Item Codes will be used to identify the cost per sampling event.

Table C-3 lists various sampling event applications and their description

2. TABLES OF SAMPLING EVENT FUNCTIONS

The following tables list various sampling event functions:

TABLE C-1 SAMPLING EVENTS

| ACTIVITY | LINE ITEM CODE | | |
|---|----------------|----------|---------|
| | ROUTINE | PRIORITY | RUSH |
| Sample Team Base Cost - Non-rad | AS01A01 | AS01A02 | AS01A03 |
| Sample Team Base Cost - Rad | AS01A04 | AS01A05 | AS01A06 |
| Aqueous Liquid Sample | AS01A07 | AS01A08 | AS01A09 |
| Non-aqueous Liquid Sample | AS01A10 | AS01A11 | AS01A12 |
| Solid Sample | AS01A13 | AS01A14 | AS01A15 |
| Soil Sample | AS01A16 | AS01A17 | AS01A18 |
| Incidental Waters (IWs) ¹ | AS01A19 | AS01A20 | AS01A21 |
| Nitrate/Nitrite (Non-IW's) | AS01A22 | AS01A23 | AS01A24 |
| Conductivity (Non-IW's) | AS01A25 | AS01A26 | AS01A27 |
| pH (non-IW's) | AS01A28 | AS01A29 | AS01A30 |
| Package and Transport Only ³ -Base Cost | AS01A31 | AS01A32 | AS01A33 |
| Transport On-site Only ² (per can) | AS01A34 | AS01A35 | AS01A36 |
| Package and Ship to Offsite Lab | AS01A37 | AS01A38 | AS01A39 |
| Sample vial provision for customer collected samples ^{2,3} | AS01A40 | AS01A41 | AS01A42 |
| Package and transport can surcharge | AS01A43 | AS01A44 | AS01A45 |
| Level A or B PPE Surcharge | AS01A46 | | |
| Glovebox Surcharge | AS01A47 | | |
| Excess Chemical Disposal | AS01A48 | | |

¹ Incidental Water (IW) analyses automatically include determination of nitrate concentration, conductivity, pH and temperature. If all three of these analyses are not needed, the customer must refer to the individual field analyses.

² Sampling was performed by building personnel and not the subcontractor. Subcontractor is involved only in the on-site transportation of the sample and/or provision of sample containers.

³ Requires documentation of circumstances in order to bill under this Line Item Code.

⁴ Any job cancelled by the requestor for reasons unrelated to the sampling subcontractor shall be charged the base sampling cost for the event. All cancellations must be thoroughly documented by the subcontractor.

One or more of the following Application/Description items in Table C-2 may be applicable to each sampling event and will add additional costs per each sampling event.

TABLE C-2 APPLICATION/DESCRIPTION

| APPLICATION | DESCRIPTION | | | |
|--|-------------|------------|------------|------------|
| Personal Protective Equipment (PPE) requirement (under contract per sampling event) | Level A | Level B | Level C | Level D |

Level A: requires working in a fully encapsulated supplied air suit. Air is supplied by the building through an external air line connected to the supplied air suit.

Level B: requires working in a Self Contained Breathing Apparatus (SCBA) suit. Air is supplied through breathing air tanks carried on the back of the individual performing the sampling event similar to the breathing air tanks carried by scuba divers.

Level C: requires working in a full-face respirator and wearing general Personal Protective Equipment (PPE) as described in the Radiological Work Permit (RWP).

Level D: requires working with non-rad samples and wearing company supplied coveralls.

EXHIBIT D

METHODS/OPERATING DOCUMENTS

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METHODS/OPERATING DOCUMENTS

1. FIELD MEASUREMENT REQUIREMENTS

The subcontractor shall make field measurements when requested by the customer. Field measurement parameters include nitrate concentration, conductivity determination, pH and temperature. When the customer requests only one or two of the field measurements, the subcontractor shall make only those measurements as requested.

- 1.1. **Method Selection:** Specific requirements for Incidental Water analyses (nitrate concentration, conductivity determination, pH and temperature) are identified in a sampling activity SOP identified in Exhibit F. The subcontractor shall follow all reporting and QA/QC criteria provided in the SOP.
- 1.2. **Method Sources:** In general, method requirements are consistent with those specified in *Methods for the Chemical Analysis of Water and Wastes* (EPA-600 Methods).
- 1.3. **Adherence to Cited Methods:** Method cited above shall be followed without modification except where such changes are approved in writing by the CTR.
- 1.4. **Implementation of Method Updates:** Updates to cited methods shall be used by the subcontractor once the method is promulgated and approved for use by the Site. The CTR shall provide the subcontractor with implementation dates for any new methods.
- 1.5. **Alternate Method Approval:** Any alternative method or modification/revision to standard methodology shall be approved in writing by the CTR prior to implementation and documented by the subcontractor.

2. SAMPLING METHODS

2.1. SAMPLING PROCEDURE FOR WASTE CHARACTERIZATION, SOP L-6245-F

This procedure is used for the sampling of materials for waste characterization, spill response, field measurements, surficial soil determinations, or unknown identification of samples. This procedure may also be used for other sampling activities where sampling protocols and techniques that are outlined herein can be employed. This procedure does not encompass bituminous liquids or solids. This procedure provides for:

- 2.1.1. method of collection/sampling equipment
- 2.1.2. sample container/equipment decontamination and disposal
- 2.1.3. field equipment and measurements
- 2.1.4. sampling parameters
- 2.1.5. sample collection, bottling and preservation (if required)
- 2.1.6. sample disposal
- 2.1.7. quality assurance/quality control
- 2.1.8. documentation and data management

2.2. WASTE CHARACTERIZATION SAMPLING PROCEDURE INSIDE RADIOLOGICAL BUFFER AREAS (RBAs), SOP L-6294-A

2.2.1. This procedure is used for the sampling of solid and liquid radioactive waste streams from inside Radiological Buffer Areas (RBAs). This procedure may also be used for other sampling events, utilizing the same sampling protocols and techniques. This procedure provides for:

- method of collection
- sampling equipment
- sample container/equipment decontamination and disposal
- field parameters and measurements
- sampling parameters
- sample collection, bottling and preservation (if required)
- sample disposal
- quality assurance/quality control
- documentation and date management
- sample returns

2.3. CUSTODY SEAL:

2.3.1. After sampling is completed, a Custody Seal shall be filled out and affixed directly on the sample bottle. The seal can be applied in one of two ways: the first option is for the seal to cover the lid and follow partly down the sides of the sample container. This is the more common of the two methods. The second option is to wrap the seal around the bottle's circumference at the top and cap interface. This second option is to be used only when the bottle is too small to allow the first option to be used since it would cover the sample bottle's label. The custody seal is used to indicate, by its destruction, whether or not the sample bottle was opened after the seal was attached.

2.3.2. Custody seals shall be signed by the sub-contractor at the time it is applied to the sample bottle. Two sampler's signatures are required on each custody seal.

2.4. SAMPLE LABELS:

2.4.1. Sample labels shall be affixed to each sample container. The label shall contain the following information:

- sample location
- date
- time
- type of analysis
- preservative (if any)
- waste stream number
- sampler's initials

- 2.4.2. If field duplicates are taken, a suffix of FD (field duplicate) will be added to the Chain of Custody (COC)/RIN indicating that the sample is a duplicate. All information shall be recorded using a permanent marker.
- 2.4.3. Original COC documents shall accompany the sample to the laboratory for analysis.
- 2.4.4. Photocopies of the COC are made and given to the CTR and one is kept by the sub-contractor.
- 2.4.5. All sampling events performed by the sub-contractor at the Rocky Flats Environmental Technology Site shall conform to this procedure.

3. SITE SPECIFIC OPERATING DOCUMENTS

Following is a list of SOPs and other operating documents necessary for the safe and successful completion of sampling activities:

3.1. 1-T93-TRAFFIC-110, ONSITE TRANSPORTATION OF HAZARDOUS AND RADIOACTIVE MATERIALS MANUAL

This manual is a Level I publication and applies to all aspects of the identification, handling, packaging, transfer and transporting of hazardous and radioactive materials at Rocky Flats and to all Rocky Flats employees. This manual also applies to Rocky Flats contractors and sub-contractors involved in transportation activities except where specific contract terms require compliance to another standard. The purpose of this manual is to implement the requirements of the Site Transportation Policy as related to on-site transportation which states:

- 3.1.1. All radioactive material, hazardous materials, hazardous substances, and hazardous waste shall be packaged, marked, labeled, handled and transported in approved containers using methods and procedures that will assure compliance with all applicable Site requirements and government regulations.
- 3.1.2. This manual establishes the requirements, objectives and authorities for the safe, secure and environmentally sound transportation of all hazardous and radioactive materials at the Rocky Flats Environmental Technology Site.
- 3.1.3. Furthermore, this manual established requirements for the identification, packaging, marking, labeling, handling and transporting of radioactive and nonradioactive hazardous materials at Rocky Flats.
- 3.1.4. The requirements established are based on current rules and regulations contained in the Federal Code of Regulations (CFR), Titles 10, 40 and 49, Code of Colorado Regulations (CCR), Title 6 and other applicable Department of Energy (DOE) orders.
- 3.1.5. The requirements established are such that personnel exposures and environmental impact as a result of transporting radioactive and other hazardous materials are maintained AS LOW AS REASONABLY ACHIEVABLE (ALARA) well below regulatory limits.

3.2. 1-T97-TRAFFIC-112, SAMPLE PACKAGING AND TRANSFER

This procedure provides detailed instructions for the labeling, packaging and transporting, within Site boundaries, of all analytical samples collected at the Rocky Flats Environmental Site. This procedure applies to all Rocky Flats contractors, sub-contractors and employees who perform sampling and transporting operations.

3.3. 1-T94-TRAFFIC-115, ONSITE TRANSPORTATION OF NON-HAZARDOUS MATERIALS MANUAL

This manual is a Level I document and implements the on-site transportation of non-hazardous materials requirements of Policy 13-2, “**Transportation**”, which states:

- 3.3.1. Transportation of materials to, from or within Rocky Flats shall be accomplished in accordance with Federal, State and internal regulations and requirements. All transportation activities shall be conducted in a safe, environmentally sound and economically responsible manner.
- 3.3.2. This manual applies to all aspects of the identification, handling, packaging, storage incident to transfer, transfer and transportation of non-hazardous materials at Rocky Flats. This manual is applicable to all RF employees, contractors and sub-contractors, including DOE and DOE contractors and sub-contractors involved in transportation activities, except where specific contract terms may require compliance to another standard.
- 3.3.3. This manual establishes the procedures and guidelines for the safe, secure and environmentally sound, regulatory correct and economically responsible transportation of non-hazardous material at the Rocky Flats Environmental Technology Site.
- 3.3.4. Transportation activities are performed in accordance with established procedures and guidelines based on rules and regulations contained in the Code of Federal Regulations (CFR), Titles 10, 29, 40, 41 and 49, DOE Orders, State of Colorado Regulations, and specific industry standards.
- 3.3.5. This manual and its guidelines established are such that personnel and public exposures and environmental impact as a result of transportation are maintained AS LOW AS REASONABLY ACHIEVABLE (ALARA).

3.4. 1-P73-HSP-18.10, RADIOACTIVE MATERIAL TRANSFER AND UNRESTRICTED RELEASE OF PROPERTY AND WASTE

This procedure provides the responsibilities, requirements and instructions regarding radioactive material transfer or unrestricted release of property and waste established by the following documents:

- Department of Energy (DOE) DOE/EH-0256T, Radiological and Control Manual (RCM)
- DOE Order 5400.5, Radiation Protection of the Public and Environment
- Rocky Flats Environmental Site Radiological Control Manual (Site RCM)
- Title 10, Code of Federal Regulations (CFR) 10 CFR 835, Occupational Radiation Protection
- 40 CFR 261, Identification and Listing of Hazardous Waste
- 49CFR 173, Subpart I, Radioactive Materials Transportation
- No Radioactivity Activity Waste (NRA) Verification Program

- 3.4.1. This manual applies to all property or waste within the Rocky Flats Environmental Technology Site boundaries and to all persons, including DOE, contractors and sub-contractors who handle or are responsible for the radioactive material transfer or unrestricted release of property or waste within the Rocky Flats boundary.

3.5. NUCLEAR MATERIALS SAFETY MANUAL FOR INTRAPLANT SHIPMENT

This manual consists of a compilation of nuclear materials safety limits for intraplant shipment. These limits are provided to assure safety in the criticality aspect of these shipments. These limits are provided to assure safety in the criticality aspect of these shipments and they are based on the latest data available. This manual addresses the following:

3.5.1. Vehicles

3.5.2. Approved Shipping Containers

- maximum fissile material (gram quantity) per transport vehicle
- description of approved shipping containers
- maximum number per transport vehicle
- arrangement in transport vehicle

3.6. DOE ORDER 5400.2, RADIATION PROTECTION OF THE PUBLIC AND THE ENVIRONMENT

This DOE order establishes standards and requirements for operations of the Department of Energy and DOE contractors with respect to protection of members of the public and the environment against undue risk from radiation.

3.6.1. **Protecting the Public:** It is DOE's objective to operate its facilities and conduct its activities so that radiation exposures to members of the public are maintained within the limits established in this Order and to control radioactive contamination through the management of real and personal property. It is also a DOE objective that potential exposures to members of the public be as far below the limits as reasonably achievable (ALARA) and that DOE facilities have the capabilities, consistent with the types of operations conducted, to monitor routine and non-routine releases and to assess doses to members of the public.

3.6.2. **Protecting the Environment:** In addition to providing protection to members of the public, it is DOE's objective to protect the environment from radiation contamination to the extent practicable.

3.7. CODE OF FEDERAL REGULATIONS (CFR) 49, TRANSPORTATION, 173.401, RADIOACTIVE MATERIAL

The CFR is a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government.

This subpart sets forth requirements for the transportation of radioactive materials by carriers and shippers subject to this subchapter. The requirements prescribed in this subpart are in addition to, but not in lieu of, other requirements set forth in this subchapter and in 10 CFR part 71 for the packaging and transportation of radioactive materials.

EXHIBIT E

QUALITY ASSURANCE/QUALITY CONTROL

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QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

1. INTRODUCTION

This Exhibit outlines the minimum requirements for subcontractor QA/QC programs. These programs are designed to ensure that all samples and information generated from sampling events in this SOW have systems for assuring that the precision, accuracy, completeness and representativeness of each sample collected is known and documented. These requirements do not release the subcontractor from maintaining their own specific QC checks on their methods. Evidence that the implementation of QA/QC program requirements fail to control activities that could have an impact on the validity of samples and information or that established program requirements are not being followed may result in a **SUBCONTRACT TERMINATION**.

2. THE QUALITY ASSURANCE PROGRAM

The subcontractor shall implement a QA/QC program with the objective of providing sound sampling methods, procedures and field parameter data determinations through training and documentation. This program shall incorporate a QA plan, QC procedures, a corrective measures system, and documentation required during sampling events as well as the quality assessment measures performed by the subcontractor to ensure acceptable sampling event methods and techniques. Some of the QA Program requirements are summarized in Table E-1. The *Reference* column refers to the document, Exhibit and Section number, and/or the title where more details may be found. This *Reference* column is intended as an aid in locating requirements but is not expected to be all-inclusive.

TABLE E-1 QA PROGRAM REQUIREMENTS SUMMARY

| Requirements | Reference Exhibit/Section |
|---|--------------------------------------|
| Development and implementation of a QA Program and documentation of the key elements of that QA Program through a written QA Plan | Exhibit E/Sections 2 and 3 |
| Preparation of and adherence to written SOPs | Exhibit F/Section 4 |
| Adherence to field determination methods and associated QC and documentation requirements | Exhibit D/Section 1 |
| Participation in on-site evaluations, including adherence to corrective action measures | Exhibit E/Section 10 |
| Submission of all raw data and pertinent documentation | Exhibit B/Section 4 |
| Submission of original documentation | Exhibit B/Section 4 |

3. QUALITY ASSURANCE PLANS

- 3.1. **Schedules:** Subcontractor shall implement and maintain a written QA Plan that represents the policies, organization, and specific QA and QC activities designed to achieve the quality requirements of this SOW as they pertain to all sampling activities. The subcontractor shall provide the CTR with a copy of

the QA Plan at time of contract award. The QA Plan shall also be delivered upon written request by the CTR and made available during on-site QA/QC evaluations.

- 3.2. **QA Plan Review:** The subcontractor shall regularly review the status and adequacy of the QA Plan and develop and maintain a system to promote continuous quality improvement. Review frequency shall not be more than every 2 years.
- 3.3. **QA Training:** Subcontractor shall receive QA training appropriate to their participation in sampling activities. Training shall be performed as necessary to assure that subcontractor personnel understands the QA, safety and technical requirements applicable to sampling activities. Documentation of training, whether specific or general, shall be maintained by the subcontractor and be available during on-site inspections and upon CTR request.
- 3.4. **References:** The QA Plan shall be based on one or more of the following references: 10 CFR 830.10, DOE Order 5700.6C, ANSI/ASQC E4-1994, and/or ASME-NQA-1-1989, ISO 9000. Additional information relevant to the preparation of a QA Plan can be found in DOE, EPA, and ASTM publications.
- 3.5. **QA Plan Key Elements:** The QA Plan shall address all key elements listed below. Requirements associated with these elements are found in this Exhibit and the references cited in the previous paragraph. Where procedures are indicated below, the QA Plan shall include these procedures in text or by reference.
 - 3.5.1. Sampling QA Policy and Objectives
 - 3.5.2. Organization and Personnel
 - Staff resumes
 - Education and experience requirements
 - Indoctrination and training procedures and requirements
 - QA management organization
 - Assignment of QC and QA responsibilities
 - QA management reporting relationships
 - 3.5.3. Facilities and Equipment
 - Guidance for measuring and test equipment calibrations
 - Procedures for maintaining measurement system stability and reproducibility
 - Maintenance activities and schedules
 - Instrumentation and backup alternatives
 - 3.5.4. Control of Purchased Items and Services
 - Criteria for approving vendors
 - Requirements for assuring procurements identify or reference quality criteria
 - Procedures for acceptance of purchased items
 - 3.5.5. Document Control
 - Procedures for measurement process documentation
 - Sample custody procedures and documentation requirements
 - Logbook content, format, maintenance, and archiving

- Procedures for preparation, approval, review, revision, and distribution of SOPs

3.5.6. Methodology and Data Generation

- Sample collecting procedure
- Standard preparation procedure
- Calibration procedure and frequency
- Field determination procedure
- Data collection procedure
- Data review procedure
- Data reporting and authorization procedure
- Data management procedure

3.5.7. Quality Control Program

- Confirmation of sampling materials (e.g., solvent, reagents, bottles, etc.)
- Reference material analysis
- Internal QC checks
- Corrective action and determination of QC limit procedures

3.5.8. Quality Assurance Program Assessment

- Data audits
- Systems audits
- Performance audits
- Corrective action procedures
- QA reporting procedures
- Control of nonconformances

4. PERSONNEL

4.1. QA Personnel

4.1.1. QA personnel shall operate independently from cost and schedule considerations and shall have the responsibility and authority to stop unsatisfactory work.

4.2. Personnel Certification

4.2.1. Procedures shall be in place for the establishment and implementation of a certification program for the indoctrination and training of subcontractor personnel performing sampling activities under this SOW. This program must define how sufficient sampling activity proficiency is defined, achieved, maintained, and documented to safely and successfully perform all sampling events.

4.2.2. Subcontractor personnel who have not passed certification to perform sampling activities shall not be allowed to conduct sampling activities under this SOW. The certification documentation shall be maintained by the subcontractor and be available during on-site inspections and upon CTR request.

4.2.3. Subcontractor shall be recertified annually.

5. MEASURING AND TESTING EQUIPMENT (M&TE)

5.1. **General Requirements for M&TE:** The subcontractor shall establish and document calibration methods and intervals for M&TE. M&TE shall include analytical instruments, balances, thermometers, pipettes and other devices used in the generation of field parameter results and to demonstrate compliance to procedural requirements. In addition, requirements for M&TE apply to equipment used to demonstrate other aspects of conformance to this contract, such as preservation of samples destined for the laboratory for analyses.

5.1.1. The subcontractor shall assign unique identifiers to all M&TE.

5.1.2. All data generated by M&TE must be labeled with the unique M&TE identifier.

5.1.3. The subcontractor shall identify the instrument manufacturer, model, instrument configuration, and instrument settings in an appropriate instrument logbook unless these parameters are precisely specified in SOPs.

5.1.4. The subcontractor shall maintain records (and if applicable, mark equipment) indicating calibration status. Records shall include the unique equipment identifier, calibration interval, traceable standard identifiers, chronological equipment condition history, and the personnel performing the calibration.

5.1.5. The subcontractor shall establish a system to identify and prevent the use of M&TE that do not meet performance standards. Failure to meet standards may be due to M&TE that are out-of-calibration, are under expired certification status, or exhibit conditions indicating compromised performance.

5.2. Instrument Maintenance, Repair, Configuration

5.2.1. The subcontractor shall document all maintenance and repairs on instrumentation, including date of maintenance/repair and personnel performing the task.

5.2.2. The subcontractor shall develop preventive maintenance schedules in accordance with instrument manufacturer recommendations.

5.2.3. Any repair, reconfiguration, or replacement of an instrument component shall be followed by verification of the calibration of the system. If the calibration verification parameters are not met, an appropriate calibration shall be performed. If instrument components are changed, the subcontractor shall also verify and report instrument parameters as specified in Exhibit B of this module.

5.2.4. Instrument maintenance/repair documentation shall be maintained by the subcontractor and be available upon request and during on-site audits.

5.3. Thermometers and Temperature Recording Devices

5.3.1. Liquid-in-glass thermometers shall be calibrated against an NIST traceable standard at a five year interval.

5.3.2. Liquid-in-glass thermometers shall be inspected annually for conditions that may degrade performance.

5.3.3. Thermometer and temperature device certifications and documentation of annual inspections shall be maintained by the subcontractor and made available upon request and during on-site audits.

5.4. Refrigerators

- 5.4.1. The temperature of refrigerators used to store Site samples shall be verified and documented every working day. Documentation shall be maintained by the subcontractor and available upon request and during on-site audits.
- 5.4.2. The subcontractor shall develop and implement procedures for sample storage in the event of refrigerator failure.
- 5.4.3. The subcontractor shall clearly identify refrigerators exceeding temperature requirements to prevent use until corrective actions have been completed.

5.5. Automatic Pipettes and Dispensers

- 5.5.1. The subcontractor shall calibrate all non-Class A pipettes and automatic sample dispensers used for quantitative measurement on a monthly basis or whenever degradation of measuring equipment performance is suspected.
- 5.5.2. Pipette and automatic sample dispenser calibration documentation shall be maintained by the subcontractor and be available upon request and during on-site audits.

6. ANALYTICAL REAGENTS

6.1. Water

- 6.1.1. The subcontractor shall have a water system or access to a water system capable of providing laboratory water meeting the American Society for Testing and Materials (ASTM) specifications for Type II water (ASTM D1193).
- 6.1.2. The Laboratory's water system shall be monitored with each use. Results of this monitoring shall be recorded at least once each day the system is in use. The conductivity shall not exceed 1.0 $\mu\text{S}/\text{cm}$ at 25° C (i.e., the resistivity shall be greater than 1.0 $\text{M}\Omega \text{ cm}$ at 25° C). If this level is exceeded, the Laboratory shall take immediate corrective action before the water can be used for sample determinations under this SOW. Monitoring and corrective action documentation shall be maintained by the Laboratory and available upon request and during on-site audits.

6.2. Purchase of Analytical Reagents

- 6.2.1. The subcontractor shall have a documented program for controlling the quality of purchased reagents.
- 6.2.2. The subcontractor shall have an established system for approving vendors to procure supplies and services. All analytical reagents shall be obtained from these approved vendors.
- 6.2.3. Material Safety Data Sheets (MSDSs) received from reagent suppliers shall be maintained by the subcontractor and submitted upon CTR request.

6.3. Documentation of the Verification of Chemical Reagents

- 6.3.1. The subcontractor shall maintain the necessary documentation to show that the reagents used in the performance of field determinations conform to requirements. Supporting documentation such as standard logs shall be maintained by the subcontractor and may be subject to review during on-site inspection visits.

6.4. **Labeling Reagents**

6.4.1. The subcontractor shall label all purchased reagents with the following information:

- Date received
- Date opened (Required when used to establish expiration date)
- Expiration date

6.5. **Expiration Dates for Reagents**

6.5.1. Expiration dates established by the manufacturer shall be used when available. The subcontractor shall not use reagents beyond the expiration date provided by the manufacturer.

6.5.2. If an expiration date is not defined, the subcontractor shall document how the shelf life of the reagent is determined. The expiration date (manufacturer or laboratory established), date received, and date opened shall be clearly identified on all reagent solution containers. If an expiration date is not required, it shall be indicated on the container.

7. **METHOD SPECIFIC QC REQUIREMENTS**

7.1. The subcontractor shall specify field, trip, and equipment blanks as per the Sampling and Analysis Plan or the required Federal/State Regulations. Identification of the QC samples shall be submitted to Analytical Services within 24 hours of sampling.

7.2. The subcontractor shall use equivalent media (DI water) for preparing field blanks. The blank medium shall not contain any of the target parameters.

8. **DATA MANAGEMENT**

8.1. Field determinations (nitrate concentration, conductivity determination, pH and temperature) may be made on aqueous samples.

8.2. All data for Incidental Waters is entered on hardcopy of the Request for Incidental Water (IW) Analysis form. This Form is photocopied, the photocopy filed by the subcontractor, and the original is surrendered to the APO for filing.

8.3. For other samples requiring field determinations, the data will be entered on the Sample Worksheet and faxed to the APO.

9. **INTERNAL AUDIT PROGRAM**

9.1. The subcontractor shall implement and maintain an internal audit program which includes corrective action procedures.

9.2. Internal audits shall be conducted by personnel knowledgeable of, but independent from, the operations performed.

9.3. Internal audits shall be conducted in accordance with written procedures and/or checklists. Audit reports shall identify the auditors, personnel interviewed during the audit, a synopsis of the audit scope,

and a summary of the final results in sufficient detail to enable corrective action. The report shall be signed by the appropriate management and submitted for retention as specified in Exhibit B, Section 2.

10. ON-SITE EVALUATION

- 10.1. **Audit Types:** The subcontractor may be subject to two types of audits: routine and follow-up.
- 10.1.1. **Routine:** A routine audit is a comprehensive audit performed to verify adherence to and effectiveness of QA/QC and SOW requirements. The subcontractor shall be subject to routine, on-site audits not more than two times per calendar year during performance of this SOW.
- 10.1.2. **Follow-up:** A follow-up audit verifies that adequate corrective action has been implemented by the subcontractor in response to a previous audit.
- 10.2. **Schedules and Notifications:** On-site inspections, surveillances, or audits for the purpose of identifying and resolving deficiencies or verifying corrective actions may be performed at any time during performance of the subcontract. Unannounced and announced inspections may be performed at any time during the subcontract period. Written notification shall be provided to the subcontractor for announced inspections. The subcontractor shall make all requested data and documentation related to this SOW available during audits.
- 10.3. **Corrective Action Reports in Response to Audit Reports:** Following an on-site evaluation, the auditors will conduct an audit closing conference with subcontractor to discuss identified deficiencies and establish a schedule for corrective action. The subcontractor shall address corrective actions taken to resolve the deficiencies identified during the on-site visit according to the schedule set during the audit closing conference. Failure to meet the established timeline for responding to the identified deficiencies and/or failure to meet the established corrective action schedule may result in a **SUBCONTRACT TERMINATION**.

11. NONCONFORMANCES:

- 11.1. Nonconformances must be identified, documented, evaluated, and resolved. Conditions adverse to quality shall be promptly identified and corrected.
- 11.2. Nonconforming items shall be identified and/or segregated until disposition.
- 11.3. The identification of adverse conditions and corrective actions shall be documented and reported to the CTR.
- 11.4. The CTR shall implement a corrective action tracking system to ensure follow-up actions are taken to confirm and document corrective action implementation.

12. PERFORMANCE CRITERIA

- 12.1. **Monitoring Performance:** Subcontractor performance will be continually assessed by the CTR. The general areas of performance that are monitored include: procedural compliance, sampling event completion dates, adherence to specific building rules and regulations.

- 12.1.1. **Procedural Compliance:** The subcontractor shall be in procedural compliance when performing work directed by SOPs. Procedural noncompliance may result in subcontract termination.
- 12.1.2. **Sampling Event Completion Dates:** The subcontractor shall meet the completion dates (turnaround time) for sampling events based on the Schedule for Sampling Event Deliverables outlined in Exhibit B of this SOW. The Site shall use turnaround times as defined in the glossary to assess conformance to delivery schedules.
- 12.1.3. **Other deliverable turnaround:** The subcontractor shall meet the required turnaround times for all other deliverables outlined in Exhibit B of this SOW.

EXHIBIT F

EVIDENTIARY REQUIREMENTS

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EVIDENTIARY REQUIREMENTS

1. INTRODUCTION

- 1.1. This Exhibit describes the evidentiary requirements that must be followed for sample collecting, sample labeling, sample packaging, and sample transporting, including requirements for sample Chain of Custody (COC), Standard Operating Procedures, and other operating documents and manuals. Subcontractor is required to be familiar with these to ensure the safe and successful completion of each sampling event.

2. SAMPLE CHAIN OF CUSTODY (COC)

A sample is physical evidence collected from a facility or from the environment and must be controlled. To accomplish this, the following sample identification, sample chain-of-custody, sample receiving, and sample tracking procedural requirements have been established. Evidence that samples are not identifiable and traceable at all stages may result in a **SUBCONTRACT TERMINATION**.

2.1. Sample Identification

- 2.1.1. Each sample collected shall be labeled with the RIN or a unique identifier supplied by the APO. If a unique identifier is used, it shall be traceable and cross-referenced to the RIN.

- 2.2. **Chain-of-Custody and Sample Tracking Requirements:** The subcontractor shall maintain a traceable custody chain for samples delivered to the Laboratory for analyses. The subcontractor shall have procedures ensuring that sample custody is maintained and documented.

- 2.2.1. A sample is under custody if any of the following applies:

- It is in your possession;
- It is in your view after being in your possession; or
- It was in your possession and you locked it up

- 2.2.2. The subcontractor shall maintain records documenting sample pickup and relinquishment to the designated recipient. This documentation shall be available upon request and during on-site audits. The records shall include documentation of the movement of samples into and out of designated storage areas.

- 2.2.3. COC documents shall demonstrate the location of the sample at all times. The COC documents shall show transfer of the sample between individuals, and into and out of the secure areas. Internal COC records shall include the name of the person in possession, the date, and the time of transfer.

- 2.2.4. **Processing Designators:** Processing requirements are specified by the use of a processing designator. Analyte prescriptions are identified on the COC by selecting Line Item Codes (See GR-1 Exhibit C) with a processing designator. The designators used for Routine, Priority, and Rush processing are provided below:

- “R” designates Routine Processing
- “P” designates Priority Processing
- “U” designates Rush Processing

- “D” designates Rapid Processing
 - “S” designates Sample Screens
- 2.2.5. The subcontractor shall maintain internal COC records documenting the handling of samples from receipt to relinquishment.
- 2.2.6. The subcontractor shall fax a copy of the COC to the APO within 24 hours following shipment of samples to laboratory.
- 2.3. **Sample Protection and Integrity:** The subcontractor shall ensure that sample security is maintained in all areas and shall ensure that samples and field measurement results are protected from accidental damage, theft, or malicious mischief. The subcontractor shall advise the CTR in writing of any losses or damage within 48 hours.

3. DOCUMENT CONTROL REQUIREMENTS

The goal of the document control program is to assure that all documents will be accounted for when the sampling event is completed by the subcontractor and that meaningful information can be extracted from these documents when retrieved. Accountable documents used by the subcontractor shall include (but shall not be limited to) logbooks, COC records, APO Sample Return Worksheet, and APO Sample Receipt. Document control procedures shall be established to assure that all records related to Site sampling activities are properly maintained.

3.1. General Requirements

- 3.1.1. All subcontractor documents and required retention copies shall be complete and legible.
- 3.1.2. All data results recorded by the subcontractor shall be on preprinted forms or shall be entered into permanent logbooks.
- 3.1.3. The subcontractor name and a descriptive form name shall be included on all documents used to record information related to the Site sampling activities.
- 3.1.4. Unused portions of documents (raw data forms, COC documentation, etc.) shall be Z'd out, initialed, and dated in black ink.
- 3.1.5. All records shall be maintained in black ink.
- 3.1.6. When columns are used to organize information recorded on logbook pages, the information recorded in that column shall be identified in a column heading.
- 3.1.7. To preserve confidentiality, references to the Site shall not appear in any documents accessible to non-sampling personnel. Any sample handling documentation that is not a part of other deliverable items shall be available during audits and upon request.
- 3.1.8. Field measurement data must be labeled with RIN or with other identifiers.
- 3.1.9. All numerical data shall be accompanied by applicable units.

3.2. **Error Correction:** Corrections and updates to supporting documentation shall be performed in a manner that preserves record integrity. The following procedures must be followed when correcting errors:

- 3.2.1. A single line shall be drawn through the error and the correct information recorded in black ink.
- 3.2.2. No information shall be obliterated or made unreadable.

- 3.2.3. All corrections, additions, and crossed out information shall be initialed and dated in black ink.
- 3.2.4. Use of correction fluid is prohibited.
- 3.3. **Requirements for Logbooks**
 - 3.3.1. The subcontractor name, address and a unique logbook identifier shall appear on the cover of all logbooks. The type of activity recorded within a logbook shall be on the cover of the logbook.
 - 3.3.2. Pages in both bound and unbound logbooks shall be sequentially numbered.
 - 3.3.3. Logbook entries shall be dated (month/day/year) and signed by the person responsible for performing the activity at the time an activity is performed.
 - 3.3.4. Logbook entries shall be in chronological order.
- 3.4. **Requirements for Preprinted Forms:** Preprinted forms shall contain the name of the subcontractor, revision date (month/day/year), and signature of the person responsible for performing the sampling activity at the time the activity is performed.
- 3.5. **Document Control Officer (DCO):**
 - 3.5.1. Before releasing results for field measurements, the DCO shall assemble and cross-check the information on custody records, instrument logs, and other relevant records. This check shall ensure that data pertaining to each particular sample is consistent.
- 3.6. **Document Numbering and Inventory Procedures**
 - 3.6.1. All documents relevant to each RIN shall be inventoried.
 - 3.6.2. The DCO shall be responsible for ensuring that all documents generated are placed for inventory and are maintained at the subcontractor onsite facilities and are available for review during on-site inspection or for reproduction.
- 3.7. **Storage of Site Files**
 - 3.7.1. The subcontractor shall maintain Site documents in a secure location that is protected from damage and deterioration.
 - 3.7.2. The subcontractor shall maintain written records and documents to be used as evidence for each sampling activity. Documents and records maintained by the subcontractor shall be legible, identifiable, and retrievable.
- 3.8. **Document Retention:** Documentation and records generated by the subcontractor shall be retained by the subcontractor for a period of five calendar years. After this period, records may be disposed of with the following provisions:
 - 3.8.1. Six months prior to the date the subcontractor intends to dispose of documentation and records related to Site sampling activities, the subcontractor shall notify the CTR or designated representative in writing. Documentation and records shall not be disposed without written approval from the CTR.
 - 3.8.2. The Site retains the right to request physical reproduction of the documentation and records by the subcontractor at any time during the retention period.

4. STANDARD OPERATING PROCEDURES (SOPS)

A Standard Operating Procedure (SOP) is a written document that provides step-by-step directions or requirements for performance of certain tasks. These procedures are necessary to ensure that sampling activities performed this SOW are acceptable.

- 4.1. **General Sampling Activities SOP Program:** The subcontractor shall establish a system and implement procedures that define when SOPs are required and that define processes by which SOPs are created, reviewed, approved, controlled, updated, and retained. At a minimum, this system shall define, establish, and implement the following:
 - 4.1.1. Document Control. A document control process shall be established to identify the title, unique SOP identifier, current revision, custodian, and copy number of all SOPs. The process shall insure that procedures are approved for release only by authorized personnel. Document control procedures shall be designed to preclude the use of outdated or inappropriate SOPs and insure that outdated and/or uncontrolled SOPs shall not be in the possession of subcontractor personnel.
 - 4.1.2. Periodic SOP Review. SOPs shall be reviewed periodically and updated as necessary when subcontract, facility, or sampling activity procedural modifications are made. Review frequency shall not be more than every 2 years.
 - 4.1.3. Document Retention. Current SOPs and superseded revisions of SOPs shall be retained as accountable documents by the subcontractor as described in Exhibit F, Section 3.
 - 4.1.4. Document Availability. Current SOPs shall be available as appropriate. SOPs shall be available during an on-site evaluation. A complete set of SOPs shall be available for inspection at such evaluations. During on-site evaluations, subcontractor may be asked to demonstrate the application of the SOPs.
 - 4.1.5. Format and Content Requirements. The format for SOPs may vary depending upon the kind of activity for which they are prepared. However, at a minimum, SOPs shall accurately describe the activity as performed at the Site and include QC acceptance criteria and corrective action procedures.
- 4.2. **SOP Delivery Requirements**
 - 4.2.1. A complete list of SOPs relevant to this SOW shall be sent to the CTR prior to contract award. The list shall include procedure identifier, title, and effective date.
 - 4.2.2. During the term of performance of the subcontract, the subcontractor shall notify the CTR, in writing, of new or amended SOPs applicable to this SOW within 14 days of the change. This notification shall identify the new or amended SOP(s) and include a revised SOP list. In the case of updated SOPs, a brief description of the change shall be included.
 - 4.2.3. The CTR may request a copy of an SOP at any time. The subcontractor shall deliver SOP copies to the CTR within three calendar days after the request is received.
- 4.3. **Requirements Common to all General Sampling Activities SOPs:** All SOPs shall:
 - 4.3.1. Be functional (i.e., clear, comprehensive, up-to-date, and sufficiently detailed) to permit duplication of results by qualified subcontractor sampling personnel.
 - 4.3.2. Describe actual processes as performed by the subcontractor.
 - 4.3.3. Include QC criteria and corrective action procedures

- 4.3.4. Be consistent with current DOE regulations, EPA regulations, State regulations, and SOW requirements.
- 4.3.5. Be consistent with instrument manufacturer's specific instruction manuals.
- 4.3.6. Provide for the development of documentation that is sufficiently complete to record the performance of all tasks required by the protocol.
- 4.3.7. Describe the mechanism for demonstrating the validity of field data reported and explain the action taken for missing or inconsistent results.
- 4.3.8. Describe the corrective measures and feedback mechanism used when field data results do not meet protocol requirements.
- 4.3.9. Sampling event SOPs shall include steps required to perform a sampling event. A reference to a standard published method is not an acceptable substitute for a sampling event.
- 4.3.10. Sampling activity SOPs shall include examples of documents, forms, and logbook formats used to document activities
- 4.3.11. Sampling activity SOPs shall address procedures to prevent sample contamination during sample collecting.
- 4.3.12. Sampling activity SOPs shall address equipment maintenance and calibration.
- 4.3.13. Sampling activity SOPs shall describe the purchase, receipt, storage, preparation, control of expiration date, traceability, and disposal of outdated standards.

5. ANALYTICAL PROJECTS OFFICE (APO) SAMPLE RETURN WORKSHEET

The APO Sample Return Worksheet, which is part of the APO Sample Request Form, is delivered with the samples to the laboratory performing the analyses. This worksheet contains the types of analyses requested by the customer as well as the location of the laboratory performing the analyses, sample bottle ID numbers and other pertinent information necessary for the successful reporting of generated data.

6. ANALYTICAL PROJECTS OFFICE (APO) SAMPLE RECEIPT

The APO Sample Receipt is supplied to the customer as notification of sample collection at time of sampling. This form contains a list of all the analyses requested. The subcontractor shall provide the customer with the sample receipt upon the completion of the sampling event.

EXHIBIT G

GLOSSARY OF TERMS AND ACRONYMS

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GLOSSARY OF TERMS AND ACRONYMS

1. INTRODUCTION

The glossary of terms and acronyms contained in this Exhibit ensure the proper understanding of language used in this SOW. The definitions used in General Sampling Activity operating procedures and documents shall supersede the definitions used in this Exhibit in cases of conflicting definitions

2. GLOSSARY OF TERMS

ASTM TYPE II WATER: Deionized water with a conductivity of less than 1.0 $\mu\text{mho/cm}$ at 25° C. For additional specifications, refer to ASTM D1193-77, "Standard Specification for Reagent Water."

CALIBRATION: The establishment of an analytical curve relating the response of an instrument to a quantifiable characteristic of the analyte in known standards.

CALIBRATION STANDARDS: A series of known standard solutions used by the analyst for calibration of the instrument (i.e., preparation of the analytical curve).

CONTRACTOR TECHNICAL REPRESENTATIVE (CTR) Person responsible for providing technical oversight of the sub-contract.

DAY: Unless otherwise specified, day shall mean calendar day. There are 365.25 days per year.

DETECTION LIMIT: A stated limiting value which designates the lowest concentration that can be estimated or determined with confidence and that is specific to the analytical procedure used.

DUPLICATE SAMPLE: A second aliquot of a sample that serves as a Batch QC Sample, demonstrating analytical method precision and sample homogeneity.

EQUIPMENT BLANK: A sample consisting of the final rinse water from sampling equipment which is collected only if the sampling equipment is to be reused.

FIELD BLANK: A full set of sample bottles filled with American society for Testing Materials (ASTM) Type II water, preserved with appropriate reagents and taken to the field. They are opened at a specific sampling location and exposed to the sampling environment during the sampling. The field blank is used to indicate the presence of contamination due to sample collection and handling.

FIELD DUPLICATE: Independent samples collected as close as possible to the same point in time and space used to document sampling process precision. Duplicates are two separate samples taken from the same source, placed in separate sample containers, and analyzed independently.

FIELD SAMPLE: A portion of material received to be analyzed that is contained in single or multiple containers and identified by a unique Site sample number.

GAMMA RADIATION: Electromagnetic radiation of nuclear origin usually accompanying another form of radioactive decay.

HOLDING TIME: The elapsed time expressed in days from the date of sampling until the date of analysis for which sample data will be considered valid.

Holding time = (sample analysis date - sampling date)

INSTRUMENT DETECTION LIMIT (IDL): Exact definitions are method-specific; however, these definitions usually involve estimating the analyte concentration or activity which creates the smallest signal above the background noise that an instrument can detect reliably.

LABORATORY: Synonymous with Contractor as used herein.

LINE ITEM CODE: This code, included on the COC or other documentation received with samples, designates the analyte prescription.

MATRIX: The predominant material of which the sample to be analyzed is composed. For the purpose of this SOW, a sample matrix is either water, soil/sediment, or waste. Matrix is not synonymous with phase (liquid or solid).

MATRIX SPIKE: An aliquot of a sample fortified with known quantities of specific parameters and subjected to the entire analytical procedure in order to judge the appropriateness of the method for the matrix by measuring recovery.

METHOD DETECTION LIMIT (MDL): For organic and inorganic analyses, the MDL is defined as the minimum concentration of an analyte that can be determined with 99% confidence that the true value is greater than zero. Instructions for the determination of MDL are usually provided by, and specific to, the method of analysis.

In radiochemical analyses, the MDL is defined as the minimum activity (concentration) of an analyte (radioisotope) that can be determined with 95% confidence that true value is greater than zero, provided by and specified to the sample type and method of analysis. In radiochemistry, the MDL considers not only the instrument characteristics, but all other factors and conditions (i.e., sample size and sample type) that influence the measurements.

NIST-TRACEABLE STANDARD: A Standard Reference Material (SRM) purchased either directly from the National Institute of Standards and Technology (NIST) or the other approved vendors who provide the traceability certificate to the NIST.

QC SAMPLE: For a batch of samples for radiochemical analysis, these are the Preparation Blank, the Duplicate Sample and the Laboratory Control Sample. For other analysis methods, QC samples typically include the following when required by the PSA Modules: preparation blanks, laboratory duplicate samples, spiked samples, spiked duplicates, and laboratory control samples.

REPORT IDENTIFICATION NUMBER (RIN): A grouping of samples identified by the CTR to be included in a single sample data package for a given PSA Module. An RIN may be comprised of more than one analytical batch, in which case, each analytical batch shall have a unique identifier that associates client and QC samples within the batch. Conversely, if two or more RINs are combined into one analytical batch, each RIN data package must contain all required QC results.

REQUIRED DETECTION LIMITS (RDL): The minimum detection level acceptable for analyses performed under this contract.

SITE: The Rocky Flats Environmental Technology Site.

SOIL: Synonymous with soil/sediment or sediment as used herein.

SPIKE: In radiochemical analysis, an accurately measured amount of tracer quantitatively introduced or transferred into a sample aliquot.

STATEMENT OF WORK (SOW): As used herein, the general requirements modules (GR01 and GR02) and the PSA Module(s).

TRIP BLANK: A volatile organic compound (VOC) vial filled with ASTM Type II water, transported in the same manner as other sampling containers to the sampling sites and back to the laboratory for analysis. Trip blanks help determine the level of contamination introduced to the sample during transport, handling, and storage.

VALIDATED TIME OF SAMPLE RECEIPT (VTSR): Synonymous with Laboratory Receipt Date as used herein.

WATER: Synonymous with aqueous or wastewater as used herein.

3. ACRONYMS

| | |
|---------|--|
| AA | Atomic Absorption |
| AIHA | American Industrial Hygiene Association |
| ANSI | American National Standards Institute |
| APHA | American Public Health Association |
| APO | Analytical Projects Office |
| ASME | American Society of Mechanical Engineers |
| ASTM | American Society for Testing and Materials |
| BNA | Base Neutral Acid (Semivolatile organic) |
| BOD | Biological Oxygen Demand |
| CBOD | Carbonaceous Biological Oxygen Demand |
| CCB | Continuing Calibration Blank |
| CCV | Continuing Calibration Verification |
| CDPHE | Colorado Department of Public Health and Environment (formerly CDH, Colorado Department of Health) |
| CFR | Code of Federal Regulations |
| CL | Confidence Limit |
| CLP | Contract Laboratory Program |
| COC | Chain-of-Custody |
| COD | Chemical Oxygen Demand |
| cpm | Counts Per Minute |
| CRDL | Contract Required Detection Limit |
| CRQL | Contract Required Quantitation Limit |
| CTR | Contractor Technical Representative |
| CVAA | Cold Vapor Atomic Absorption Spectrometry |
| DCO | Document Control Officer |
| DEAR | Department of Energy Acquisition Regulations |
| DI | Deionized (water) |
| DIC | Dissolved Inorganic Carbon |
| DOC | Dissolved Organic Carbon |
| DOE | Department of Energy |
| DOT | U. S. Department of Transportation |
| dpm | Disintegration Per Minute |
| dps | Disintegration Per Second |
| EDCN | Environmental Data Collection Network |
| EDD | Electronic Data Deliverable |
| EM | Environmental Management |
| EML | U. S. DOE Environmental Monitoring Laboratory |
| EMSL | U. S. EPA Environmental Monitoring Systems Laboratory |
| EPA | U. S. Environmental Protection Agency |
| EPA-600 | EPA-600/4-79-020 <i>Methods for Chemical Analysis of Water and Wastes</i> |
| EQL | Estimated Quantitation Limit |
| ERM | Environmental Restoration Management |
| ERWM | Environmental Restoration & Waste Management |
| FEP | Full Energy Peak or Photopeak |
| FLAAS | Flame Atomic Absorption Spectrometry |
| FWHM | Full Width at Half Maximum |
| GAC | Granular Activated Carbon |
| GC | Gas Chromatography |
| GC/MS | Gas Chromatography/Mass Spectrometry |

| | |
|--------|--|
| GFAAS | Graphite Furnace Atomic Absorption Spectrometry |
| GLP | Good Laboratory Practice |
| GPC | Gas Proportional Counter |
| GRRASP | General Radiochemistry and Routine Services Protocol |
| IC | Ion Chromatography |
| ICB | Initial Calibration Blank |
| ICP | Inductively Coupled Plasma |
| ICPES | Inductively Coupled Plasma Emission Spectrometry |
| ICP-MS | Inductively Coupled Plasma Mass Spectrometry |
| IDL | Instrument Detection Limit |
| IPA | Instrument Performance Assessment |
| IR | Infra-red |
| KLP | Kinetic Laser Phosphorescence |
| KPA | Kinetic Phosphorescence Analysis |
| LSC | Liquid Scintillation Counter |
| MAPEP | Mixed Analyte Performance Evaluation Program |
| M&TE | Measuring and Testing Equipment |
| MB | Matrix Blank |
| MDA | Minimum Detectable Activity (Radiochemistry Modules), Minimum Detectable Amount (Bioassay Modules) |
| MDL | Method Detection Limit |
| MS | Matrix Spike |
| MSD | Matrix Spike Duplicate |
| MSDS | Material Safety Data Sheet |
| N/A | Not Applicable |
| NB | No Bid |
| ND | Not Determined |
| NEG | No Established Guidelines |
| NARA | National Archive Record Act |
| NIOSH | National Institute of Occupational Safety and Health |
| NIST | National Institute of Standards and Technology |
| NRC | Nuclear Regulatory Commission |
| NVSS | Non-Volatile Suspended Solids |
| OMB | Office of Management and Budget |
| OSWER | U. S. EPA Office of Solid Waste and Emergency Response |
| PB | Preparation Blank |
| PCB | Polychlorinated Biphenyls |
| PE | Performance Evaluation |
| PN | Price Negotiable |
| PQL | Practical Quantitation Limit |
| PSA | Parameter-Specific Analytical (Module) |
| QA | Quality Assurance |
| QAO | Quality Assurance Officer |
| QC | Quality Control |
| RASP | Radioanalytical Services Protocol |
| RCRA | Resource Conservation and Recovery Act |
| RDL | Required Detection Limit |
| RFEDS | Rocky Flats Environmental Data System |
| RFETS | Rocky Flats Environmental Technology Site |
| RFP | Rocky Flats Plant |

| | |
|--------|---|
| RIN | Report Identification Number |
| ROI | Region of Interest |
| RPD | Relative Percent Difference |
| RSD | Relative Standard Deviation |
| SIC | Site Identification Code |
| SM | Standard Methods |
| SOP | Standard Operating Procedure |
| SOW | Statement of Work |
| SRM | Standard Reference Material |
| SW-846 | U. S. EPA-OSWER Document <i>Test Methods for Evaluating Solid Waste</i> |
| TAT | Turn Around Time |
| TAL | Target Analyte List |
| TCLP | Toxicity Characteristic Leaching Procedure |
| TDS | Total Dissolved Solids |
| TIC | Tentatively Identified Compound |
| TIC | Total Inorganic Carbon |
| TKN | Total Kjeldahl Nitrogen |
| TOC | Total Organic Carbon |
| TOX | Total Organic Halides |
| TPH | Total Petroleum Hydrocarbons |
| TS | Total Solids |
| TSD | Treatment Storage Disposal |
| TSS | Total Suspended Solids |
| TVSS | Total Volatile Suspended Solids |
| USEPA | United States Environmental Protection Agency |
| VTSR | Validated Time of Sample Receipt |
| VOA | Volatile Organic Analysis |
| VOC | Volatile Organic Compound |