

# Rocky Flats Environmental Technology Site

## BOA IMPLEMENTATION REQUIREMENTS

### GR03-A.5

October 21, 2003

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# RFETS BOA IMPLEMENTATION REQUIREMENTS

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# **RFETS BOA IMPLEMENTATION REQUIREMENTS**

## **INTRODUCTION**

Kaiser-Hill Company, LLC (Contractor) is the Integrating Management Contractor for the Department of Energy (DOE)'s Rocky Flats Environmental Technology Site (RFETS, Site) near Denver, Colorado. The Site is a former nuclear weapons processing facility currently under environmental remediation.

This document incorporates the RFETS specific requirements for analytical services performed under the Basic Ordering Agreement (BOA) for Laboratory Analytical Services administered by Westinghouse Savannah River Company on behalf of the Department of Energy. The document is organized in sections by parameter type, i.e., organics, metals, water quality, radiochemistry, etc., and Line Item Code (LIC) Prefixes. Each section contains clarifications and/or site specific interpretations to the BOA as well as RFETS specific requirements.

Clarifications are RFETS interpretations of BOA requirements both explicit and implied. These clarifications are not intended to be new requirements and should not affect the site specific multiplier associated for implementing a BOA Line Item Code.

Sections identified as RFETS specific requirements contain requirements in addition to what is required in the BOA. These sections shall be used to determine site specific multipliers by LIC.

## CHANGE DESCRIPTION FORM

**Instructions:** GR03 is being transmitted in its entirety. Please replace Version A.4 with Version A.5 and destroy the previous version.

<b>Module:</b> GR03	<b>Version:</b> A.5	<b>Effective Date:</b> October 21, 2003
<b>Originator:</b> M.R. Wood	<b>Description:</b> BOA Implementation Requirements	

Affected Page(s)	Section No.	Change Description
Cover Page	N/A	New version and Effective date
3	2.2	Revised transmittal requirements
5	<a href="#">2.4.2</a>	Requirement to include documentation of sample pH or temperature at time of sample receipt if not recorded on the COC.
9	3.1.1	Correct the CAS No. for 2-Chloroethylvinyl ether from 100-75-8 to 110-75-8 for VOA-A-025.
9	3.1.2	Correct the CAS No. for vinyl acetate from 108-5-4 to 108-05-4 for LICs VOA-A-027 and VOA-A-028.
9	3.1.3	Correct the CAS No for phenol from 108-95-27 to 108-95-2.
9	<a href="#">3.1.4</a>	Clarified reporting the concentration for 3-Methylphenol and 4-Methylphenol shall be summed and reported as 4-Methylphenol.
9	<a href="#">3.2.1</a>	Revised RDLs for LICs RPE-A-001 and RPE-A-002 (PCB High Level)
11	<a href="#">4.1.2</a>	“NR” was defined for LICs MET-A-001 and MET-A-013.
11	4.1	Clarified references to ILM04.0.
14	5.1.1	Raised the RDL for Ortho Phosphate, LIC WCH-A-028.
15	5.1.2	Clarified the Con ID and reporting units for MIS-A-003, MIS-A-004, and MIS-A-017.
15	<a href="#">5.1.3</a>	The reporting units for Specific Conductance were corrected to UMHOS/CM.
17	5.1.5.2	Removed reference to “or most current version” of ILM04.0.
17	5.1.6.3	Provided an exception to TCLP sub-sample requirements.
18	5.2.1	Removed RFETS Specific Wet Chemistry Line Item Codes (Table 1 of 2), RWC-A-001, RWC-A-002, and RWC-A-003.
20	5.2.6	Clarified requirements for preparation blanks.
26	<a href="#">6.1.1.1</a>	The Results Only Deliverable Requirements were revised to reflect the Radiochemistry Reporting Forms.
27	<a href="#">6.1.1.2</a>	The Requirements for the Standard Deliverable’s Batch QC Requirements were revised to reflect the Radiochemistry Reporting Forms.
30	<a href="#">6.1.1.3</a>	A section in the Calibration Raw Data was added for the Daily Check Source and background counts.
31	6.1.3	Clarified the list of analytes and Con ID’s for ASP-A-010 and ASP-A-011.
31	<a href="#">6.2.2</a>	The option to use the Radiochemistry Reporting forms in either the portrait or landscape page orientation was added to this section.
33	6.2.4.2	Added clarification to alpha spectroscopy sample preparation to remove matrix interferences prior to column separation to obtain good tracer recoveries.
34	6.2.4.6	Added clarification for blank correction of composited air filter samples to consider the number of filters in the composite.

Affected Page(s)	Section No.	Change Description
36	6.2.6.6	Clarified isotope CAS No.'s for GPC analyses.
37	<a href="#">6.2.7.2</a>	Eliminated U238 from the constituent list for liquid LICs RGA-A-002 and RGA-A-003 and added Pa-234m as a new constituent. Revised Con IDs for <sup>228</sup> Ac, <sup>144</sup> Pm, <sup>146m</sup> Pm, <sup>212</sup> Pb, <sup>40</sup> K, and <sup>230</sup> Th.
37	6.2.6.6	Clarified isotope CAS No.'s for GPC analyses.
Appendix A	1.0	Revise wording in third paragraph.
Appendix A	2.8	Clarified constraints on EDD file naming.
Appendix A	<a href="#">4.1</a>	The requirement to report results in the same units given for the analyte RDL was added to the Format/Contents description column for the field name "Result Units". Added requirement to report LCS yield result unit as %REC.
Appendix A	<a href="#">4.1</a>	Columns 202 – 204 for RAD Data was identified as a field "not used" under the implementation of the BOA.
Appendix A	<a href="#">4.1</a>	A new field for RAD Data was identified as being located in Columns 205 – 214 for providing the Relative Bias of the LCS.
Appendix C	<a href="#">5.1.2.1</a>	The form referenced in Appendix C for TCLP preparation was corrected to Form "2" rather than Form "3".

# 1. GENERAL SITE SPECIFIC CLARIFICATIONS

## 1.1. COMPUTERIZED INVOICE

RFETS does not require a computerized invoice. Please see Section G, Subcontract Administration Data, of the subcontract terms and conditions for payment procedures.

## 1.2. CONTRACTOR DELIVERABLES REQUIREMENTS LIST

RFETS does not require the entire list of Contractor's Deliverable Requirements as provided in Attachment 4 of the BOA. The following list summarizes the applicable Contractor's Deliverable requirements as they pertain to RFETS.

### RFETS Deliverables Requirements List (All references are to calendar days)

<u>Item</u>	<u>Schedule</u>
A List of Analytical Procedures (SOPs)	Within 30 days of subcontract award and within 30 days of changes or revisions for duration of subcontract
Requested SOPs	Within 3 days of request
QA/QC Plan	Within 3 days of request
Minimum Sample Size Requirements	Within 15 days of subcontract award and within 15 days of changes or revisions for duration of subcontract
Proof of NRC or Agreement State Licenses	Within 30 days of subcontract award and within 30 days of changes or revisions for duration of subcontract
Relevant state certification	Within 180 days of subcontract award and within 30 days of changes or revisions for duration of subcontract
Return of Sample Shipping Containers	Within 14 days following laboratory custody receipt
Lost Samples, Reporting Error, or Loss of Capability	Within 24 hours
Loss of Capability Action Plan	Within 15 days following loss of capability notification
Performance Evaluation Corrective Action Responses	Within 30 days of written request
Response to QA/QC Questions	Within 7 days of notification
Regulatory Inter laboratory Comparison Data Report	Within 14 days of completion
Regulatory Audit Correspondence	Within 30 days
Reporting Regulatory Investigation or Suspension	Within 2 days
Invoices	See RFETS Subcontract Terms and Conditions
Data Report Deliverables	As specified in Delivery Order and per the requirements of the BOA and GR03
Reanalysis Data Package	Within 28 days of request
Hazardous, Radioactive, and/or Mixed Waste Sample Disposition	Within 7 days of request

### 1.3. **BASE METHOD SELECTION AND APPLICATION**

#### 1.3.1. ***Base Method Compliance***

The laboratory must be in strict compliance with the Approved Method listed in the BOA Attachment K for the associated (LIC) identified for the sample on the COC. However, LICs specifying SW-846 or EPA-600 as the Approved Method Source are exempt from Approved Method IDL/MDL requirements. IDLs/MDLs for SW-846 or EPA-600 methods shall be determined as specified in the BOA Attachments 1 and G.

##### 1.3.1.1. **RFETS Specific Requirements**

Additional method requirements and quality assurance measures are listed in RFETS Specific Requirements Sections. In general, when conflicts between Site Specific requirements and base method requirements exist, the Site Specific requirements shall take precedence.

##### 1.3.1.2. **Achieving RDL**

Sample pretreatment, digestion, and analysis procedures must achieve the specified RDLs for each listed analyte. However, if the sample concentration exceeds ten times the RDL, the value may be reported even though the MDL may not equal the RDL for the specified LIC. Where samples are diluted in preparation and/or before analysis, MDLs must be multiplied times the combined dilution factors for comparison to RDLs. Where chosen sample preparation methods result in concentration of the samples, RDLs may be multiplied by these concentration factors for comparison to MDLs.

### 1.4. **GENERAL QUALITY CLARIFICATIONS**

#### 1.4.1. ***Lab Fortified Blanks (Non Radchem)***

The analysis of a LCS that meets CLP-SOW protocols satisfies EPA-600 series method requirements for analysis of Lab Fortified Blanks.

#### 1.4.2. ***Method Blank Analysis (Non Radchem)***

If an analyte concentration in the Method Blank or Preparation Blank is above the RDL, the lowest concentration of that analyte which can be reported in the associated samples shall be ten times the blank concentration. All samples with determined analyte concentrations less than ten times the blank concentration must be redigested and reanalyzed for that analyte.

#### 1.4.3. ***Requirements for Sample Dilutions Due to High Analyte Concentrations (Non Radchem)***

When sample readings exceed the calibration curve, the sample must be diluted and reanalyzed. Analyte concentrations following dilutions must be greater than the RDL or ten times the MDL, whichever is greater.

#### 1.4.4. ***Raw Data Labeling Requirements***

Raw data shall provide necessary documentation to assess validity of all results through processes such as recalculating reported values, tracing analytical batch QC, and tracing all standards to valid reference materials.

- Data labels shall clearly identify samples designated as duplicates, spiked samples, controls and blanks.

- For Wet Chemistry and Miscellaneous LICs, Labeling protocols used in the CLP-SOW for Inorganics is suggested. The use of other identification schemes is acceptable provided all codes are clarified in a description table with each Sample Data Package.
- The identification scheme used shall provide an unequivocal and unique link between all samples and QC samples prepared as an analytical batch.

## 2. GENERAL SITE SPECIFIC REQUIREMENTS

### 2.1. TURNAROUND TIME (TAT) AND DATA PACKAGE CATEGORY

RFETS will use a Turnaround Time/Package (TATPKG) Code on the Chain of Custody (COC) form to request TAT and the Sample Data Package Category. This information will be provided under the “Sample Analysis” column of the COC. The following table identifies the TATPKG Codes and their associated TAT and Data Package Category:

**TATPKG Codes**

<b>TATPKG Code</b>	<b>TAT/Data Package Category</b>
<b>28dR</b>	28 Day/Results Only Deliverable
<b>28dS</b>	28 Day/Standard Deliverable
<b>28dF</b>	28 Day/Standard Plus Raw Data Deliverable
<b>21dR</b>	21 Day/Results Only Deliverable
<b>21dS</b>	21 Day/Standard Deliverable
<b>21dF</b>	21 Day/Standard Plus Raw Data Deliverable
<b>14dR</b>	14 Day/Results Only Deliverable
<b>14dS</b>	14 Day/Standard Deliverable
<b>14dF</b>	14 Day/Standard Plus Raw Data Deliverable
<b>7dR</b>	7 Day/Results Only Deliverable
<b>7dS</b>	7 Day/Standard Deliverable
<b>7dF</b>	7 Day/Standard Plus Raw Data Deliverable
<b>3dR</b>	3 Day/Results Only Deliverable
<b>3dS</b>	3 Day/Standard Deliverable
<b>3dF</b>	3 Day/Standard Plus Raw Data Deliverable
<b>48hrR</b>	2 Day/Results Only Deliverable
<b>48hrS</b>	2 Day/Standard Deliverable
<b>48hrF</b>	2 Day/Standard Plus Raw Data Deliverable
<b>24hrR</b>	1 Day/Results Only Deliverable
<b>24hrS</b>	1 Day/Standard Deliverable
<b>24hrF</b>	1 Day/Standard Plus Raw Data Deliverable

### 2.2. TRANSMITTAL REQUIREMENTS

Transmittals shall include, if applicable, documentation regarding any discrepancies encountered between samples received and COC records, any internal laboratory “discrepancy reports” and their resolutions.

2.2.1. ***COC Transmittal Requirements***

The laboratory shall fax or email a signed copy of the COC to the CTR within 24 hours of sample receipt.

2.2.2. ***Other Deliverable Requirements***

The laboratory shall include all correspondence regarding the samples or analyses, including: Email or telephone logs stating CTR or Project Lead special requirements or acceptable changes.

2.3. **ELECTRONIC DATA DELIVERABLE (EDD)**

The subcontractor shall provide an EDD in the format specified in Appendix A of this document, "Electronic Data Deliverable.

2.3.1. ***Laboratory Quality Control Reporting Requirements***

The subcontractor shall be in strict compliance with Appendix A Section 2, Reporting Quality Control Data.

2.3.2. ***EDD Transmittal***

The EDD shall be transmitted to the Site by email. No other means of transmittal will be accepted.

2.4. **ANALYTICAL DATA REPORTS**

2.4.1. ***Data Packages***

For a given RIN, the subcontractor shall submit a stand-alone data package for each set of LICs with a similar prefix, i.e., VOA, SVO, MET, etc. The only exception to this requirement involves line item codes with prefixes WCH and MIS. When a RIN includes LICs with "WCH" and "MIS" prefixes, data for these two prefixes shall be combined into one data package.

Data packages shall be generated using the following guidelines:

- A single data package shall be generated for all analyses requested within a given LIC prefix for a given RIN.
- All samples submitted under a RIN, regardless of matrix, shall be contained in the single data package for a given LIC prefix, i.e., soil samples and the associated aqueous field QC samples shall be contained in the same report.
- The laboratory shall submit, in a single data package for a given LIC prefix, all samples contained within a RIN even when samples are received on multiple COCs over a one week period. For samples received over a one week period, the laboratory shall batch samples in a manner that prevents missed holding times, i.e., VOA samples may require multiple analytical batches over the one week period. For performance tracking, turnaround time will be calculated on the date the laboratory receives the last sample in a RIN for a specific LIC.

2.4.1.1. **Report Identification Number (RIN) Definition**

A grouping of samples identified by the CTR to be included in a single sample data package for a given LIC prefix. A 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. RINs are formatted as YY\*NNNN, where YY is the 2-

digit designator for the Federal fiscal year in which the sample was assigned, \* is an internal letter designator, and NNNN designates a four-digit number.

#### 2.4.2. **Electronic Image Deliverable**

The subcontractor shall provide an electronic image, in Portable Document Format (PDF), for all components contained in the "Results Only Deliverable" and "Standard Deliverable" categories. An electronic image of the "Standard Plus Raw Data Deliverable" is required for all components except Raw Data. The Site encourages, however, the transmittal of Raw Data as a PDF file whenever possible. When printed, the Electronic Image Deliverable shall meet all content, reporting, and formatting requirements contained in the BOA for the hardcopy deliverables.

**Note:** Documentation of sample pH and/or temperature checks at the time of sample receipt must be included as a separate record if this information is not captured on the COC.

The following additional requirements shall be met for the Electronic Image Deliverable:

##### 2.4.2.1. **Certification Statement**

The cover page shall contain the following statement:

*"I certify that this electronic image, and all hardcopies produced from this image accurately represent the data and are in compliance with the BOA and RFETS specific requirements, both technically and for completeness, other than the conditions detailed above or in the sample data package narrative. Release, by submission through email, of the data contained in this electronic image and the computer-readable EDD (as applicable), has been authorized by the Laboratory Manager or the Manager's designee."*

- This statement shall be directly followed by the typed name of the Laboratory Manager or his/her designee including title, and the date of the authorization.
- In the event that the Laboratory Manager or his/her designee cannot validate all data reported for each sample, he/she shall provide a detailed description of the problems associated with the sample(s) in the sample data package narrative.

##### 2.4.2.2. **Hard Copy Deliverables**

The subcontractor shall not deliver any hardcopy deliverables that have already been provided in electronic form. Delivery of the original COC and all CTR requests for hardcopies are exceptions to this requirements.

The following requirements shall be met for Hard Copy Deliverables:

- **Original Chain of Custody (COC):** The original COC shall be delivered to the CTR within 3 business days of Electronic Image transmittal.
- **Raw Data:** Raw data, provided in hard copy, shall be delivered to the CTR within 3 business days of Electronic Image transmittal. Raw data shall be sequentially numbered beginning with the page number following the last page of the PDF document. A cover letter shall accompany the raw data indicating the Laboratory Name, Contractor Sample Numbers, LIC(s) associated with the data package, and a statement indicating that the first xxx pages of the deliverable were transmitted electronically (where xxx is the last page of the electronic deliverable).
- **CTR Request:** The subcontractor shall provide a hardcopy for all or any part of a deliverable category (Results Only, Standard Deliverable, or Standard Plus Raw Data Deliverable) within 7 calendar days of CTR request.

The Site will produce all needed hardcopy data packages by combining a printed copy of the Electronic Image Deliverable with associated hard copy transmittals.

#### 2.4.2.3. **Electronic Image Transmittal**

- The Electronic Image Deliverable shall be transmitted to the Site by email. The Site will reply to all transmittals with an email confirming receipt. No other means of transmittal will be accepted at this time. The Site is currently evaluating alternate methods of transmittal, and as these methods become available for use, the subcontractor will be notified.
- The date of data delivery shall be the date of email transmission of the Electronic Image Deliverable provided the complete data package (original COC and applicable Raw data), is received within 3 business days of the electronic delivery. Otherwise the official date of delivery will be the date the complete package is received.

#### 2.4.2.4. **Electronic Image Guidelines**

- Wherever possible, pdf files should be created by printing directly to Adobe Acrobat as this results in maximum legibility and minimum file size.
- Scanned images should be scanned in black and white (1 bit) mode at 150 to 300 dpi. Lower dpi is preferable but may not be acceptable for small text.
- Consideration should be given to scanning in color only for low contrast color print. Legibility, however, is more important than file size.
- Portable document format (pdf) files should be version 1.3 or higher.

## 2.5. **DELIVERABLE ACCEPTANCE AND RESUBMISSIONS**

### 2.5.1. ***Complete Deliverables***

Performance calculations, used in the determination of payment, are based on the receipt date of *complete* deliverables. Subcontractor submitted deliverables, both hardcopy and electronic, that are deficient in content, contain errors, are illegible or include inaccuracies will not be considered as a *complete* deliverable until acceptable corrections are received.

### 2.5.2. ***Resubmission Requirements***

The subcontractor may be required to submit or resubmit data as a result of a CTR request, an incomplete deliverable, or an amendment to a previously submitted deliverable. Resubmissions fall under three category types as described below:

***Previously Submitted Deliverables:*** A resubmission of a deliverable without change from what was originally submitted (duplicate report).

***Additional Data:*** Submission of data to a previously submitted deliverable that was not included in the original submission.

***Revised Data:*** Submission of data that differ from the original submission.

#### 2.5.2.1. **Turnaround Requirements for Resubmitted Deliverables**

The subcontractor shall provide the CTR or their designee Previously Submitted deliverables within 7 calendar days of request. Additional or Revised Data shall be submitted to the CTR or their designee immediately upon request. CTR receipt of Additional or Revised Data shall not exceed 3 working days.

### 2.5.2.2. Identification of Resubmitted Deliverables

Resubmissions shall be clearly marked to allow proper processing of the deliverables upon receipt. The identification requirements for the three resubmission categories are provided below for the identified deliverable types:

2.5.2.2.1. **Electronic Image:** All Electronic Image resubmissions shall be transmitted as a complete stand-alone document that includes all components of the initially submitted deliverable.

**Cover Page:** The following information shall appear at the very top of the Electronic Image required Cover Page (see [Appendix E](#) for an example):

- The first line shall state: “**Duplicate Report**”, for previously submitted deliverables, or “**Revised Report**” for deliverables containing Additional or Revised data.
- Non-Compliance Notification (NCN) Number requesting the resubmission (when applicable).
- A description of what changed
- List of pages containing new or revised information (do not list pages affected by pagination only).
- A sequential two digit Revision number shall be appended to the end of the Laboratory Report Identification Number, i. e., Rev 01. This number shall correspond to the revision number provided in the electronic image file name.

**Affected Pages:** The top right corner of all pages containing new or revised information shall be marked with “**Revised**” followed by the date of resubmittal. Pages that change because of pagination only shall not be given a designation.

**File Name:** The following designations shall be appended to the end of the pdf file name for Resubmitted Deliverables:

- **\_DUP** for Previously Submitted Deliverables
- **\_REVxx** for Additional or Revised Data, where “**xx**” is a two-digit number identifying the number of resubmissions beginning with 01.

2.5.2.2.2. **Raw Data** (not included in the Electronic Image) : A cover page shall accompany the resubmittal of all hardcopy raw data and shall contain the following information:

**Cover Page:**

- The first line or top of the cover page shall state: “**Duplicate Raw Data**”, “**Supplementary Raw Data**”, or “**Revised Raw Data**” as designated by the resubmission category, followed by the date of resubmittal. Resubmittals that contain both additional and revised data shall be flagged as “**Revised Raw Data**”.
- Non-Compliance Notification (NCN) Number requesting the resubmission (when applicable)

- A description of what changed and a list of the affected pages (Additional or Revised Raw Data only).
- Laboratory Name
- Contractor Sample Numbers
- LIC(s) associated with the raw data

**Affected Pages:** The top right corner of all affected pages shall be marked with “**Appended**” or “**Revised**” followed by the date of resubmittal. Pages that contain both Additional and Revised Data shall be flagged as “**Revised**”. For Additional or Revised Raw Data, only the affective pages shall be included in the resubmission. These pages shall be paginated for insertion into the original document. Revised pages shall have the same page numbers as the original, and additional pages shall be numbered as the previous page followed by a letter, i.e., 14a, 14b, 14c, etc..

#### 2.5.2.2.3. *EDD*

**Contractor Requested EDD Resubmissions:** The text section of the email containing the resubmitted EDD file shall include the Non-Compliance Notification (NCN) Number requesting the resubmission (when applicable).

**Unsolicited EDD Resubmissions:** The subcontractor shall include a reason for an unsolicited EDD resubmission in the text section of the email containing the new EDD file.

**File Name:** The following designations shall be appended to the end of the file name for Resubmitted EDDs:

- **\_DUP** for previously submitted EDDs
- **\_REVxx** for EDDs containing Additional or Revised Data, where “**xx**” is a two digit number identifying the number of resubmissions beginning with 01. This number is independent of the number used to track electronic image data packages.

### 3. ORGANICS (LIC Prefixes: VOA, SVO, PEP, DXF, and HER)

#### 3.1. CLARIFICATIONS

##### 3.1.1. Volatile Organics by EPA 624 (LIC VOA-A-025)

The laboratory shall report the Con ID for 2-Chloroethylvinyl ether as 110-75-8.

##### 3.1.2. Volatile Organics by SW-846 Appendix IX (LIC's VOA-A-027 and 028)

The laboratory shall report the Con ID for vinyl acetate as 108-05-4.

##### 3.1.3. Semivolatile by CLP and by SW-846 8270B (LIC's SVO-A-001, SVO-A-003, SVO-A-005, SVO-A-007)

- The laboratory shall report the Con ID for Phenol as 108-95-2.

##### 3.1.4. TCLP Semivolatile (LIC SVO-A-013)

The laboratory shall not report 3-Methylphenol as a separate constituent. The concentration for 3-Methylphenol and 4-Methylphenol shall be summed and reported as 4-Methylphenol (106-44-5).

#### 3.2. REQUIREMENTS

##### 3.2.1. RFETS Specific Organic Line Item Codes

LIC	Title	Method	Matrix	Analyte(s)	Con ID	RDL	Units
RPE-A-001	PCB (High Level)	SW846 8082	Water	Aroclor-1016	12674-11-2	5	mg/L
				Aroclor-1221	11104-28-2	5	mg/L
				Aroclor-1232	11141-16-5	5	mg/L
				Aroclor-1242	53469-21-9	5	mg/L
				Aroclor-1248	12672-29-6	5	mg/L
				Aroclor-1254	11097-69-1	5	mg/L
				Aroclor-1260	11096-82-5	5	mg/L
RPE-A-002	PCB (High Level)	SW846 8082	Soil Sludge Waste	Aroclor-1016	12674-11-2	5	mg/kg
				Aroclor-1221	11104-28-2	5	mg/kg
				Aroclor-1232	11141-16-5	5	mg/kg
				Aroclor-1242	53469-21-9	5	mg/kg
				Aroclor-1248	12672-29-6	5	mg/kg
				Aroclor-1254	11097-69-1	5	mg/kg
				Aroclor-1260	11096-82-5	5	mg/kg

##### 3.2.2. Dilutions

All dilutions shall be justified in the Sample Case Narrative and in the raw data section of the sample data package.

3.2.2.1. **Dilutions Factors Determined From Initial Undiluted Run**

Dilution factors shall be chosen to give a response for off scale compounds in the upper half of the calibration range. This criteria shall be met regardless of the number of times a sample is diluted and reanalyzed. Only the off scale compounds shall be reported from the dilution analysis and all other compounds shall be reported from the initial undiluted run.

3.2.2.2. **Dilution Factors Determined From a Prescreen**

The following criteria shall be met for samples that were diluted based on the results of a prescreen rather than from an initial undiluted run:

- The organic raw data section of a sample data package shall include the prescreening raw data used for the determination of the dilution factor.
- The prescreening raw data justifies the dilution factor chosen.
- The dilution factor chosen does not exceed what is necessary to put the response for the off scale compound within the upper half of the calibration range.

Samples that do not meet this criteria shall be reanalyzed until the dilution factor selected meets the above criteria.

3.2.3. ***Reporting Continuing Calibration***

The continuing calibration results shall be reported as Percent Difference on the appropriate summary form.

3.2.4. ***EPA Method 524.2***

RFETS routinely employs the use of EPA Method 524.2 for the determination of volatile organic compounds in groundwater in order to meet Site regulatory action levels. Some of the target analytes in these samples may be at concentrations higher than those typically found in drinking water. Laboratories shall make every effort to assure required detection limits in the reported data are met. Dilutions shall strictly follow the requirements set forth in Section 3.2.1.

## 4. METALS (LIC Prefix: MET)

### 4.1. CLARIFICATIONS

All references to CLP-SOW are to the [ILM04.0 Document](#) .

#### 4.1.1. *BOA RDL Variance for Arsenic*

RFETS raised the RDL for the arsenic component of the metal suite identified under BOA Line Item Codes MET-A-029, and MET-A-030. Use of the RDLs provided in the table below in lieu of the BOA listed RDLs for this analyte are acceptable under the RFETS implementation of the BOA.

LIC	Title	Method	Matrix	Analyte(s)	Con ID	RDL	Units
<b>MET-A-029</b>	RCRA Metals	SW 846 6010, 7471A, 7000A	Aqueous	Arsenic	7440-38-2	10	ug/L
<b>MET-A-030</b>	RCRA Metals	SW 846 6010, 7471A, 7000A	Solid	Arsenic	7440-38-2	43	mg/Kg

#### 4.1.2. *“NR” Definition for LICs MET-A-001 and MET-A-013*

The use of “NR” for the Uranium RDL under Metal LICs indicate that no specific RDL was determined. However, uranium concentrations shall be reported for all detects and the laboratory determined IDL shall be reported for nondetects.

#### 4.1.3. *Base Method Selection And Application*

##### 4.1.3.1. **EPA Method 600**

Where EPA-600 is listed as the approved method source, methods used must be specifically promulgated for use according to *40CFR136: Table IB. - List Of Approved Inorganic Test Procedures*. For example, ICP/MS method 200.8 can be used only if it has been promulgated for determinations performed according to *40CFR136: Table IB. - List Of Approved Inorganic Test Procedures*.

##### 4.1.3.2. **RDL1 Detection Limits**

When LICs with RDL1 requirements are requested, samples may be pre-concentrated by up to a factor of four, if necessary to meet required detection limits.

##### 4.1.3.3. **ICP/MS Method**

When CLP-SOW Methods are required, the ICP/MS method may be used (in addition to those specified in [ILM04.0](#)). However, when determinations are performed by ICP/MS these analyses must meet all requirements of the USEPA Contract Laboratory Program Statement of Work for Low Concentration Water for Inorganic Analytes, Document No. [ILM05.2](#) and calcium, magnesium, mercury, potassium, and sodium must be determined by a method other than ICP/MS. All other analysis techniques must be performed as defined in [ILM04.0](#). Where analytes required are not included on the CLP

analyte list, these analytes shall be determined by ICPEs, FLAAS, GFAAS and/or other methods included in the CLP-SOW.

4.1.3.4. **Laboratory Control Samples**

Laboratory Control Sample results are required for all requested analytes included in the list of the requested LIC, not just those in an approved method (e.g., the CLP target analyte list).

4.1.3.5. **Matrix Spike Samples**

Matrix Spike Sample results are required for all requested analytes included in the list of the requested LIC, not just those in an approved method (e.g., the CLP-SOW target analyte list). Spiking at CLP-SOW levels is acceptable provided all requested analytes are included in the spike solution. Matrix spike values for those analytes not included in the CLP-SOW shall be at least 10 times the determined IDL but not greater than 100 times the RDL. Matrix Spike results for Ca, Mg, K, and Na are not required for water and soil samples by ICP.

4.1.4. **Method QC**

4.1.4.1. **CRDL Standards**

CLP-SOW requirements for analysis frequency and reporting of CRDL standards will be met regardless of the approved method source. The following clarifications apply:

- The 'true' concentration chosen for each analyte in the CRDL standard must be the CLP-SOW specified value when the required base method source is the CLP-SOW. For all other method sources, the 'true' concentration chosen for each analyte in the CRDL standard must be either the CLP-SOW specified value or a value between one and two times the RDL stated in the BOA.
- Analytes required for the requested LIC, but not included in the CLP-SOW target analyte list shall be included in the CRDL standard. The chosen concentrations for these analytes shall be between one and two times the RDL stated in the BOA.

4.1.5. **Method Specific Clarifications For ICPEs**

4.1.5.1. **ICPEs Interelement Corrections**

- The absence of spectral interference from elements in a sample must be verified even if there is no instrument detection channel for that element. Documentation of this verification is required, at a minimum, for all elements listed in the applicable LIC. In other words, all listed elements must be evaluated as potential interferences, even if these elements are not requested analytes.
- The correction factors must be determined under the same instrument conditions used for sample analysis. If the instrument was adjusted in any way that may affect the ICP interelement correction factors, the factors must be re-determined and implemented.

4.1.5.2. **ICPEs Initial Calibration Verification**

Where Quality Control Samples (QCS) analyses are used to perform initial instrument calibration verification in EPA-600 Methods, the QCS samples used for this Initial Calibration Verification (ICV) shall be certified and all preparation and traceability for this ICV must be independent of the preparation and traceability of the solutions used for instrument calibration.

#### 4.1.5.3. **ICP Interference Check Sample (ICS) Analysis**

Requested analytes not included on the CLP Target Analyte List (CLP-TAL) shall be included in the ICSAB solution. These analytes shall be evaluated and reported in both ICSA and ICSAB solutions by the protocols established for the CLP-TAL analytes.

#### 4.1.5.4. **ICPES Sample Serial Dilution Analysis**

Analysis and reporting of sample serial dilutions shall be as specified in the CLP-SOW, regardless of the method source. Frequency of serial dilution analysis shall be one per analytical batch or one per matrix, whichever is more frequent.

#### 4.1.5.5. **ICPES Sample Dilutions**

Samples containing interferent or required analyte concentrations higher than the established linear range must be diluted so that all analytes and interferents are in range and reanalyzed. Reported analyte results must be based on measurements taken when analyte concentrations are within the established linear range and interelement spectral interference effects are properly corrected.

- If the resulting dilution factor multiplied by the established IDL is less than the specified RDL for an analyte then that analyte may be reported from the diluted data. If the analyzed concentration of an analyte in the diluted sample is equal to or greater than ten times the established IDL then that analyte may be reported from the diluted data.
- If the resulting dilution factor multiplied by the established IDL for any trace required analyte exceeds the specified RDL, the sample must be analyzed by ICPES at a lesser dilution (or undiluted). If the sample cannot be analyzed at a lesser dilution (or undiluted), the CTR shall be contacted for direction.

**Note:** The lesser dilution factor for ICPES must be chosen so that elements in high concentration do not cause a severe matrix effect and any interelement spectral interferences or shifts in background intensity can be properly corrected. Reported analyte results must be based on measurements taken when interelement spectral interference effects are properly corrected. If interelement corrections are calculated manually, the use of these corrections must be documented in the sample narrative which must also include a reference to the location of actual calculations in the sample data package deliverable. If the accuracy of interelement corrections is demonstrated by non-routine analysis of synthetic interferent solutions, this demonstration must be described in the sample narrative.

#### 4.1.5.6. **TCLP Determinations by ICPES**

If the sample is a TCLP extract and sodium is the only element above the linear range, analyte results may be reported if the concentration of sodium in TCLP extracts has been demonstrated not to cause significant interferences on other required analytes. This demonstration must be documented in the Interelement Correction Factor Determinations and Verifications section of the Supporting Documentation Package. In this case, the Results Sheet (Form 1) shall indicate that sodium was determined to be greater than the instrument linear range in a TCLP extract.

4.1.6. **Method Specific Clarifications For GFAAS**

4.1.6.1. **GFAAS Continuing Calibration Verification**

The percent recovery for the analyzed concentrations for GFAAS Continuing Calibration Verification Check standards must meet CLP-SOW requirements or be within the method-specified range, whichever is more stringent.

4.1.6.2. **GFAAS Analytical Spike Sample Analysis**

All determinations performed by GFAAS, regardless of method source, shall include analytical spike analysis as required by CLP-SOW.

4.2. **REQUIREMENTS**

4.2.1. **RFETS Specific Metal Line Item Codes**

LIC	Title	Method	Matrix	Analyte(s)	Con ID	RDL	Units
RME-A-001	Silver & Cadmium	EPA 600	Aqueous	Silver	7440-22-4	0.3	µg/L
				Cadmium	7440-43-9	1	µg/L
RME-A-002	Beryllium & Chromium	EPA 600	Aqueous	Beryllium	7440-41-7	1	µg/L
				Chromium	7440-47-3	2	µg/L
RME-A-003	Total Silica	EPA 600	Aqueous	Silica	7631-86-9	20	µg/L

4.2.2. **Requirements For ICP**

4.2.2.1. **ICPES Initial Calibration Verification**

Results of the Initial Calibration Verification solution(s) for each wavelength used must be within 10% (relative) of the certified 'true' value. If measurements exceed these limits, the analysis shall be terminated, the problem corrected, the instrument recalibrated, and the calibration reverified.

4.2.2.2. **ICPES Corrections For Uranium**

Inter-element correction factors for spectral interference due to uranium must be applied to all results for samples analyzed according to LICs specifying SW-846 as the Approved Method Source. Even if uranium is not a requested analyte, uranium interelement corrections must be applied unless the determined concentration of uranium in the sample is below the lowest uranium concentration found to introduce significant interference.

## 5. WET CHEMISTRY and MISCELLANEOUS DETERMINATIONS (LIC Prefixes: WCH and MIS)

### 5.1. CLARIFICATIONS

#### 5.1.1. BOA RDL Variance for Ortho Phosphate and Total Phosphate

RFETS raised the RDL's for Ortho Phosphate and "Phosphate (total) as P" identified under BOA Line Item Codes WCH-A-028 and WCH-A-029, respectively. Use of the RDLs provided in the table below in lieu of the BOA listed RDL for these analytes is acceptable under the RFETS implementation of the BOA.

LIC	Title	Method	Matrix	Analyte(s)	Con ID	RDL	Units
WCH-A-028	Phosphate (ortho) as P	EPA 365.1, .2, .3, SM4500-P F, E, EPA 300.0	Aqueous	Ortho Phosphate	14265-44-2	0.05	mg/L
WCH-A-029	Phosphate (total) as P	EPA 365.1, .2, .3 SM4500-P.B.5	Aqueous	Total Phosphate Phosphorous	7723-14-0	0.05	mg/L

#### 5.1.2. Clarification of MIS-A-003 and MIS-A-004

RFETS requires the following Con ID and reporting units for MIS-A-003, MIS-A-004, and MIS-A-017.

LIC	Title	Method	Matrix	Analyte(s)	Con ID	RDL	Units
MIS-A-003	pH of Aqueous & Multiphasic wastes (>20% water) for the 40CFR§261.22(a) (1)	SW-846 Method 9040B as specified in SW-846 Chapter Seven.	Aqueous	Corrosivity for Liquid Waste	261.22-A-1	Method Specific	S.U.
MIS-A-004	pH of Solid wastes (<20% water) for the 40CFR§261.22(a) (1)	SW-846 Method 9045C as specified in SW-846 Chapter Seven. ASTM-D4972-95	Solid	Corrosivity of Solids	261.22-A-1(S)	Method Specific	S.U.
MIS-A-017	Paint Filter Liquids Test for compliance with 40 CFR 264.314 and 265.314	SW-846 Method 9095A	Solid	Paint Filter Liquids 9095A	FREE LIQUID		YES/NO

#### 5.1.3. BOA Reporting Units for Specific Conductance (WCH-A-035)

RFETS requires the Units of UMHOS/CM for reporting Specific Conductance (conductivity) data. This is the standard unit of measure for reporting this parameter.

#### 5.1.4. *Sample Data Packages*

CLP-SOW Forms 1 through 14 or equivalent shall be used for reporting all sample and QC sample results.

GR03 Appendices B and C contain Sample and QC Result Form templates for producing *Sample and QC Result Summary* portions of a Sample Data Package for Wet Chemistry and Miscellaneous Determinations respectively. The exact *Sample and QC Result Summary Forms* provided in the Appendices are NOT mandatory, but are provided as an option for meeting the BOA reporting requirements.

##### 5.1.4.1. **TCLP Determinations**

When a TCLP is requested, only the Appendix C, Form 2 is completed for the TCLP preparation or Method 1311 portion of the analysis. TCLP results are to be reported in the SDP per the applicable Site Specific analyte (e.g., metals) subcontract requirements. TCLP metals may be reported in either ug/L or mg/L, however, the laboratory must consistently report in the same units.

#### 5.1.5. *Method Selection and Application*

##### 5.1.5.1. **SW-846 and EPA-600 Method MDL Requirements**

The analysis of samples with “MIS” LICs specifying SW-846 or EPA-600 as the Approved Methods Source are exempt from Approved Method IDL/MDL requirements. MDLs shall be determined as specified in the BOA Attachment 1, BOA Attachment G or the RFETS Specific Miscellaneous Requirements Section of this document.

##### 5.1.5.2. **References to CLP-SOW**

All references to CLP-SOW are to document ILM04.0, Section V, “Required QA/QC Operations.”

#### 5.1.6. *Sample Preparation*

##### 5.1.6.1. **Gravimetric Solids Determinations**

Gravimetric solids determinations (e.g., NVSS, TSS, and TDS) shall be performed with enough sample, to a maximum of 500 mL, to yield 1 mg of residue for all Site samples.

##### 5.1.6.2. **Total Cyanide and Amenable Cyanide**

Total cyanide and amenable cyanide determined for RCRA shall be treated according to SW-846 Method 9010 or 9020 prior to analysis for cyanide.

##### 5.1.6.3. **TCLP (Method 1311)**

When volatiles are not involved, the sub-sample taken for filtration and extraction shall be at least 100 grams (total for all phases). [An exception to this would be samples with limited sample volume and/or high radioactivity which requires a small sample volume for waste minimization.](#)

#### 5.1.7. *General Quality Clarifications*

The following clarifications apply to all determinations regardless of the Approved Method Source.

5.1.7.1. **Matrix Spike Samples**

Matrix Spike Sample results are only required for requested analytes where a N/A is not present on Form 4 of the appendices. Matrix spike values for these analytes shall be at least 10 times the determined MDL but not greater than 100 times the RDL.

5.1.7.2. **Preparation Blank Analyses for all Methods**

Preparation Blank subtraction is not permissible under any circumstance. A target analyte present in both a blank and sample analysis shall be reported in each.

5.2. **REQUIREMENTS**

Throughout this section, requirements will be identified for specific analytical methods or for analytical techniques employed by a given method. For the purpose of this document, requirements identified for “*Classical Analytical Techniques*” apply to any analytical method that utilizes one or more of the following:

- *Colorimetric/Spectrophotometric*
- *Titrimetric*
- *Gravimetric*
- *IC*
- *Potentiometric (e.g., ISE, BOD/CBOD, pH, etc.)*
- *Turbidimetric*
- *IR (e.g., TRPH, etc.)*
- *GC (e.g., TPH, etc.)*

Specific requirements for analytical methods or analytical techniques shall take precedence over requirements identified for Classical Analytical Techniques.

5.2.1. **RFETS Specific Wet Chemistry Line Item Codes**

LIC	Title	Method	Matrix	Parameter Name	Parameter Description	Con ID	Units
RWC-A-004	Sediment Analysis (Sand-Silt Split)	ASTM D422	Water	Sieve 1	>0.75 in	RFS-SS-96-1	%
				Sieve 2	<0.75" & > 0.375"	RFS-SS-96-2	%
				Sieve 3	<0.375" & >0.188"	RFS-SS-96-3	%
				Sieve 4	<0.188" & > 2mm	RFS-SS-96-4	%
				Sieve 5	<2mm & >425 microns	RFS-SS-96-5	%
				Sieve 6	<425 microns & > 75 microns	RFS-SS-96-6	%
				Remainder	< 75 microns	RFS-SS-96-7	%

### 5.2.2. *RFETS Specific Miscellaneous Line Item Codes*

LIC	Title	Method	Matrix	Analyte(s)	Con ID	RDL	Units
RMI-A-001	Total Petroleum Hydrocarbons Diesel Range Organics (DROs)	SW 846 8015B	Soils Solid Waste	DROs	RF_DRO	20	mg/Kg
RMI-A-002	Total Petroleum Hydrocarbons Gasoline Range Organics (GROs)	SW 846 8015B	Soils Solid Waste	GROs	RF_GRO	20	mg/Kg

### 5.2.3. *Requirements for Calibration and Standardization*

#### 5.2.3.1. **Calibration Frequency Requirements for all Methods**

Instruments shall be calibrated daily or once every 24 hours and each time the instrument is set up unless otherwise stated. The Calibration/standardization date and time shall be included in the raw data. Concentrations of preparation and preservation reagents in calibration standards and prepared samples must be identical.

- IC Analyses: For IC analyses, daily calibration is not required, but a calibration curve must be determined whenever one or more of the following conditions exist:
  - The existing calibration curve does not meet calibration verification requirements.
  - The type or concentration of eluent and regenerant is changed.
  - Any instrument parameters such as eluent flow rate are changed.
  - Response or retention times for any analyte varies from those values obtained during calibration by more than ten percent.

#### 5.2.3.2. **Calibration Curve Requirements for Classical Analytical Techniques**

The following calibration curve requirements apply to the Classical Analytical Techniques except titrimetric and gravimetric:

- A minimum of four points is required for all calibration curves.
- Calibration standards shall be prepared at a minimum of three different concentration levels. These three standards and the calibration blank comprise the four-point calibration curve.
- At least one non-blank standard concentration shall be at the RDL, another standard shall be at a concentration near the mid-point of the calibration curve, and the remaining standard shall define the upper limit of the calibration curve. All standards shall be identified in the raw data with a unique identifier.
- To establish a calibration curve for each reported target analyte; peak heights, absorbance readings, or area responses are tabulated against the associated standard concentrations. Using the least squares fit linear regression, the correlation coefficient is calculated for each calibration curve. The correlation coefficient for each reported target analyte must be  $> 0.995$ .
- These calibration curve requirements must be met even if the calibration curve and concentration calculations must be performed externally to the analytical instrumentation. Documentation of calculations shall be included in the raw data.

#### 5.2.3.3. **Titrimetric Standardizations**

Titrimetric standardizations shall be standardized monthly and the laboratory shall provide the last date of titrant standardization on the bench-sheet. Titrant concentration values shall be traceable to standardization data.

#### 5.2.4. **Requirements for Calibration Verifications**

##### 5.2.4.1. **Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) for Classical Analytical Techniques**

The following CLP-SOW requirements for ICV and CCV solutions apply to the Classical Analytical Techniques except titrimetric and gravimetric:

- Analysis frequency (Exception: CCV may be analyzed at a minimum frequency of 5% and shall be analyzed after the last analytical sample)
- Analyte concentrations (Exception: The same standard may be used for both the ICV and CCV solutions)
- Use of Certified and/or Independent Solutions
- Analysis Conditions
- Actions for Exceeding Control Limits (85% to 115%)

##### 5.2.4.2. **Gravimetric Verifications**

For gravimetric determinations, the laboratory shall include as part of the raw data, all applicable copies of analytical balance verification results. Balance verification, at a minimum shall be performed once per working day whenever the balance is in use.

##### 5.2.4.3. **Retention Time Windows For Ion Chromatography**

If response or retention times for any IC analyte varies from calibration standards by more than 10%, recalibrate and reanalyze all affected samples. The width of the retention time window used to make identifications should be based upon measurements of the actual retention time variations of standards over the course of the analysis batch. Three times the standard deviation of a retention time can be used to calculate a suggested window size for each analyte. However, the experience of the analyst should weight heavily in the interpretation of chromatograms. If a resulting chromatogram fails to produce adequate resolution or identification of specific anions is questionable, confirmatory techniques such as sample dilution and spike must be used.

#### 5.2.5. **Requirements for Calibration Blanks**

##### 5.2.5.1. **Initial Calibration Blank (ICB) and Continuing Calibration Blank (CCB) for Classical Analytical Techniques**

The following CLP-SOW requirements for ICB and CCB solutions apply to the Classical Analytical Techniques except gravimetric:

- The ICB and CCB solutions shall be identical to the calibration blank.
- The ICB must be analyzed immediately after every ICV.
- The CCB must be analyzed immediately after every CCV.
- If the absolute value of the ICB or CCB reading is greater than the RDL, the analysis must be stopped, the problem corrected, the instrument recalibrated, and affected samples reanalyzed. Affected samples are defined as all samples analyzed since the last 'in control' ICB or CCB.

## 5.2.6. *Requirements for Preparation Blanks*

Preparation blanks are required for all methods.

### 5.2.6.1. **Preparation Blank Analyses**

- A minimum of one preparation blank must be prepared with each analytical batch. Dilution of samples only for analysis is not to be considered sample preparation. The preparation blank is an aliquot of reagent water or ASTM Type II water treated exactly as a sample including exposure to all labware, equipment, and reagents.
- Actual results of all blank analyses associated with Site samples shall be reported on QC summary forms.
- If the PB concentration is greater than the RDL, all associated samples with analyte concentrations less than five times the blank concentration shall be redigested and reanalyzed for that analyte as part of a new complete analytical batch.
- A BOD/CBOD dilution water-seed blank must be prepared with each BOD/CBOD analytical batch. The blank result (DO uptake) is determined from the difference of the initial DO and the final DO of a BOD bottle full of dilution water and seed aliquot incubated at 20°C for 5 days. The BOD/CBOD dilution water-seed blank uptake shall be reported. No control limit is applicable to the blank uptake for the HACH Method since the HACH Graphical calculation method automatically compensates for the DO uptake of the dilution water-seed blank.

## 5.2.7. *Requirements for Matrix Spiked Samples*

### 5.2.7.1. **Spike Sample Analysis for Classical Analytical Techniques**

All methods employing Classical Analytical Techniques (except gravimetric) shall include but not be limited to the following CLP-SOW general matrix spike requirements:

- Preparation
- Non use of field blanks for the spiking sample
- Actions for spike recoveries outside of limits (75% to 125%)
- Matrix spikes are required for each matrix or waste type within an analytical batch.

In addition, the following requirements shall apply:

- The concentration level of the spike must be equivalent to the mid-point concentration of the instrument calibration curve. For methods not requiring preparation before analysis, spikes shall be added to samples after necessary dilutions have been performed so that spiked and unspiked sample dilution levels are identical. The raw data shall contain the concentration level of the standard spike and be traceable to the primary standard.
- Spike samples shall be identified in the raw data with a unique identifier that is traceable to an analytical batch.

## 5.2.8. *Requirements for Laboratory Duplicates*

### 5.2.8.1. **Laboratory Duplicate Agreement for Classical Analytical Techniques**

- The results of the sample and duplicate of the sample must be within a Relative Percent Difference (RPD) of 20% for sample concentrations greater than five times the analyte RDL or the absolute value of the difference between the sample and duplicate results must be less than the RDL for sample concentrations less than five times the RDL.

- If the RPD of a sample and duplicate involving sample preparation is not within the above control limits, the analyses must be terminated, the problem corrected, and the samples associated with the Laboratory Duplicate reanalyzed (after preparation of another analytical batch, if necessary).
- If the deviation of a sample and duplicate not involving sample preparation is not within the above control limits, the analyses must be terminated, the problem corrected, and the analytical batch reanalyzed.

#### 5.2.9. *Requirements for Laboratory Control Samples*

##### 5.2.9.1. **Laboratory Control Sample Recovery for Classical Analytical Techniques**

- The LCS concentration shall be within the limits of the calibration curve. For an analytical batch with results determined with autodilution, a LCS also requiring dilution shall be analyzed similar to the samples in the analytical batch.
- If the %R of an LCS involving sample preparation is not within the control limits of 80% to 120%, the analyses must be terminated, the problem corrected, and samples associated with that LCS reprepared and reanalyzed.
- If the %R of an LCS not involving sample preparation is not within the control limits of 80% to 120%, the analyses must be terminated, the problem corrected, and the analytical batch reanalyzed.

##### 5.2.9.2. **Laboratory Control Sample Recovery For BOD/CBOD**

Determine the 5 day 20°C BOD of a standard glucose-glutamic acid solution with each analytical batch. The case narrative shall discuss all LCS recoveries not within the control limits of 82% to 118%.

#### 5.2.10. *Requirements for Hach BOD/CBOD Graphical Calculation Method*

The following guidelines shall be followed for determining and calculating CBOD and BOD results by the HACH Graphical Calculation Method.

- Five sample dilutions for each Site sample and LCS shall be processed. Initial DO values of diluted samples are not required.
- The Sample DO value (S) of the undiluted sample shall be used for the S value in the following formula when calculating BOD or CBOD results:

$$\text{BOD/CBOD (mg/L)} = 300(\text{Slope}) - \text{Y intercept} + \text{S}$$

##### 5.2.10.1. **Slope Value**

- The Slope value for calculating BOD/CBOD (mg/L) in the above formula shall be determined from a linear plot of the diluted sample volumes processed and the final diluted sample DO values after incubation.
- The linear plot should have a correlation coefficient (r<sup>2</sup>) of at least 0.95.
- Analytical judgment shall be used to eliminate data points that are not consistent with the other data points to obtain an acceptable linear plot of the data. For example, if there are four points on a straight line and one point differs from the general line of the others, it should be discarded. Also, if three or more data points fall on a straight line, they could all be used even though one does not deplete more than 2 mg/L oxygen or leave more than 1 mg/L. Documentation shall be provided in the raw data regarding any outlier that is discarded.
- Documentation shall be provided in the SDP Narrative for any results determined from a plot with less than three data points or a linear plot with a correlation coefficient (r<sup>2</sup>) of less than 0.95.

##### 5.2.10.2. **Y Intercept Value**

- The Y intercept of the plot should agree within ± 0.5 mg/L of the DO value of the dilution water and seed blank after incubation (final blank DO value).

Alternately, the Y intercept cannot be above the DO value of the saturated dilution water minus the seed correction. Documentation shall be provided in the raw data regarding any outlier that is discarded.

- Analytical judgment shall also be used when determining a linear plot based upon the Y intercept. Documentation shall be provided in the raw data regarding any outlier that is discarded.
- Documentation shall be provided in the SDP Narrative for any results determined from a plot with a Y intercept that is not within  $\pm 0.5$  mg/L of the DO value of the dilution water and seed blank after incubation (final blank DO value).

#### 5.2.11. *Requirements for Ignitability*

##### 5.2.11.1. **Method Selection**

- Finite flash measurements must be performed. (A flash/no flash test is not acceptable.) Flash points determined to be above 110 °C may be reported as > 110 °C.

#### 5.2.12. *Requirements for Corrosivity By Methods 9040 And 9045*

All requirements of SW-846 Methods 9040B and 9045C must be met. It is the responsibility of the laboratory to determine which of the two methods (9040 or 9045) is appropriate for the sample even if the LIC on the COC is different. The RFETS CTR shall be notified if the LIC is not applicable to the sample matrix.

##### 5.2.12.1. **Corrosivity Laboratory Duplicate Agreement**

If the absolute value of the difference between the sample and duplicate sample pH values is greater than 0.10 S.U., the problem must be corrected and the analysis repeated. Duplicate results shall be reported as directed in Appendix C, Form 3 or equivalent.

##### 5.2.12.2. **Corrosivity Laboratory Control Sample Recovery**

- For each analytical batch containing acidic wastes, a pH 2 buffer solution shall be analyzed as a laboratory control sample. If the absolute value of the difference between the measured and true pH buffer values is greater 0.1 S.U., the affected samples must be reanalyzed.
- For each analytical batch containing caustic wastes, a pH 12 buffer solution shall be analyzed as a laboratory control sample. If the absolute value of the difference between the measured and true pH buffer values is greater than 0.1 S.U., the affected samples must be reanalyzed.
- For each analytical batch containing both acidic and caustic wastes, pH 2 and pH 12 buffer solutions shall be analyzed as a laboratory control samples. If the absolute value of the difference between the measured and true pH buffer values is greater than 0.1 S.U. for the pH 2 buffer all affected acidic samples must be reanalyzed. If the absolute value of the difference between the measured and true pH buffer values is greater than 0.1 S.U. for the pH 12 buffer all affected caustic samples must be reanalyzed.
- No data associated with out-of tolerance LCSs shall be reported.

##### 5.2.12.3. **Requirements for samples with pH > 12:**

If the pH of the sample is above 12.0, the following requirement shall be met:

- The sample shall be measured at  $25 \pm 1^\circ\text{C}$ .

#### 5.2.13. *Requirements for Corrosivity Toward Steel*

Results for Corrosivity to Steel shall be reported as directed in Appendix C, Form 5 or equivalent.

5.2.13.1. **Replicate Samples:**

At a minimum, all steps of Method 1110 shall be performed on two coupons for each waste sample submitted.

5.2.13.2. **Balance Requirements:**

All mass measurements must be performed on a four-place balance. Masses must be recorded to at least four decimal places, i.e. 0.0001 g.

5.2.13.3. **Replicate Agreement:**

If the relative percent difference between replicates is greater than 20% and the highest of the two results is greater than 20% of the regulatory level, the test shall be repeated.

5.2.13.4. **Reanalysis Replicate Agreement:**

If, for the second pair of results, the relative percent difference between replicates is also greater than 20%, the highest of all four results shall be reported on Appendix C, Form 1. The narrative shall address both sets of replicate data and include results for all four analyses.

5.2.13.5. **Blank Requirements:**

A blank shall be treated with each analytical batch of samples. Blank subtraction is allowed as required by Method 1110.

5.2.14. **Requirements for Cyanide and Sulfide Methods**

5.2.14.1. **Total and Amenable Cyanide**

Distillation techniques that use less than a one-liter flask are NOT permitted for heterogeneous waste forms.

5.2.14.2. **Spike Sample Requirements for all Cyanide and Sulfide Analyses**

- To prepare an analysis spike, an additional aliquot of the sample is brought through the distillation process. The analytical spike is added immediately after the distillate is transferred from the scrubber.

5.2.14.3. **Distillation Recovery Check for Reactivity**

- A Distillation Recovery Check must be performed for each analyte using the same sample preparation, analytical methods and QA/QC procedures employed for Site samples.
- Documentation and reporting of distillation recovery check solution sources and concentrations shall be provided in the raw data.
- The mean of ten or more previous Distillation Recovery Checks shall be calculated and designated as the *Mean Distillation Recovery*. The standard deviation of these measurements shall also be calculated and designated as the *Distillation Recovery Standard Deviation*. Results used for these statistical calculations shall be the ten (or more) most recent Distillation Recovery Check measurements. Calculations to determine these means and standard deviations must be performed at least quarterly using the most recent ten or more measurements.
- The upper control limit for the Distillation Recovery Check is the *Mean Distillation Recovery* plus three times *Distillation Recovery Standard Deviation*. The lower control limit for the Distillation Recovery Check is the *Mean Distillation Recovery* minus three times the *Distillation Recovery Standard Deviation*.

- If Distillation Recovery Check results are not within the upper and lower control limits, analyses must be terminated, the problem corrected, and samples associated with that Distillation Recovery Check reprepared and reanalyzed.

#### 5.2.15. *Requirements for TCLP (Method 1311)*

##### 5.2.15.1. **General Requirements**

- If the sample provided will not yield sufficient extract for all required analyses to be performed on the aqueous phase, contact the RFETS CTR for instructions.

##### 5.2.15.2. **TCLP Inorganics Requirements**

- If spike recovery is less than 75% for silver and the concentration of silver in the unspiked sample is greater than 0.500 mg/L, silver shall be analyzed in the undigested extract for all associated samples. If non-digested silver results are higher than digested results, it is presumed that the digestion step caused loss of analyte. Report the higher result, on Form 1. Provide additional CLP type Forms 5a, 5b, 6, and 9 for the non-digested analysis. Describe the use of non-digested extracts with the reason in the SDP narrative.
- If it is suspected for other reasons that the digestion step may cause loss of analyte, the sample shall be analyzed with and without digestion. Report non-digested results, on Forms 1, 5a, 5b, 6, and 9 for those analytes that appear to be biased low due to loss during the digestion step. Describe the use of non-digested extracts with the reason in the SDP narrative.

#### 5.2.16. *Requirements for Paint Filter Liquids Test (Method 9095A)*

##### 5.2.16.1. **Sample Descriptions and Sub-samples**

The SDP Narrative or a Paint Filter Liquids Test Summary Form shall include the following:

- Physical descriptions of each sample which includes the types of materials present and their approximate proportions (i.e. % composition).
- How the 100-gram representative sub-sample required for the test was obtained.
- How Size Reduction of the 100-gram representative sub-sample required for the test was accomplished when required to assure uniformity and standardization of the test.

##### 5.2.16.2. **Quality Control**

- Record in the SDP Narrative or Paint Filter Liquids Test Summary Form the temperature at which each test was performed.
- Duplicate samples shall be analyzed with each analytical batch and reported in the SDP Narrative or on the Paint Filter Liquids Test Summary Form.

##### 5.2.16.3. **Test Results**

Report any portion of the test material collected in the 5-min. test period to the nearest 0.01 grams. A minimum result of 0.01 grams shall be reported if any portion of the test material is collected in the 5-min. test period and 0.00 grams shall be reported if NO test material is collected in the 5-min. test period. Thus the material is deemed to contain free liquids for the purposes of 40 CFR 254.314 and 265.314 if a result of 0.01 grams or more is reported.

#### 5.2.17. *Requirements for Determination of Moisture (ASTM D2216)*

##### 5.2.17.1. **Sample Descriptions and Sub-samples**

The SDP Narrative or a Water Content (Moisture) Summary Form shall include the following:

- Physical descriptions of each sample which includes the types of materials present and their approximate proportions (i.e. % composition).
- A note indicating whether the test specimen included the entire sample submitted or a sub-sample. If a sub-sample was used, also note how a representative sample was obtained and if any material (size and amount) was excluded from the sub-sample (test specimen).

#### 5.2.17.2. **Quality Control**

- Duplicate samples shall be analyzed with each analytical batch and reported in the SDP Narrative or on a Water Content (Moisture) Summary Form.

### 5.2.18. **Requirements for Determination of Particle Size (ASTM D422)**

#### 5.2.18.1. **Sample Descriptions and Sub-samples**

The SDP Narrative or a Particle Size Analysis Summary Form shall include the following:

- Physical descriptions of each sample which includes the types of materials present.
- A note indicating whether the test specimen included the entire sample submitted or a sub-sample. If a sub-sample was used, also note how a representative sample was obtained and if any material (size and amount) was excluded from the sub-sample (test specimen).

## 6. RADIOCHEMISTRY (LIC Prefixes: ASP, GAM, GPC, LSC, and KPA)

### 6.1. CLARIFICATIONS

#### 6.1.1. Data Package Components

The data package components identified in BOA Attachment I are not applicable for Radiochemistry deliverables. The following tables identify the deliverable components for a Results Only, Standard, and Standard Plus Raw data package for radiochemistry determinations.

##### 6.1.1.1. Results Only Deliverable

#### RADIOCHEMISTRY RESULTS ONLY DELIVERABLE

Component Name	Description
<b>Cover Page</b> <b>Chain Of Custody</b> <b>Case Narrative</b>	The <b>Cover page</b> , <b>Chain of Custody</b> , and <b>Case Narrative</b> shall be included per the requirements of Attachment I to the BOA SOW.
<b>Sample and QC Results Summary</b> (all sample results shall be arranged by Site sample identification number in increasing alphanumeric order)  Sample Results shall be grouped by analyte	The Sample and QC Summary shall be provided in a tabular format grouped by analytical batch (See <a href="#">Appendix D</a> for suggested format). The summary shall include the information identified below for both the client samples and the analytical batch QC samples. Each QC sample type shall be clearly identified, i.e., LCS, Batch Blank, Duplicate, and/ or Matrix Spike. <ul style="list-style-type: none"> <li>• LABORATORY NAME</li> <li>• REPORT IDENTIFICATION NUMBER (RIN)</li> <li>• RFETS SAMPLE ID</li> <li>• LAB SAMPLE ID</li> <li>• ANALYTE</li> <li>• SAMPLE MATRIX</li> <li>• RESULTS and UNITS</li> <li>• 2S (total propagated uncertainty)</li> <li>• TRACER RECOVERY</li> <li>• MDA</li> <li>• ALIQUOT SIZE ANALYZED</li> <li>• ANALYTICAL BATCH ID</li> </ul>

6.1.1.2. Standard Deliverable

**RADIOCHEMISTRY STANDARD DELIVERABLE**

Component Name	Description
<b>Radiochemistry Results Only Deliverable</b>	All components contained in the Radiochemistry Results Only Deliverable data package shall also be included in the <b>Standard Deliverable</b> .
<b>Batch QC Summary</b>	<p>The Batch QC Summary Sheet shall contain the following information for the LCS, batch blank, duplicates, and matrix spike in a tabulated format (See <a href="#">Appendix D</a> for suggested format).</p> <p>Batch QC Summary Sheet Header shall contain LABORATORY NAME, ANALYTE, RIN, and LAB BATCH ID</p> <p>For each QC Type the following is required:</p> <ul style="list-style-type: none"> <li>• LAB SAMPLE ID</li> <li>• COUNT DATE</li> <li>• QC OBSERVED VALUE with associated two sigma uncertainty</li> <li>• TRACER RECOVERY (as applicable)</li> </ul> <p>For the QC Types identified below, the information is also required:</p> <ul style="list-style-type: none"> <li>• LCS: Know value and relative Bias</li> <li>• BATCH BLANK: RDL and MDA</li> <li>• DUPLICATE: For each duplicate pair, the result of the duplicate equivalency test as defined in <i>BOA Attachment J, Section 2.3.3</i></li> <li>• MATRIX SPIKE (As applicable) Matrix Spike Recovery as defined in <i>BOA Attachment J, Section 2.3.4.4</i></li> <li>• CONTINUING CALIBRATION CHECK STANDARD: (Required for KPA only) Percent Recovery of uranium for each continuing calibration check standard</li> </ul>
<b>Blank Population Summary</b> <i>(If Applicable):</i>	<ul style="list-style-type: none"> <li>• BLANK SAMPLE NUMBER</li> <li>• DATE OF ANALYSIS (for each blank in the population)</li> <li>• DPM OF TRACER USED IN THE BLANK</li> <li>• BLANK RESULT IN CPM (for each blank in the blank population)</li> <li>• TRACER RECOVERY (for each blank in the blank population)</li> <li>• DETECTOR EFFICIENCY (for each blank in the blank population)</li> <li>• BLANK RESULT in dpm (for each blank in the blank population)</li> <li>• STANDARD DEVIATION OF BLANK POPULATION (in dpm)</li> <li>• STANDARD DEVIATION OF BLANK POPULATION (in cpm)</li> <li>• MEAN BLANK VALUE OF THE BLANK POPULATION (in dpm)</li> </ul>

6.1.1.3. Standard Plus Raw Data Deliverable

**RADIOCHEMISTRY STANDARD PLUS RAW DATA DELIVERABLE**

Component Name	Description
<b>Radiochemistry Standard Deliverable</b>	All components contained in the Radiochemistry Standard Deliverable data package shall also be included in the Standard Plus Raw Data Deliverable.
<b>Preparation Raw Data</b>	<p>Sample preparation raw data shall be documented in the form of bench sheets and/or preparation logs containing, at a minimum, the following:</p> <ul style="list-style-type: none"> <li>• ANALYTICAL BATCH IDENTIFIER</li> <li>• DATE OF PREPARATION</li> <li>• IDENTIFIER FOR THE LABORATORY SOP for the preparation</li> <li>• IDENTIFIERS FOR ALL SAMPLE AND QC SAMPLES in the batch</li> <li>• IDENTIFIERS THAT PROVIDE FOR TRACEABILITY of tracer, LCS, matrix spike, etc. dilutions used</li> <li>• CONCENTRATION OF WORKING STANDARDS used for tracer, LCS, matrix spike, etc.</li> <li>• VOLUMES OR WEIGHTS OF ADDED TRACERS, LCS ANALYTE(S), MATRIX SPIKE(S), CARRIERS, etc. (if the concentration is given in activity per unit weight then the weight added shall be reported; if the concentration is given in activity per unit volume, then the volume added shall be reported)</li> <li>• BALANCE IDENTIFIERS WITH DATES OF USE(if applicable)</li> <li>• INITIAL AND FINAL WEIGHTS AND VOLUMES for all samples and QC samples including gross weights, tare weights, and aliquot weights where applicable</li> <li>• PIPETTE IDENTIFIERS AND DATES OF USE (if applicable)</li> <li>• COMMENTS describing any significant sample changes or reactions which occur during preparation</li> <li>• SIGNATURES AND DATES of all analysts and reviewers</li> </ul> <p><b>Additional Preparation Raw Data Is Required for the Following:</b></p> <p><b>Soils, Sediments, Sludges, and Solid Waste</b></p> <ul style="list-style-type: none"> <li>• APPROXIMATE SAMPLE VOLUME RECEIVED, THE ALIQUOT SIZE HOMOGENIZED</li> </ul> <p><b>Tritium</b></p> <ul style="list-style-type: none"> <li>• DISTILLATION DATE, VOLUME OF ALIQUOT DISTILLED, AND VOLUME OF DISTILLATE COLLECTED, SAMPLE VOLUME MEASURED, TYPE OF COCKTAIL(as applicable)</li> </ul> <p><b>Gas Proportional Counting</b></p> <ul style="list-style-type: none"> <li>• SAMPLE ALIQUOT PLATED ON PLANCHET, NET WEIGHT OF RESIDUE ON COUNTING PLANCHET</li> </ul> <p><b>Air Filters</b></p> <ul style="list-style-type: none"> <li>• NUMBER OF AIR FILTERS analyzed in a composite</li> </ul>

## RADIOCHEMISTRY STANDARD PLUS RAW DATA DELIVERABLE

Component Name	Description
<b>Standards Summary Raw Data</b>	<p>This section shall contain information for all standards used for data reported in the RIN. This shall include but is not limited to the tracer, analyte(s) in the LCS, matrix spikes, and the Instrument Calibration Standards used for efficiency and/or check sources.</p> <ul style="list-style-type: none"> <li>• STANDARD ID. (Working Standard) that was used traced back to the <i>PRIMARY STANDARD ID</i>. (All identifiers must be traceable to standard reference material certificates. Submit only the first page of the NIST certificate to establish primary standard ID. and/or traceability.</li> <li>• STANDARD ISOTOPE, CONCENTRATION, AND ERROR IN THE WORKING STANDARD USED</li> <li>• EXPIRATION DATE of Working Standard</li> <li>• USE for this standard (tracer, LCS, efficiency, etc.)</li> <li>• DATE OF PREPARATION</li> <li>• SUFFICIENT DILUTION data to provide for calculation of the activity</li> </ul>
<b>Calibration Raw Data</b>	<p>All associated raw data used to calibrate the instrument and for check sources for the period in which the samples were counted</p> <ul style="list-style-type: none"> <li>• IDENTIFIER FOR THE INSTRUMENT CALIBRATION SOP</li> <li>• IDENTIFICATION OF SOFTWARE used to produce Instrument Calibration</li> <li>• DATA FILE NAME for this Calibration</li> <li>• ENERGY CALIBRATION DATA <ul style="list-style-type: none"> <li><b>Alpha Spec and Gamma Spec:</b> Energy Calibration date and isotopes used, calibration equation</li> <li><b>Liquid Scintillation Counting and KPA:</b> Not Applicable</li> <li><b>Gas Proportional Counting:</b> Date of voltage plateau and discriminator window settings and isotopes used</li> </ul> </li> <li>• BACKGROUND DETERMINATION <ul style="list-style-type: none"> <li>➤ Date of Background</li> <li>➤ Length of background count</li> <li>➤ Background Counts</li> <li>➤ List ROI for each isotope of interest with counts in ROI (For Alpha Spec and Gamma Spec)</li> </ul> </li> <li>• EFFICIENCY DETERMINATION <ul style="list-style-type: none"> <li><b>Alpha Spec:</b> Date of Efficiency Curve, isotopes used and efficiency</li> <li><b>Gamma Spec:</b> Date of Efficiency, isotopes used, and efficiency equation</li> <li><b>Liquid Scintillation Counting:</b> Date of quench curve or date of Efficiency calibration for constant quench, equation relating efficiency to Quench parameters. Include the daily measurements with appropriate control charts for Instrument Performance Assessment taken on count date of samples in this package.</li> <li><b>Gas Proportional Counting:</b> Date of efficiency/self-absorption Curve(s) and isotopes used and graph or equation of self-absorption curve</li> </ul> </li> </ul>

## RADIOCHEMISTRY STANDARD PLUS RAW DATA DELIVERABLE

Component Name	Description
<b>Calibration Raw Data</b> (continued)	<p><b>KPA:</b> Date of reference cell solution preparation, date of calibration curve, calibration curve(graph clearly labeled), calibration equation with associated R2, calibration check standard recovery for each calibration check standard, starting background.</p> <ul style="list-style-type: none"> <li>• <b>DAILY CHECK SOURCE &amp; BACKGROUND COUNTS</b> Instrument outputs must clearly identify the instrumentation used, file name of data collected, and date of calibration checks performed. In addition, the following is required:                             <ul style="list-style-type: none"> <li><b>Gamma Spec</b> <ul style="list-style-type: none"> <li>◇ Output of daily energy calibration check with acceptance criteria or complete calibration if recalibration was necessary.</li> <li>◇ Output of daily efficiency check source with control charts showing 2 sigma and 3 sigma limits.</li> <li>◇ FWHM values of efficiency peaks &amp; associated control chart</li> </ul> </li> <li><b>Gas Proportional Counting</b> <ul style="list-style-type: none"> <li>◇ Output of daily background check and output of daily check source count for each detector used to generate data in the package.</li> <li>◇ Current control charts for background and daily check source showing 2 &amp; 3 sigma limits.</li> </ul> </li> <li><b>Liquid Scintillation Counting</b> <ul style="list-style-type: none"> <li>◇ Output of daily instrument performance assessment to include background, carbon-14 check source result, &amp; tritium result.</li> <li>◇ Current control charts for the above showing 2 &amp; 3 sigma limits.</li> </ul> </li> </ul> </li> <li>• LIST OF DETECTOR IDS calibrated on the above dates and with the above characterization. Do not report detectors that did not meet calibration limits of acceptability with regard to energy, background or efficiency.</li> </ul>
<b>Sample Analysis Raw Data</b>	<p>This section shall contain information for all raw data associated with the generation of sample results. This includes data for analyses performed but not used for reporting. It also includes raw data for matrix spike, duplicate, blanks, LCS and every sample in the batch. It shall include but is not limited to the following Information:</p> <ul style="list-style-type: none"> <li>• SAMPLE ID (Site / Laboratory)</li> <li>• DATE AND TIME of analysis</li> <li>• COUNT TIME</li> <li>• DATA FILE NAME</li> <li>• INSTRUMENT AND DETECTOR ID</li> <li>• FILE NAME OF BACKGROUND USED</li> <li>• APPROPRIATE DETECTOR BACKGROUND</li> <li>• DETECTOR EFFICIENCY FOR THIS SAMPLE</li> <li>• ANALYTICAL BATCH ID</li> <li>• SAMPLE ALIQUOT SIZE</li> <li>• ANALYTE ISOTOPE(S)</li> </ul>

## RADIOCHEMISTRY STANDARD PLUS RAW DATA DELIVERABLE

Component Name	Description
<p><b>Sample Analysis Raw Data</b> (continued)</p>	<ul style="list-style-type: none"> <li>• START AND END CHANNELS FOR ALL APPLICABLE ROIS</li> <li>• ANALYTE(S) GROSS COUNTS</li> <li>• BACKGROUND COUNTS (IDENTIFY COUNT TIME OF BACKGROUND)</li> <li>• ANALYTE(S) NET COUNTS</li> <li>• FWHM AND PEAK ENERGY where applicable</li> <li>• INSTRUMENT RUN LOG for applicable count dates(copy is acceptable)</li> </ul> <p><b>Additional Sample Analysis Raw Data Is Required for the Following:</b></p> <p><b>Determinations Using Tracer Isotopes</b></p> <ul style="list-style-type: none"> <li>• TRACER ISOTOPE(S)</li> <li>• START AND END CHANNELS FOR ALL APPLICABLE ROIS</li> <li>• TRACER GROSS COUNTS</li> <li>• BACKGROUND COUNTS (IDENTIFY COUNT TIME OF BACKGROUND)</li> <li>• TRACER NET COUNTS</li> <li>• FWHM AND PEAK ENERGY where applicable</li> </ul> <p><b>Determinations Using Carrier</b></p> <ul style="list-style-type: none"> <li>• CARRIER ELEMENT AND CHEMICAL FORM</li> <li>• CARRIER ADDED</li> <li>• CARRIER RECOVERY</li> </ul> <p><b>Alpha Spec</b></p> <ul style="list-style-type: none"> <li>• CHANNEL BY CHANNEL SPECTRAL PRINT-OUT that includes each ROI (including tracer) and an equivalent number of channels above and below the ROI</li> </ul> <p><b>Liquid Scintillation Counting</b></p> <ul style="list-style-type: none"> <li>• QUENCH INDICATING PARAMETER (QIP) identified as tSIE, H #, etc. and its value</li> <li>• COMPLETE PROTOCOL DEFINITION</li> <li>• TABLE WHICH CROSS REFERENCES SAMPLE ID TO COUNTING POSITION shall be included if the raw data is identified only by counting position number</li> </ul> <p><b>Gross Alpha/Beta</b></p> <ul style="list-style-type: none"> <li>• CALIBRATION ISOTOPES</li> </ul> <p><b>KPA Determinations</b></p> <ul style="list-style-type: none"> <li>• NUMBER OF LASER PULSES USED (sample and sample plus spike)</li> <li>• REFERENCE RATIO (sample and sample plus spike)</li> <li>• INTENSITY(sample and sample plus spike)</li> <li>• R2 (sample and sample plus spike)</li> <li>• <math>\mu</math> U added for sample plus spike measurement</li> </ul>

6.1.2. **Total Propagated Uncertainty Reporting Requirements**

The total propagated uncertainty as described in BOA Statement of Work, Attachment J, “General Radioanalytical Requirements,” Section 2.5.3, shall be reported at the two sigma confidence level.

6.1.2.1. **Relative Error Ratio(RER)**

The RER formula for the evaluation of duplicates shall use total propagated uncertainty at the one sigma confidence level as stated in BOA Statement of Work, Attachment J, “General Radioanalytical Requirements,” Section 2.3.3.3.

6.1.3. **Clarification of ASP-A-010 and ASP-A-011**

RFETS requires the following analyte list and Con ID’s for ASP-A-010 and ASP-A-011.

LIC	Title	Method	Matrix	Analyte(s)	Con ID	RDL	Units
ASP-A-010	Curium	Alpha Spec	Aqueous	<sup>243/244</sup> Cm	13981-15-2	1	pCi/L
				<sup>242</sup> Cm	15510-73-3	1	pCi/L
				<sup>245/246</sup> Cm	15757-90-1	1	pCi/L
ASP-A-010	Curium	Alpha Spec	Solid	<sup>243/244</sup> Cm	13981-15-2	1	pCi/g
				<sup>242</sup> Cm	15510-73-3	1	pCi/g
				<sup>245/246</sup> Cm	15757-90-1	1	pCi/g

6.2. **REQUIREMENTS**

6.2.1. **Decay Correction Requirements**

All reported sample results shall be decay corrected to the sample collection date and time.

6.2.2. **Data Package Reporting Forms**

The subcontractor shall use the Radiochemistry forms contained in GR03 [Appendix D](#) for reporting sample and QC results and for summarizing batch QC data. [The page orientation of these forms may be in either portrait or landscape.](#) These forms shall be used in all applicable Radiochemistry data package deliverables. The subcontractor shall obtain written approval from the CTR prior to implementing any modifications to the content or format of these forms.

6.2.3. **General Preparation Requirements for Solid Samples**

6.2.3.1. **Soils, Sludges and Sediments**

The following preparation steps are required for soils, sludges and sediments:

- if there is sufficient sample, the initial aliquot to be dried and homogenized shall be at least 10% of the entire sample by volume (up to approximately 100 grams), and a minimum of 30 grams
- if there are less than 30 grams in the sample container, the entire contents of the container shall be dried and homogenized
- the dried aliquot shall be mechanically reduced in particle size to a fine powder.

6.2.4. *Isotopic Determinations by Alpha Spec*

6.2.4.1. **RFETS Specific Alpha Spectrometry Line Item Codes**

The Rocky Flats Environmental Technology Site requires the following Site Specific LICs for Surface Water Samples.

**Site Specific LICs for Surface Water Samples**

LIC	Title	Method	Matrix	Analyte(s)	Con ID	RDL	Units
RAS-A-001	Americium, Plutonium, Uranium	Alpha Spec	Water (Blank Corrected)	<sup>241</sup> Am	14596-10-2	0.03	pCi/L
				<sup>239, 240</sup> Pu	10-12-8	0.03	pCi/L
				<sup>233, 234</sup> U	11-08-5	1	pCi/L
				<sup>235</sup> U	15117-96-1	1	pCi/L
				<sup>238</sup> U	7440-61-1	1	pCi/L
RAS-A-002	Americium	Alpha Spec	Water (Blank Corrected)	<sup>241</sup> Am	14596-10-2	0.03	pCi/L
RAS-A -003	Plutonium	Alpha Spec	Water (Blank Corrected)	<sup>239, 240</sup> Pu	10-12-8	0.03	pCi/L
RAS-A-004	Uranium	Alpha Spec	Water (Blank Corrected)	<sup>233, 234</sup> U	11-08-5	1	pCi/L
				<sup>235</sup> U	15117-96-1	1	pCi/L
				<sup>238</sup> U	7440-61-1	1	pCi/L

6.2.4.2. **General Preparation Requirements**

Samples may contain considerable interferences that will preclude obtaining good tracer recoveries, especially for americium without some removal of matrix interferences prior to column separation. When tracer recoveries do not meet the minimum requirement the laboratory shall make provision for removal of interferences prior to column separation.

6.2.4.3. **Preparation Requirements for Solid Samples**

- Following ashing, total digestion/dissolution is required for soils, sediments, sludges, waste, filter socks, and filters, unless specified otherwise by the Site.
- Benchsheets shall document sample weights used to calculate sample wet/dry ratio.

6.2.4.4. **Preparation Requirements Specific to Air Filters (LIC ASP-\*-006)**

- For air filter samples, retain 50% of the digestate for backup analysis in case a reanalysis is required.
- The laboratory shall prepare and analyze two Laboratory Control Samples (LCS) in lieu of a duplicate sample.

6.2.4.5. **Preparation Requirements Specific to Surface Water Samples (LICs RAS-\*-001, RAS-\*-002, RAS-\*-003, RAS-\*-004)**

- Results for surface water samples containing both water and solids shall be for the total sample: i.e. water and any suspended solids.

\* Denotes current Line Item Code revision letter

6.2.4.6. **Preparation Blank Corrections and MDA Calculations for Air Filters (LIC ASP- \*-006) & Surface Water Samples (LICs RAS- \*-001, RAS- \*-002, RAS- \*-003, RAS- \*-004)**

Blank populations shall be implemented following the requirements described in Attachment J, Section 2.6.3 of this BOA and also here for blank correction of results and calculation of MDA for surface water, effluent air filter and ambient air filter samples. **Blank correction for composited filter samples must take into consideration the actual number of filters in the composite.**

- Required Matrices (both batch blanks and laboratory control samples)
  - a) **Surface Water:** ASTM Type II water; same volume as samples
  - b) **Effluent Air Filters:** Site furnished effluent air filters; each blank and LCS shall consist of 10 individual filters composited into one sample.
  - c) **Ambient Air Filters:** Site furnished 8 x 10 fiber glass filters(one per batch blank and one per LCS) and oil impregnated impactor pads(one per batch blank and one per LCS)
- Blank Population Maintenance Instructions:
  - a) A matrix specific blank population shall be established for each of the following isotopes for each matrix (surface water, effluent air filters, ambient fiberglass filters and ambient impactor pads): Pu-239/240, Am-241, U-234, U-235, and U-238.
  - b) Matrix specific blank populations shall consist of the 20 most recent batch blanks with the oldest blank being deleted when the latest blank is added.
  - c) Either a beginning or a new blank population shall be selected from the best 20 of 24(two batches of 12) consecutively analyzed blanks. Random selection of blanks for beginning or new blank populations is not acceptable.
  - d) Only failed blanks may be removed from the blank population. Failed blanks are those for which the tracer recovery does not fall in the range 30% - 110% in addition to the acceptance criteria for batch blanks given in Attachment J, Section 2.3.1.4. Removal of any blanks from the blank population shall be described with the reason for the removal in the Case Narrative of the Data Package.
  - e) All blanks in the blank population shall be counted for the same count time as the samples for which the MDA is being determined.
- Batch Blank Acceptance Criteria for Isotopic Uranium for Effluent and Ambient Air Filters:

For effluent and ambient air filters that contain uranium in the blank filter matrix, the following criterion shall be used for acceptance of the activity of the batch blank: The activity of the batch blank shall be less than the mean blank value of the blank population plus twice the associated standard deviation.
- Calculations
  - a) **Blank Correction:** The mean blank value of the 20 latest batch blanks(current blank population) which shall include the batch blank from the data being processed shall be subtracted from each result.
  - b) **Implementation of MDA:** Reference: Curie's equations for MDA as described in ANSI N 13.30, page 27, Section 4.3.1.2 Calculation of Minimum Detectable Amount (MDA) or ... (MDC) for Indirect Radiobioassay:  
$$S_{b_0} = \text{the standard deviation of a matrix blank population}$$
  
$$S_{b_1} = \text{the standard deviation of a sample where the sample contains no actual analyte activity above the matrix blank}$$

$S_{b1} = [S_{b0}(cpm)]/(E \cdot R)$  for this specific implementation where E is the detector efficiency for the sample for which the MDA is being calculated and R is the tracer recovery for the sample for which the MDA is being calculated.

The complete formula is as follows:

$$MDA = \frac{1}{VF} \times \left[ 3.29 \sqrt{\left\{ \frac{S_b(cpm)}{ER} \right\}^2 + S_b(dpm)^2} + \frac{3}{ERT} \right]$$

where

VF = volume fraction (i.e. =0.5 for ½ aliquot of the sample, etc.)  
For Surface Waters VF is simply the volume analyzed in liters

$S_b(cpm)$  = standard deviation of the matrix blank population in counts per minute

E = detector counting efficiency where the sample for which the MDA is calculated was counted

R = tracer recovery of the sample for which the MDA is being calculated

$S_b(dpm)$  = standard deviation of blank population in disintegrations per minute

T = count time

### Units

The above equation (using the true volume fraction analyzed and not liters) gives results in units of dpm/sample – the correct units for air filters.

For MDA for surface water in units of pCi/l: as described previously, VF is the volume analyzed in liters. The resulting dpm/l is divided by 2.22 to obtain units of pCi/l.

## 6.2.5. *Liquid Scintillation Counting*

### 6.2.5.1. **Storage of Distillates**

All tritium distillates shall be stored in glass bottles.

### 6.2.5.2. **Waste Samples**

Every attempt will be made by the Site to specify in the Special Instructions on the COC when samples for tritium distillation contain known constituents that may react violently with the reagents (sodium hydroxide and potassium permanganate) added prior to distillation. Such samples shall be pretreated in a manner so as to render them safe to analyze using routine procedures. Pre-distillation (distillation without any added reagents, followed by distillation using routine procedures) has been successfully used; however, other methods may also be identified.

The laboratory shall, by physical observation for any possible organic phases, carefully assess the safety of the classical tritium distillation and contact the Site if there is any indication that the sample may not be safe to distill.

**6.2.5.3. Soil Matrix Preparation**

Due to the variable amount of water which may be collected from soil samples, the constant quench method of calibration may not be appropriate. If insufficient water is obtained to meet minimum cocktail loading requirements, the Site shall be notified immediately and the Case Narrative shall include an explanation as to why the sample could not be analyzed.

**6.2.6. Gas Proportional Counting**

**6.2.6.1. Calibration Requirements**

The gas proportional counters shall be calibrated, at a minimum, every two years.

**6.2.6.2. Preparation Requirements For Soils, Biota, Sediments, Sludges, Waste, And Filter Socks**

Total digestion/dissolution is required for soils, biota, sediments, sludges, waste, and filter socks unless specified otherwise prior to sample receipt or in documentation accompanying the samples.

**6.2.6.3. Surficially Contaminated Solid Waste (LIC GPC-\*-006)**

Due to the origin of some waste materials, some types of solid waste would be expected to be only surficially contaminated. In this case, three successive hot nitric acid leaches of the material is the appropriate preparation technique.

**6.2.6.4. Preparation Requirements for Aqueous Samples containing Sediment**

This section is applicable to aqueous samples that contain, by visual approximation, greater than 10% sediment, soil or other solid material.

- The aliquot shall be digested with nitric acid or a nitric/hydrochloric acid mixture until the sediment is dissolved or nearly dissolved. Total dissolution is not required; however, any undissolved material should be left in the digestate. If the solids concentration in the digestion solution is too high to transfer all of the digested sample to the counting planchet, the solution must be brought to a standard volume before aliquoting onto the counting planchet. The digestate shall be thoroughly mixed before aliquoting in order to suspend any undissolved material.

**6.2.6.5. LCS Isotopes for Gas Proportional Counting**

The isotopes used for the LCS for gross alpha/gross beta analysis shall be documented in the Case Narrative. The isotopes for the LCS shall be <sup>241</sup>Am for gross alpha and <sup>90</sup>Sr/<sup>90</sup>Y or <sup>137</sup>Cs for gross beta analyses.

**6.2.6.6. GPC Isotope Clarifications**

The following isotopes had the incorrect CAS No in Attachment K of the BOA.

- Plutonium-241 should be 14119-32-5 (GPC-A-016, GPC-A-017)
- Radium-226 should be 13982-63-3 (GPC-A-018, GPC-A-019)
- Lead-210 should be 14255-04-0 (GPC-A-022, GPC-A-023)

6.2.7. **General Gamma Spectrometry**

6.2.7.1. **RFETS Specific Gamma Spectrometry LIC for Single Analyte**

LIC	Title	Method	Matrix	Analyte(s)	Con ID	RDL	Units
RGA-A-001	Cesium-137	Gamma Spec	Aqueous	<sup>137</sup> Cs	10045-97-3	10	pCi/L

6.2.7.2. **RFETS Specific Gamma Spectrometry LICs for Analyte Suites**

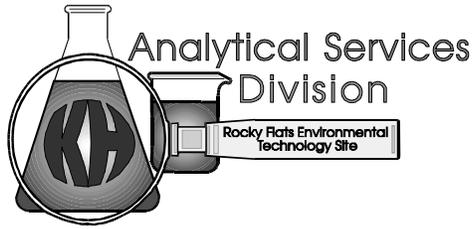
Title: Isotopic Specific (19 Analytes)

Line Item Code:		RGA-A-002	RGA-A-003	RGA-A-004	RGA-A-005	RGA-A-006
Matrix:		Aqueous	Liquid Waste	Soil	Solid	Paint Chips
Method:		Gamma Spec	Gamma Spec	Gamma Spec	Gamma Spec	Gamma Spec
Analyte(s)	Con ID	RDL (pCi/L)	RDL (pCi/L)	RDL (pCi/g)	RDL (pCi/g)	RDL (pCi/g)
<sup>241</sup> Am	14596-10-2	100	125	0.1	25	5
<sup>235</sup> U	15117-96-1	100	125	0.1	25	5
<sup>238</sup> U	7440-61-1	Analyte Not Required	Analyte Not Required	1	100	35
<sup>234m</sup> Pa	RF_15100-28-4					
<sup>228</sup> Ac	14331-83-0					
<sup>125</sup> Sb	14234-35-6					
<sup>144</sup> Ce	14762-78-8					
<sup>134</sup> Cs	13967-70-9	10	20	0.15	0.15	1
<sup>137</sup> Cs	10045-97-3	10	20	0.15	0.15	1
<sup>60</sup> Co	10198-40-0					
<sup>152</sup> Eu	14683-23-9					
<sup>154</sup> Eu	15585-10-1					
<sup>155</sup> Eu	14391-16-3					
<sup>212</sup> Pb	15092-94-1					
<sup>40</sup> K	13966-00-2					
<sup>144</sup> Pm	14834-73-2					
<sup>146</sup> Pm	14834-74-3					
<sup>106</sup> Ru	13967-48-1					
<sup>230</sup> Th	14269-63-7					
<sup>234</sup> Th	15065-10-8					
<sup>88</sup> Y	13982-36-0					

6.2.7.3. **LCS Matrix Specifications**

The following table identifies the LCS matrix specifications for the indicated sample types:

<b>Sample Type</b>	<b>LCS Matrix Specifications</b>
Water	Distilled or deionized water acidified to pH $\leq 2$ , radon free and spiked with the appropriate NIST traceable isotopes.
Soil	Soil LCS.
Filters	Filter media supplied by the Site and spiked with the appropriate NIST traceable isotopes
Miscellaneous Solids	An aqueous LCS as described above for water may be used. Geometry in this case will imply the same sample weight as the samples in the batch and the same type of counting container. Requires documentation in Case Narrative. For any samples in this category which require a different LCS, the appropriate documentation will be provided prior to shipment of samples.



# **APPENDIX A**

## **ELECTRONIC DATA DELIVERABLES**

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## 1. INTRODUCTION

The purpose of the Electronic Data Deliverable (EDD) module is to define a data format that enables efficient return of quality analytical data in support of the Rocky Flats Environmental Technology Site (Site) closure mission.

This requirements specification re-iterates the format to be used to generate an electronic data deliverable from laboratories that perform analyses on samples taken by the Site. The goal of the requirements is to receive quality electronic data for various Site program databases. For questions regarding the electronic data deliverable or other subcontract specifications, contact your Kaiser-Hill Co., L.L.C., Analytical Services Division Contract Technical Representative (CTR).

This document derives from the EDD specification that has been in use at RFETS since 1997 and will continue for an indefinite period [until Site Closure](#). This document stands as an attachment to the Rocky Flats site specific implementation requirements for analyses performed under the Basic Ordering Agreement (BOA) administered by Westinghouse Savannah River Company on behalf of the Department of Energy.

## 2. GENERAL DESCRIPTION OF THE ELECTRONIC DATA DELIVERABLE (EDD)

The general record structure consists of a header record followed by analytical data records related by the Line Item Code (LIC) in the header, which identifies a specific analysis. This grouping of one header record and multiple related detail records is referred to as a data group or packet. All analytical data records that follow a header record will be associated with that header record. Detailed formats for the Radiochemistry and General Chemistry analytical module formats are provided in Section 4.0 of this document. General Chemistry is defined to include Organic, Inorganic, Wet Chemistry and Miscellaneous Chemistry parameters.

All fields in the EDD are required to be filled, unless otherwise specified. For example, Qualifier fields may be blank-filled if certain conditions exist. Or a field may not be designated as relevant for certain data conditions. Refer to the field definitions in Section 4.0 for specific examples.

All EDDs are to be submitted electronically via e-mail. See Attachment A, "EDD Delivery Process," of this document for instructions.

### 2.1. CHARACTER FIELDS

All character fields, unless otherwise specified, shall be **UPPER CASE** standard printing ASCII characters. Any exceptions to case sensitivity will be explicitly listed in the specific module. All character fields must be left-justified and padded to the right with blanks. Additionally, all fields within the records will be padded to the right with blanks to the end of the field. Fields are delimited within the EDD by fixed column specifications. If data does not start at the correct column position in the record, data errors will occur and the EDD will be rejected.

### 2.2. END-OF-LINE SPECIFICATION

The end of every data line will contain a carriage return/line feed combination (CR/LF) to signify the end of that line of text compatible with the MS-DOS convention. (Unix systems do not follow the DOS convention; the provider must ensure that any submitted EDDs meet the DOS convention.) Any additional data placed after the last specified field on any line is not according to specification and may cause data errors.

### 2.3. NUMERIC FIELDS

Numeric fields are unrestricted decimal numbers that may be represented in scientific notation. The format for scientific notation is as follows:

signed\_decimal\_mantissa[e|E][+|-]integer\_exponent

**with no spaces within the number itself.** A negative sign (-) or a plus sign may precede the integer\_exponent as indicated by [+|-] in the notation; the plus sign (+) is optional. There is no requirement concerning the location of the decimal point or left or right justification of the number in the field.

Negative numbers are allowed where appropriate (in general chemistry, negative numbers are only allowed in QC samples). Negative numbers will have the minus sign immediately preceding the number itself. Plus signs are not allowed in positive numbers with the exception of the exponent in scientific notation format.

All numerical fields are required to be delivered in consistent formatting. For example, a LIC may not be submitted containing both a standard numeric format and scientific notation. Additionally, all EDDs submitted within the same LIC must contain consistent numerical formatting over time.

### 2.4. REPORTING QUALITY CONTROL DATA

This EDD module provides a means of reporting QC data. Lab QC samples (for example, blanks, matrix spikes, etc.) are to be reported electronically using this version.

#### 2.4.1. *QC Derived From Site Samples*

Matrix spikes and laboratory duplicates derived from Site samples are to be reported with the sample identifier in the Sample Number field as if they were normal Site samples with their specific Result Identifier fields reported as LDn, MSn or MDn, where LD, MS, and MD are Laboratory Duplicate, Matrix Spike, and Matrix Spike Duplicate respectively, and the “n” designator identifies the nth analysis attempt performed on the respective QC. For radiological analyses using Site samples as duplicates, report the Relative Error Ratio (RER) field on the LD1 result.

#### 2.4.2. *QC Derived From Non-Site Samples*

For matrix spikes and laboratory duplicates derived from non-Site samples, report the Laboratory Sample Number in the both the Sample Number field and the Laboratory Sample Number fields with the appropriate Result Identifiers of LDn, MSn or MDn, where LD, MS, and MD are Laboratory Duplicate, Matrix Spike, and Matrix Spike Duplicate respectively, and the “n” designator identifies the nth analysis attempt performed on the respective QC. Laboratory duplicates using non-site samples must report the initial sample result as LD1 and the duplicate sample reported as LD2. Reanalyses should use sequentially higher numbered pairs. For radiological analyses where non-site samples are used as duplicates, report the RER field with the LD2 or second result. Paired results are not required for MS or MD QC samples when non-Site samples are involved.

Refer to Attachment C, “**Result Identifiers,**” of this document for acceptable QC item result identifiers.

## 2.5. REPORTING RESULTS FOR UNDETECTED ANALYTES

An analyte is said to be “Undetected by a method” if either no result could be computed or the computed result is less than a method-specific detection limit. This method-specific detection limit is often called the Method Detection Limit (MDL) for organic analyses or the Instrument Detection Limit (IDL) for Inorganics. A Radiochemistry Limit is often called the Minimum Detectable Activity (MDA). This definition is the basis for the following rules:

### 2.5.1. *Organics*

- All analytical results below the MDL are reported with a U qualifier. Results with concentrations greater than the MDL but less than the Required Detection Limit (RDL) as stated in this document are to be reported with a J qualifier.
- Refer to Section 4.2.1 and Attachment E, “Result Qualifiers,” of this document for additional acceptable result qualifiers and definitions.

### 2.5.2. *Inorganics*

- **Metals:** All analytical results below the IDL are reported with a U qualifier. Results with concentrations greater than the IDL but less than the RDL are to be reported with a B qualifier.
- **Nonmetals:** All analytical results below the MDL are reported with a U qualifier. Results with concentrations greater than the MDL but less than the RDL are to be reported with a B qualifier.
- **Result Qualifiers:** Refer to Section 4.2.1 and Attachment E, “Result Qualifiers,” of this document for additional acceptable result qualifiers and definitions.

### 2.5.3. *Radiochemistry*

- For all detected analytes, report the result value with no U result qualifier assigned.
- For all undetected analytes for which a result was computed, report the result value as the result with the appropriate qualifier as allowed for in Attachment E, “Result Qualifiers,” of this document. This differs from the rules for Organics and Inorganics in that the actual result is still reported even though the analyte was undetected.

## 2.6. FIELD DEFINITIONS

Field definitions are contained in the format description in Section 4.

## 2.7. DATA PROTECTION AND PRIVACY CONSIDERATION

The information provided to the laboratory and the data results returned are covered under the privacy act of 1974 and shall be protect from unauthorized access with applicable federal law. 10 CFR 1008 Privacy Act and (Public Law 93-579).

## 2.8. FILE NAMING

File names should be constructed to be unique and easily cross-referenced by the laboratory with the Report Identification Number. File names cannot have embedded spaces in the name and should not be longer than 24 characters in the root portion of the name. Only underscores as special character will be allowed, otherwise alpha numeric with no dashes, parentheses, etc. will be used.

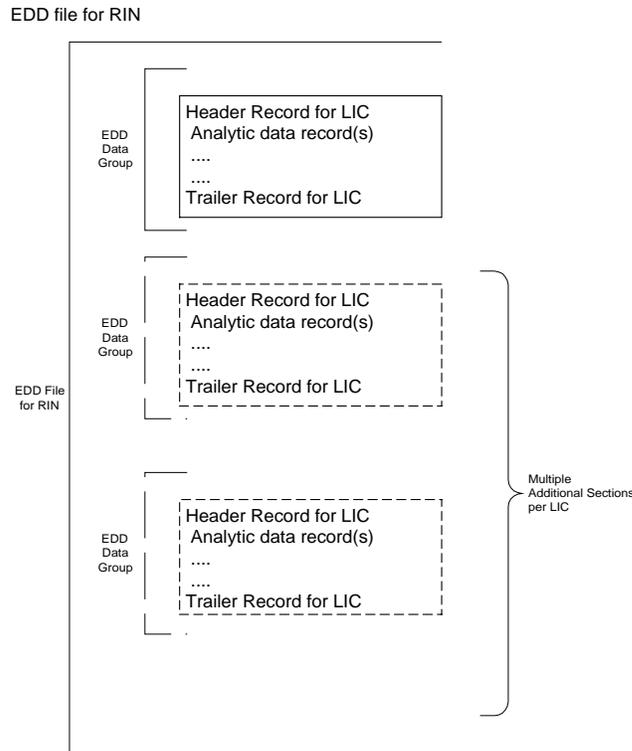
Files sent via e-mail may be zipped for compression provided they are packaged as a self-extracting executable. Some mail servers wrap attached files in unexpected places. Zipping the file may be a remedy for such a problem.

### 3. GUIDELINES FOR EDD FILE CREATION

Creation of the EDD must follow the format specifications outlined in section 4.0 of this document. Failure to follow specifications will be cause for data rejection and require resubmittal. EDDs are processed by the Site through various levels of automatic data checking. A basic EDD checker program will be provided to all participating laboratories. The lab’s process must include submitting files only if they have passed successfully through the checker. Any files that fail to pass the checker on receipt at the Site will be immediately rejected, which will impact the lab’s turnaround performance. If there are problems with the checker program, contact the Analytical Services Division’s CTR.

EDDs are used to expedite loading data into Site databases and to avoid re-transcription from the data report package. Accordingly, all data reported **in the EDD must match the “hardcopy” of the data report**. All environmental sample data submitted with the hardcopy must be included in the EDD. This includes dilutions, re-analysis or re-extraction of samples.

An EDD file will not contain data for more than a single RIN. However, a RIN may be comprised of multiple report package modules corresponding to the various Line Item Codes (LICs) requested for analysis. Within the data file for a RIN, multiple data groups for LICs may be present provided they are delineated by the appropriate Header and Trailer records. The Header record is essential for associating the RIN and LIC as well as the Lab Identifier with the analysis records. LICs cannot be combined within



an EDD data group. The following diagram illustrates the LIC group data relationship within an EDD file.

While it is preferred that all the data for a RIN be presented within a single file, if necessary, multiple files for a RIN can be submitted provided the integrity of the LIC data group is maintained. Partial deliverable of a LIC is not acceptable, i.e., all the data for the LIC must be delivered in a single data group.

## 4. EDD FORMATS FOR RAD AND NON-RAD ANALYTICAL DATA

Radiochemistry (RAD) and Non-Radiochemistry (Non-RAD) EDDs follow the general structure of a header record, analysis records and a closing trailer record. The order, specific content and field sizes may vary between the two types.

### 4.1. RADIOCHEMISTRY EDD FORMAT FORM

<b>Header Line Format</b> RAD Data			
<b>Column(s)</b>	<b>Field Name</b>	<b>Field Type</b>	<b>Format/Contents</b>
1-10	RIN Number	Character (10)	Report Identification Number assigned by the Site (found on the Site COC).
11-20	File Date	Character (10)	(MM/DD/YYYY) Date of EDD creation.
21-30	Line Item Code	Character (10)	Line Item Code as requested on Site COC.
31-40	Laboratory ID	Character (10)	Laboratory ID as provided by the Site.
<b>Note: All character fields are left-justified and padded to the right with blanks.</b>			

<b>Analytical Data Line Format</b> RAD Data			
<b>Column(s)</b>	<b>Field Name</b>	<b>Field Type</b>	<b>Format/Contents</b>
1-15	Analytical Batch ID	Character (15)	Unique number internal to laboratory performing analysis that links all the related QC and analytical data. (See definition of Analytical Batch in Attachment G, Basic Ordering Agreement.)
16-35	Sample Number	Character (20)	Sample Number i.e. Bottle Number assigned by the site as stated on the Site COC
36-55	Laboratory Sample Number	Character (20)	Laboratory Sample Number (assigned by the laboratory)
56-65	Sample Receipt Date	Character (10)	(MM/DD/YYYY) Date Lab received sample
66-75	Sample Volume Received	Character (10)	Required for Line Item Code LSC-*-003 (Tritium Bubbler). Reporting units are (ml).
76-85	Date Analyzed	Character (10)	(MM/DD/YYYY) Date analysis performed
86-90	Result Identifier	Character (5)	Code that differentiates between analytical results, duplicates, spikes, and QC items. See Attachment C of Appendix A for acceptable values.

<b>Analytical Data Line Format</b> RAD Data			
<b>Column(s)</b>	<b>Field Name</b>	<b>Field Type</b>	<b>Format/Contents</b>
91-106	CAS Number	Character (16)	Formal CAS number for the analyte. Site specified constituent ids ( <b>Con ID</b> ) shall be used when formal numbers are not available. Contact the CTR if CAS number is unknown. Must match the Site's identifier for target analytes.
107-136	Isotope	Character (30)	Descriptive name of the analyte. Refer to the analyte name in the Line Item Code table.
137-146	Result (measured value)	Character (10)	Analytical Result associated with the analysis of this analyte.
147-156	Result Units	Character (10)	<b>“Result Units” shall be in the same units given for the analyte RDL. LCS yield shall be reported as %REC for the LCS yield result.</b>
157-161	Result Qualifier	Character (5)	See GR03 Attachment E - Result Qualifiers, for acceptable values.
162-171	Total Propagated Error at 2 sigma	Character (10)	The square root of the sum of the squares of the 2-sigma error terms from all stages of the measurement processes involved.
172-181	Percent Tracer Recovery	Character (10)	Percentage of sample recovery for the added tracer or carrier, as applicable. (Required for all samples containing a tracer recovery)
182-191	MDA	Character (10)	Minimum Detectable Amount (required for all samples)
192-201	RER*	Character (10)	Equivalency test at <u>1 sigma</u> . (required on duplicate sample)
202-204	Field Not Used	Character (3)	<b>The contents of this three character field will be ignored for data generated under the Requirements of GR03.</b>
205-214	LCS Relative Bias	Character (10)	<b>As required per BOA Attachment J, Section 2.3.2.5.</b>
<b>Note: All character fields are left-justified and padded to the right with blanks.</b>			

\* Relative Error Ratio (RER) as defined in the Basic Ordering Agreement, Statement of Work for Laboratory Analytical Services, Attachment J, “General Radioanalytical Requirements,” Section 2.3.3.

<b>Trailer Line Format</b> RAD Data			
<b>Column(s)</b>	<b>Field Name</b>	<b>Field Type</b>	<b>Format/Contents</b>
1-3	\$\$\$	Character  (3)	“\$\$\$” End of data group designator.
<b>Note: All character fields are left-justified and padded to the right with blanks.</b>			

#### 4.2. NON-RADIOCHEMISTRY EDD FORMAT FORM

<b>Header Line Format</b> NON-RAD Data			
<b>Column(s)</b>	<b>Field Name</b>	<b>Field Type</b>	<b>Format/Contents</b>
1-10	RIN Number	Character (10)	Report Identification Number assigned by the Site. (found on the Site COC).
11-20	File Date	Character (10)	(MM/DD/YYYY) Date of EDD creation.
21-30	Line Item Code	Character (10)	Code as listed on Chain of Custody form sent with samples. See Standard Services analytical module for correct code format.
31-40	Laboratory ID	Character (10)	Laboratory ID as provided by the Site.
<b>Note: All character fields are left-justified and padded to the right with blanks.</b>			

<b>Analytical Data Line Format</b> NON-RAD Data			
<b>Column(s)</b>	<b>Field Name</b>	<b>Field Type</b>	<b>Format/Contents</b>
1-15	Analytical Batch ID	Character (15)	Unique number internal to laboratory that links all the related QC and analytical data. (See definition of Analytical Batch in Attachment G, Basic Ordering Agreement.)
16-35	Sample Number	Character (20)	Sample Number i.e. Bottle Number assigned by the site-as stated on the Site COC
36-55	Laboratory Sample Number	Character (20)	Laboratory Sample Number (assigned by the laboratory)
56-65	Sample Receipt Date	Character (10)	(MM/DD/YYYY) Date Lab received sample
66-75	Date Analyzed	Character (10)	(MM/DD/YYYY) Date analysis performed

<b>Analytical Data Line Format</b> NON-RAD Data			
<b>Column(s)</b>	<b>Field Name</b>	<b>Field Type</b>	<b>Format/Contents</b>
76-95	Matrix	Character (20)	Matrix of sample as identified by Line Item Code. See GR03 Attachment B – Sample Matrix Types, for acceptable values.
96-100	Result Identifier	Character (5)	Code that differentiates between analytical results, duplicates, spikes, and QC items. See Appendix A, Attachment C - Result Types, for acceptable values.
101-116	CAS Number	Character (16)	Formal CAS number for the analyte. Site specified constituent ids shall be used when formal numbers are not available. Contact the CTR if CAS number is unknown. Must match the Site’s identifier for target analytes.
117-176	Analyte	Character (60)	Descriptive name of the analyte. Refer to the analyte name in the Line Item Code table.
177-186	Result (measured value)	Character (10)	Analytical Result associated with the analysis for this analyte.
187-196	Result Units	Character (10)	See Appendix A, Attachment D - Units of Measure, for acceptable values.
197-201	Result Qualifier	Character (5)	See Appendix A, Attachment E - Result Qualifiers, for acceptable values.
202-211	Dilution Factor	Character (10)	Required for diluted samples only. Recorded as a numeric value (i.e. 2.5, 5, 10, 100, etc.).
212-221	Detection Limit	Character (10)	Detection Limit as stated in the hardcopy report. See discussion in Section 2.5, “Reporting Results for Undetected Analytes”.
222-224	Secondary Result Type	Character (3)	Code to designate analytical results for tentatively identified compounds (TIC) or surrogates (SUR).
225-234	Extraction Date	Character (10)	(MM/DD/YYYY) The date of sample preparation at the lab for all samples that require preparation or extraction, including lab generated samples.
<b>Note: All character fields are left-justified and padded to the right with blanks.</b>			

<b>Trailer Line Format</b> NON-RAD Data			
<b>Column(s)</b>	<b>Field Name</b>	<b>Field Type</b>	<b>Format/Contents</b>
1-3	\$\$\$	Character (3)	“\$\$\$” End of data group designator.
<b>Note: All character fields are left-justified and padded to the right with blanks.</b>			

## 5. APPENDIX A - ATTACHMENTS

### 5.1. ATTACHMENT A - EDD DELIVERY PROCESS

EDD files shall be provided via E-Mail. Submission of EDDs electronically is the preferred method of data transmittal. The E-Mail address for sending EDD files is:

Analytical.Services@rfets.gov

The Site will reply with an email confirming receipt. If a confirmation is not received within a reasonable time, i.e. one business day, call the Analytical Services CTR.

If necessary, EDDs may be submitted on a diskette, to:

Kaiser-Hill Company, L.L.C.  
Analytical Services Division  
10808 Hwy 93, Unit B  
Building T130C  
Golden, Colorado 80403-8200

Should a laboratory supply EDDs on a diskette, the following conditions apply:

- Diskettes must be PC-compatible, 3.5 inch high-density 1.44 megabyte diskettes.
- Diskettes must be formatted and recorded compatible with a Microsoft Windows operating environment.

### 5.2. ATTACHMENT B - SAMPLE MATRIX TYPES

- AIR** - Sample of confined air.
- FAUNA** - Sample of animal tissues, bodies or composite; including mammals, insects, reptiles and amphibians.
- FISH** - Sample of aquatic vertebrate.
- FILTER** - Sample composed of any type of filter.
- FLORA** - Sample of any type of plant.
- LIQUID** - Sample of oils, solvents, or other non-aqueous liquids.
- WATER** - Sample of aqueous media. This sample matrix type shall also be used for all TCLP analysis.
- SOIL** - Sample of soil or sediment.
- SOLID** - Sample of asphalt, crushed glass or other solids.
- SLUDGE** - Sample of chemical sludge, mixtures of which are neither solid nor liquid.
- WIPE** - Sample of any material used as a wipe.

### 5.3. ATTACHMENT C - RESULT IDENTIFIERS

#### **QC Item types**

PBn - Preparation Blank, for Radiochemistry analysis only (includes blank filters submitted by RFETS to be utilized as QC samples), n identifies the nth analysis attempt performed on a Prep Blank (i.e. PB1, PB2, etc).

RBn - Reagent Blank (prep. blank for tritium). Radiochemistry only, used to identify reagent blank analysis, n identifies the nth analysis attempt performed on a Reagent Blank, (i.e. RB1, RB2, etc.)

LCn- Laboratory Control Sample, n identifies the nth analysis attempt performed on a laboratory control sample (i.e. LC1, LC2, etc.). Only LCn spike compounds (%REC) are to be reported.

LDn- Laboratory Duplicate, n identifies the nth analysis attempt performed on a laboratory duplicate (i.e. LD1, LD2, etc.). Re-analysis of a replicate sample shall be designated by incrementing to the next nth value (i.e. a re-analysis or dilution of LD1 shall be designated LD2).

MBn- Method Blank, General Chemistry only, n identifies the nth analysis attempt performed on a method blank (i.e. MB1, MB2, etc.).

MSn- Matrix Spike, General Chemistry only, n identifies the nth analysis attempt performed on a matrix spike (i.e. MS1, MS2, etc.). Only MSn spike compounds (% REC) are to be reported.

MDn- Matrix Spike Duplicate, General Chemistry only, n identifies the nth analysis attempt performed on a matrix spike duplicate (i.e. MD1, MD2, etc.). Only MDn spiked compounds are reported as %REC.

\*Since the QC item type is a Key in the RFETS system, QC item types are to be reported with a unique identification that is tied to the nth analysis attempt in which it was performed.

#### **Analytical Result identifiers**

DLn- Laboratory Dilution, n identifies the nth analysis attempt performed on a laboratory sample (i.e. DL1, DL2, etc.).

RXn- Re-extraction, n identifies the nth analysis attempt performed on a re-extraction (i.e. RX1, RX2, etc.).

TRn- Target Compound, n identifies the nth analysis attempt performed on a target compound (i.e. TR1, TR2, etc.).

All results submitted in the hardcopy report for environmental samples must be reported in the EDD. For example, the initial analysis is reported with a result identifier of TR1. If a method QC criteria was not met and a re-analysis required, the 2<sup>nd</sup> analysis is reported as TR2. Additionally, if a dilution is now required the 3<sup>rd</sup> set of data is reported as DL1.

All surrogates and TICs are to be reported with the same analytical result identifier as their parent sample but are also to include the secondary result type of either SUR or TIC.

Only RFETS sample numbers are to utilize DLn, RXn, and TRn. These Result Identifiers are not to be utilized for QC samples.

#### 5.4. ATTACHMENT D - UNITS OF MEASURE

C/100ML -	Counts per 100 milliliters
DPM -	Disintegration per minute
DPM/ML -	Disintegration per minute per milliliters
DPM/FILTER -	Disintegration per minute per filter
MG/L -	Milligrams per liter
MG/KG -	Milligrams per kilogram
UMHOS/CM -	Micromhos per centimeter
PCI/G -	Picocuries per gram
PCI/L -	Picocuries per liter
S.U. -	Standard Units (for pH analysis results)
UG/KG -	Micrograms per kilogram
UG/L -	Micrograms per liter
UG/WIPE -	Micrograms per wipe, used for PCBs
% -	For general chemistry use with percent solids, percent moisture, etc.
DEG C	Degrees Celsius (Ignitability)
NTU -	Turbidity
%REC -	For use with percent recovery on quality control samples including LC(n)*, MS(n), MSD(n) and Surrogates results.
Y -	Yes (Drinking Water module only)
N -	No (Drinking Water module only)

For all units, the standard alphabetical character will be utilized, symbols are not acceptable.

- \* If an error occurs during preparation/analysis that results in the exclusion of an analyte/isotope in the laboratory control sample, the laboratory shall:
- a) Re-extract/re-analyze the analytical batch if holding time has not expired and there are adequate sample volumes.
  - b) If holding time has expired or inadequate sample volumes remain for a re-extraction/re-analysis, perform the following:
    1. Contact the laboratory appropriate RFETS Contract Technical Representative (CTR);
    2. Write a Non-Conformance Report and submit to the CTR;
    3. Include discussing in the report Case Narrative and include same discussion when submitting the EDD. In both cases reference NCR; and
    4. In the EDD Result column include “NS” with units of %REC and “R” as the laboratory qualifier.

## 5.5. ATTACHMENT E - RESULT QUALIFIERS

### Gen. Chem. Qualifiers

#### Organic

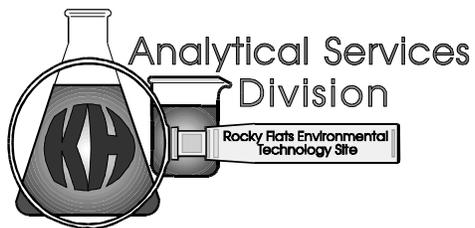
- A - TIC - suspected aldol-condensate product - organic
- B - Analyte found in blank and sample-organic;
- D - Component identified using secondary dilution factor-organic;
- E - Concentration exceeds calibration range of instrument-organic;
- I - Interference - organic
- J - Estimated value, > MDL but < RDL - organic
- U - Undetected, analyzed for, but not detected

#### Inorganic

- B - Estimated value, result > IDL but < RDL -inorganic
- E - Estimate due to suspected interference - inorganic
- M - Replicate instrument readings not within control limits - inorganic
- N - Spiked recovery not within control limits - inorganic
- S - Determined by method of additions - inorganic
- U - Undetected, analyzed for, but not detected
- W - Analytical spike recoveries not within control limits - inorganic
- \* - Duplicate agreement not within control limits - inorganic
- + - Determined by method of additions, correlation coefficient not within control limits - inorganic

### Radiochemistry Qualifiers

- U - Results < MDA (The result being reported is less than the MDA. If the MDA is blank, the ERROR is used as the limit.)
- J - Result < RDL and no undetected "U" qualifier assigned (The result is less than the required detection limit (RDL) and no undetected ("U") qualifier is assigned.)
- B - Reagent blank without "U" qualifier - result  $\geq$  MDA (The reagent blank associated with this sample had a result without an undetected ("U") qualifier and the result is greater than or equal to the MDA for this sample.



# **APPENDIX B**

## **WET CHEMISTRY REPORTING FORMS**

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WET CHEMISTRY REPORTING FORM 1  
WCH ANALYSIS DATA SHEET

Lab Name: \_\_\_\_\_ RF Sample ID: \_\_\_\_\_  
 Lab Code: \_\_\_\_\_ Lab Sample ID: \_\_\_\_\_  
 RDG: \_\_\_\_\_

Parameter ID	Parameter Name	Result	Qualifiers		Units
			C <sup>(1)</sup>	Q	
10-70-8	Acidity				mg/L
T-005	Alkalinity, Total as CaCO <sub>3</sub>				mg/L
71-52-3	Alkalinity, Bicarbonate as CaCO <sub>3</sub>				mg/L
3812-32-6	Alkalinity, Carbonate as CaCO <sub>3</sub>				mg/L
7727-37-9	Ammonia as N				mg/L
10-26-4	BOD				mg/L
24959-67-9	Bromide				mg/L
11-03-0	CBOD				mg/L
C-004	COD				mg/L
16887-00-6	Chloride				mg/L
18540-29-9	Chromium VI				mg/L
57-12-5	Cyanide, Total				mg/L
10-87-7	Cyanide, Amenable to Chlorination				mg/L
10-71-9	Cyanide, Releasable, for RCRA Compliance				mg/L
16984-48-8	Fluoride				mg/L
11-02-9	Hardness as CaCO <sub>3</sub>				mg/L
14797-55-8	Nitrate as N				mg/L
14797-65-0	Nitrite as N				mg/L
C-005	Nitrate/Nitrite as N				mg/L
10-30-0	Oil and Grease, Total Recoverable				mg/L
11-59-6	Organic Carbon, Dissolved				mg/L
10-35-5	Organic Carbon, Total				mg/L
10-29-7	pH				S.U. at 25°C
108-95-2	Phenol				mg/L
14265-44-2	Phosphate (ortho) as P				mg/L
7723-14-0	Phosphate (total) as P				mg/L
RFS-SS-96	Sediment Analysis, Sand-Silt Split				%
7631-86-9	Silica as SiO <sub>2</sub> , Dissolved				mg/L
11-06-3	Solids, Non-Volatile Suspended (NVSS)				mg/L
C-008	Solids, Total (TS)				mg/L
10-33-3	Solids, Total Dissolved Solids (TDS)				mg/L
10-32-2	Solids, Total Suspended (TSS)				mg/L
10-34-4	Specific Conductance (Conductivity)				mmho/cm at 25°C
14808-79-8	Sulfate as SO <sub>4</sub> <sup>2-</sup>				mg/L
RFS-RS-97	Sulfide as H <sub>2</sub> S				mg/L
18496-25-8	Sulfide as S				mg/L
7727-37-9-TKN	TKN/Organic Nitrogen as N				mg/L
59473-04-0	Total Organic Halides (TOX)				mg/L
10-90-2	Total Petroleum Hydrocabons (TPH)				mg/L
10-08-02	Turbidity				NTU

<sup>(1)</sup> A U in the C qualifier column indicates that this parameter was not detected; the method detection limit

WATER QUALITY PARAMETERS REPORTING FORM 2  
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: \_\_\_\_\_

RDG: \_\_\_\_\_

Lab Code: \_\_\_\_\_

Reporting units are as listed on Form I.

Parameter ID	Parameter Name	Initial Calibration (ICV)			Continuing Calibration (CCV)				
		True	Found	%R <sup>(1)</sup>	True	Found	%R <sup>(1)</sup>	Found	%R <sup>(1)</sup>
10-70-8	Acidity								
T-005	Alkalinity, Total as CaCO <sub>3</sub>								
71-52-3	Alkalinity, Bicarbonate as CaCO <sub>3</sub>								
3812-32-6	Alkalinity, Carbonate as CaCO <sub>3</sub>								
7727-37-9	Ammonia as N								
10-26-4	BOD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
24959-67-9	Bromide								
11-03-0	CBOD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C-004	COD								
16887-00-6	Chloride								
18540-29-9	Chromium VI								
57-12-5	Cyanide, Total								
10-87-7	Cyanide, Amenable to Chlorination								
10-71-9	Cyanide, Releasable, for RCRA Compliance								
16984-48-8	Fluoride								
11-02-9	Hardness as CaCO <sub>3</sub>								
14797-55-8	Nitrate as N								
14797-65-0	Nitrite as N								
C-005	Nitrate/Nitrite as N								
10-30-0	Oil and Grease, Total Recoverable	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11-59-6	Organic Carbon, Dissolved								
10-35-5	Organic Carbon, Total								
10-29-7	pH								
108-95-2	Phenol								
14265-44-2	Phosphate (ortho) as P								
7723-14-0	Phosphate (total) as P								
RFS-SS-96	Sediment Analysis, Sand-Silt Split	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7631-86-9	Silica as SiO <sub>2</sub> , Dissolved								
11-06-3	Solids, Non-Volatile Suspended (NVSS)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C-008	Solids, Total (TS)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10-33-3	Solids, Total Dissolved Solids (TDS)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10-32-2	Solids, Total Suspended (TSS)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10-34-4	Specific Conductance (Conductivity)								
14808-79-8	Sulfate as SO <sub>4</sub> <sup>2-</sup>								
RFS-RS-97	Sulfide as H <sub>2</sub> S								
18496-25-8	Sulfide as S								
7727-37-9-TKN	TKN/Organic Nitrogen as N								
57473-04-0	Total Organic Halides (TOX)								
10-90-2	Total Petroleum Hydrocarbons (TPH)								
10-08-02	Turbidity								

N/A indicates information which is not applicable to this parameter.

<sup>(1)</sup> For pH enter |Found - True| in S.U.; for all other parameters enter %R = 100 \* (Found) / (True)

FORM 2 - WCH



WET CHEMISTRY REPORTING FORM 4  
SPIKE SAMPLE RECOVERY

Lab Name: \_\_\_\_\_

RDG: \_\_\_\_\_

Lab Code: \_\_\_\_\_

Site Sample Identifier: \_\_\_\_\_

Lab Sample Identifier: \_\_\_\_\_

Reporting units are as listed on Form I.

Parameter ID	Parameter Name	Control Limit <sup>(1)</sup>	Spiked Sample Result (SSR)	Sample Result (SR)	C	Spike Added (SA)	%R <sup>(2)</sup>	Q
10-70-8	Acidity							
T-005	Alkalinity, Total as CaCO <sub>3</sub>							
71-52-3	Alkalinity, Bicarbonate as CaCO <sub>3</sub>							
3812-32-6	Alkalinity, Carbonate as CaCO <sub>3</sub>							
7727-37-9	Ammonia as N							
10-26-4	BOD	N/A	N/A	N/A		N/A	N/A	
24959-67-9	Bromide							
11-03-0	CBOD	N/A	N/A	N/A		N/A	N/A	
C-004	COD							
16887-00-6	Chloride							
18540-29-9	Chromium VI							
57-12-5	Cyanide, Total							
10-87-7	Cyanide, Amenable to Chlorination							
10-71-9	Cyanide, Releasable, for RCRA Compliance							
16984-48-8	Fluoride							
11-02-9	Hardness as CaCO <sub>3</sub>							
14797-55-8	Nitrate as N							
14797-65-0	Nitrite as N							
C-005	Nitrate/Nitrite as N							
10-30-0	Oil and Grease, Total Recoverable	N/A	N/A	N/A		N/A	N/A	
11-59-6	Organic Carbon, Dissolved							
10-35-5	Organic Carbon, Total							
10-29-7	pH	N/A	N/A	N/A		N/A	N/A	
108-95-2	Phenol							
14265-44-2	Phosphate (ortho) as P							
7723-14-0	Phosphate (total) as P							
RFS-SS-96	Sediment Analysis, Sand-Silt Split	N/A	N/A	N/A		N/A	N/A	
7631-86-9	Silica as SiO <sub>2</sub> , Dissolved							
11-06-3	Solids, Non-Volatile Suspended (NVSS)	N/A	N/A	N/A		N/A	N/A	
C-008	Solids, Total (TS)	N/A	N/A	N/A		N/A	N/A	
10-33-3	Solids, Total Dissolved Solids (TDS)	N/A	N/A	N/A		N/A	N/A	
10-32-2	Solids, Total Suspended (TSS)	N/A	N/A	N/A		N/A	N/A	
10-34-4	Specific Conductance (Conductivity)	N/A	N/A	N/A		N/A	N/A	
14808-79-8	Sulfate as SO <sub>4</sub> <sup>2-</sup>							
RFS-RS-97	Sulfide as H <sub>2</sub> S							
18496-25-8	Sulfide as S							
7727-37-9-TKN	TKN/Organic Nitrogen as N							
59473-04-0	Total Organic Halides (TOX)							
10-90-2	Total Petroleum Hydrocarbons (TPH)							
10-08-02	Turbidity							

N/A indicates information which is not applicable to this parameter.

<sup>(1)</sup>The Control Limit column is blank when SR > 4\*SA and 75-125% when SR ≤ 4\*SA.

<sup>(2)</sup> %R = 100 \* (SSR - SR) / (SA)

FORM 4 - WCH

WET CHEMISTRY REPORTING FORM 5  
DUPLICATE SAMPLE ANALYSIS

Lab Name: \_\_\_\_\_

RDG: \_\_\_\_\_

Lab Code: \_\_\_\_\_

Site Sample Identifier: \_\_\_\_\_

Lab Sample Identifier: \_\_\_\_\_

Reporting units are as listed on Form I.

Parameter ID	Parameter Name	Control Limit <sup>(1)</sup>	Sample Result (SR)	C	Duplicate Result (D)	C	RPD <sup>(2)</sup>	Q
10-70-8	Acidity							
T-005	Alkalinity, Total as CaCO <sub>3</sub>							
71-52-3	Alkalinity, Bicarbonate as CaCO <sub>3</sub>							
3812-32-6	Alkalinity, Carbonate as CaCO <sub>3</sub>							
7727-37-9	Ammonia as N							
10-26-4	BOD							
24959-67-9	Bromide							
11-03-0	CBOD							
C-004	COD							
16887-00-6	Chloride							
18540-29-9	Chromium VI							
57-12-5	Cyanide, Total							
10-87-7	Cyanide, Amenable to Chlorination							
10-71-9	Cyanide, Releasable, for RCRA Compliance							
16984-48-8	Fluoride							
11-02-9	Hardness as CaCO <sub>3</sub>							
14797-55-8	Nitrate as N							
14797-65-0	Nitrite as N							
C-005	Nitrate/Nitrite as N							
10-30-0	Oil and Grease, Total Recoverable							
11-59-6	Organic Carbon, Dissolved							
10-35-5	Organic Carbon, Total							
10-29-7	pH	0.1 S.U.						
108-95-2	Phenol							
14265-44-2	Phosphate (ortho) as P							
7723-14-0	Phosphate (total) as P							
RFS-SS-96	Sediment Analysis, Sand-Silt Split							
7631-86-9	Silica as SiO <sub>2</sub> , Dissolved							
11-06-3	Solids, Non-Volatile Suspended (NVSS)							
C-008	Solids, Total (TS)							
10-33-3	Solids, Total Dissolved Solids (TDS)							
10-32-2	Solids, Total Suspended (TSS)							
10-34-4	Specific Conductance (Conductivity)	5						
14808-79-8	Sulfate as SO <sub>4</sub> <sup>2-</sup>							
RFS-RS-97	Sulfide as H <sub>2</sub> S							
18496-25-8	Sulfide as S							
7727-37-9-TKN	TKN/Organic Nitrogen as N							
59473-04-0	Total Organic Halides (TOX)							
10-90-2	Total Petroleum Hydrocabons (TPH)							
10-08-02	Turbidity							

N/A indicates information which is not applicable to this parameter.

<sup>(1)</sup> The control limit for pH is 0.1 S.U.; conductivity is 5% RPD. For all other parameters enter 20% in the *control limit* column when SR > 5\*MDL; enter the RDL when SR < 5\*MDL.

<sup>(2)</sup> RPD = 100 \* |SR-D| / (SR+D)/2 units for RPD are percent

FORM 5 - WCH

WET CHEMISTRY REPORTING FORM 6  
LABORATORY CONTROL SAMPLE

Lab Name: \_\_\_\_\_

RDG: \_\_\_\_\_

Lab Code: \_\_\_\_\_

Reporting units are as listed on Form I.

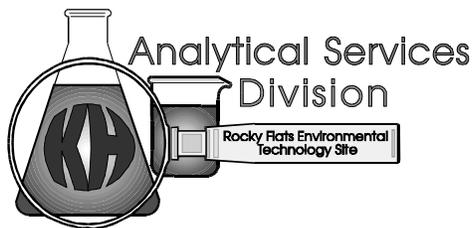
Parameter ID	Parameter Name	True	Found	%R <sup>(1)</sup>	Lower Control Limit %R	Upper Control Limit %R
10-70-8	Acidity				80.0	120.0
T-005	Alkalinity, Total as CaCO <sub>3</sub>				80.0	120.0
71-52-3	Alkalinity, Bicarbonate as CaCO <sub>3</sub>				80.0	120.0
3812-32-6	Alkalinity, Carbonate as CaCO <sub>3</sub>				80.0	120.0
7727-37-9	Ammonia as N				80.0	120.0
10-26-4	BOD				82.0	118.0
24959-67-9	Bromide				80.0	120.0
11-03-0	CBOD				82.0	118.0
C-004	COD				80.0	120.0
16887-00-6	Chloride				80.0	120.0
18540-29-9	Chromium VI				80.0	120.0
57-12-5	Cyanide, Total				80.0	120.0
10-87-7	Cyanide, Amenable to Chlorination				80.0	120.0
10-71-9	Cyanide, Releasable, for RCRA Compliance				80.0	120.0
16984-48-8	Fluoride				80.0	120.0
11-02-9	Hardness as CaCO <sub>3</sub>				80.0	120.0
14797-55-8	Nitrate as N				80.0	120.0
14797-65-0	Nitrite as N				80.0	120.0
C-005	Nitrate/Nitrite as N				80.0	120.0
10-30-0	Oil and Grease, Total Recoverable				80.0	120.0
11-59-6	Organic Carbon, Dissolved				80.0	120.0
10-35-5	Organic Carbon, Total				80.0	120.0
10-29-7	pH				True-0.1 S.U.	True+0.1 S.U.
108-95-2	Phenol				80.0	120.0
14265-44-2	Phosphate (ortho) as P				80.0	120.0
7723-14-0	Phosphate (total) as P				80.0	120.0
RFS-SS-96	Sediment Analysis, Sand-Silt Split				80.0	120.0
7631-86-9	Silica as SiO <sub>2</sub> , Dissolved				80.0	120.0
11-06-3	Solids, Non-Volatile Suspended (NVSS)				80.0	120.0
C-008	Solids, Total (TS)				80.0	120.0
10-33-3	Solids, Total Dissolved Solids (TDS)				80.0	120.0
10-32-2	Solids, Total Suspended (TSS)				80.0	120.0
10-34-4	Specific Conductance (Conductivity)				95.0	105.0
14808-79-8	Sulfate as SO <sub>4</sub> <sup>2-</sup>				80.0	120.0
RFS-RS-97	Sulfide as H <sub>2</sub> S				80.0	120.0
18496-25-8	Sulfide as S				80.0	120.0
7727-37-9-TKN	TKN/Organic Nitrogen as N				80.0	120.0
59473-04-0	Total Organic Halides (TOX)				80.0	120.0
10-90-2	Total Petroleum Hydrocabons (TPH)				80.0	120.0
10-08-02	Turbidity				80.0	120.0

N/A indicates information which is not applicable to this parameter.

<sup>(1)</sup> For pH enter |Found - True| in S.U.; for all other parameters enter %R = 100 \* (Found) / (True)

<sup>(2)</sup> Control Limits are stated as %R, except where units are noted.

FORM 6 - WDG



# **APPENDIX C**

## **MISCELLANEOUS DETERMINATIONS**

### **REPORTING FORMS**

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**MISCELLANEOUS DETERMINATIONS REPORTING FORM 1**

Lab Name: \_\_\_\_\_

RDG: \_\_\_\_\_

Lab Code: \_\_\_\_\_

RF Sample ID: \_\_\_\_\_

Lab Project: \_\_\_\_\_

Lab Sample ID: \_\_\_\_\_

Analytical Batch: \_\_\_\_\_

Sample Matrix: \_\_\_\_\_

Parameter ID	Parameter Name and Method:	Result	Qualifiers		Units
			C	Q	
RFS-FP-97	Flash Point (Ignitability) SW-846 1110 or 1020A				°C
10-29-7	Corrosivity (pH) SW-846 9040B or 9045C				S. U.
RFS-CTS-97	Corrosivity to Steel SW-846 1110				mm/year
10-71-9	Reactive Cyanide SW-846 Chap. 7 § 7.3.3 & 9010				mg HCN /Kg
18496-25-8	Reactive Sulfide SW-846 Chap. 7 § 7.3.4 & 9030				mg H <sub>2</sub> S /Kg
18496-25-8	Acid Soluble Sulfides SW-846 9030B & 9034 or 9215				mg /Kg
57-12-5	Total Cyanide SW-846 9010B or 9012A				µg/L or mg/Kg
10-87-7	Amenable cyanide SW-846 9010B or 9012A				µg/L or mg/Kg
<b>FREE LIQUID</b>	Paint Filter Liquids Test SW-846 9095A				Grams (g)

**MISCELLANEOUS DETERMINATIONS REPORTING FORM I - CONTINUED**

Parameter ID	Parameter Name and Method:	Result	Qualifiers		Units
			C	Q	
D2216-M-99	Moisture ASTM D2216				%
D422-PSF1-99	Particle-Size Fraction (+3") ASTM D422				%
D422-PSF2-99	Particle-Size Fraction (3" X 2") ASTM D422				%
D422-PSF3-99	Particle-Size Fraction (2" X 1.5") ASTM D422				%
D422-PSF4-99	Particle-Size Fraction (1.5" X 1") ASTM D422				%
D422-PSF5-99	Particle-Size Fraction (1" X 0.75") ASTM D422				%
D422-PSF6-99	Particle-Size Fraction (0.75" X 0.375") ASTM D422				%
D422-PSF7-99	Particle-Size Fraction (0.375" X 4.75 mm) ASTM D422				%
D422-PSF8-99	Particle-Size Fraction (4.75 mm X 2.00 mm) ASTM D422				%
D422-PSF9-99	Particle-Size Fraction (2.00 mm X 425 µm) ASTM D422				%
D422-PSF10-99	Particle-Size Fraction (425 µm X 75 µm) ASTM D422				%
D422-PSF11-99	Particle-Size Fraction (75 µm X 0.074 mm) ASTM D422				%
D422-PSF12-99	Particle-Size Fraction (0.074 mm X 0.005 mm) ASTM D422				%
D422-PSF13-99	Particle-Size Fraction (0.005 mm X 0.001 mm) ASTM D422				%

**MISCELLANEOUS DETERMINATIONS REPORTING FORM I CONTINUED**

Parameter ID	Parameter Name and Method:	Result	Qualifiers		Units
			C	Q	
D422-PSF14-99	Particle-Size Fraction (- 0.001 mm) ASTM D422				%
10-35-5	Total Organic Carbon SW-846 9060 or EPA 415.1				mg/L or mg/Kg
24959-67-9	Bromide SW-846 9056 or EPA 300.0 & method prep if applicable				mg/L or mg/Kg
16887-00-6	Chloride SW-846 9056 or EPA 300.0 & method prep if applicable				mg/L or mg/Kg
16984-48-8	Fluoride SW-846 9056 or EPA 300.0 & method prep if applicable				mg/L or mg/Kg
14797-55-8	Nitrate – N SW-846 9056 or EPA 300.0 & method prep if applicable				mg/L or mg/Kg
14797-65-0	Nitrite – N SW-846 9056 or EPA 300.0 & method prep if applicable				mg/L or mg/Kg
14265-44-2	ortho-Phosphate – P SW-846 9056 or EPA 300.0 & method prep if applicable				mg/L or mg/Kg
14808-79-8	Sulfate SW-846 9056 or EPA 300.0 & method prep if applicable				mg/L or mg/Kg
10-90-2	Total Recoverable Petroleum Hydrocarbons EPA 418.1				mg/L
10-90-2	Total Recoverable Petroleum Hydrocarbons SW-846 8440 & 3560				mg/Kg
RF_DRO	Total Petroleum Hydrocarbons for Diesel Range Organics (DROs) SW-846 8015B				mg/Kg
RF-GRO	Total Petroleum Hydrocarbons for Gasoline Range Organics (GROs) SW-846 8015B				mg/Kg

**MISCELLANEOUS DETERMINATIONS REPORTING FORM 2**

**TCLP Extraction Parameters Data Sheet**

**Lab Name:** \_\_\_\_\_

**RDG:** \_\_\_\_\_

**Lab Code:** \_\_\_\_\_

**Analytical Batch:** \_\_\_\_\_

**Lab Project:** \_\_\_\_\_

RF Sample ID					
Lab Sample ID					
Line Item Code					
Waste Description					
% Solids					
Method by which % Solids was determined					
Was particle size reduction required?					
Free Liquid Present?					
Free Liquid miscible with water?					
Volume of non-miscible liquid					
pH of solids in contact with water					
pH of solids after acid addition					
Net Sample Weight (g)					
Net Weight of Solids Extracted (g)					
Weight of extraction fluid (g)					
Extraction Fluid Number					
Extraction Start Date & Time					
Extraction End Date & Time					
Extraction fluid pH after extraction					
Leachate preservation method					
Was a Spiked Sample Prepared?					

Comments:

**MISCELLANEOUS DETERMINATIONS REPORTING FORM 3**

**QC Data Summaries for Ignitability and pH**

**Lab Name:** \_\_\_\_\_

**RDG:** \_\_\_\_\_

**Lab Code:** \_\_\_\_\_

**RF Sample ID.:** \_\_\_\_\_

**Lab Project:** \_\_\_\_\_

**Lab Sample ID.:** \_\_\_\_\_

**Analytical Batch:** \_\_\_\_\_

**Sample Matrix:** \_\_\_\_\_

	<b>Flash Point</b>	<b>pH</b>
Initial Verification (IAV/ICV) True		
Initial Verification (IAV/ICV) Found		
Initial Verification (IAV/ICV) %R		
Continuing Verification (CAV/CCV) True		
Continuing Verification Found, CAV/CCV 1		
Continuing Verification %Diff., CAV/CCV 1		
Continuing Verification Found, CAV/CCV 2		
Continuing Verification %Diff., CAV/CCV 2		
Continuing Verification Found, CAV/CCV 3		
Continuing Verification %Diff., CAV/CCV 3		
Duplicate Sample Control Limit		
Sample Identifier for Sample Run in Duplicate		
Sample Results (SR) for the Sample run in Duplicate		
Duplicate Sample Result (D)		
Duplicate Sample Difference		
Duplicate Difference Qualifier		
Lab Control Sample True		
Lab Control Sample Found		
Lab Control Sample Difference		
LCS Lower Control Limit		
LCS Upper Control Limit		

**MISCELLANEOUS DETERMINATIONS REPORTING FORM 4 A**

**QC Data Summaries for Reactivity**

**Lab Name:** \_\_\_\_\_

**RDG:** \_\_\_\_\_

**Lab Code:** \_\_\_\_\_

**RF Sample ID.:** \_\_\_\_\_

**Lab Project:** \_\_\_\_\_

**Lab Sample ID.:** \_\_\_\_\_

**Analytical Batch:** \_\_\_\_\_

**Sample Matrix:** \_\_\_\_\_

	Reactive Cyanide		Reactive Sulfide	
		C / Q qualifier		C / Q qualifier
Initial Verification (IAV/ICV) True				
Initial Verification (IAV/ICV) Found				
Initial Verification (IAV/ICV) %R				
Continuing Verification True				
Continuing Verification Found CAV/CCV 1				
Continuing Verification %R CAV/CCV 1				
Continuing Verification Found CAV/CCV 2				
Continuing Verification %R CAV/CCV 2				
Continuing Verification Found CAV/CCV 3				
Continuing Verification %R CAV/CCV 3				
MDL				
Initial Blank IAB/ICB Found				
Continuing Blank Found CAB/CCB 1				
Continuing Blank Found CAB/CCB 2				
Continuing Blank Found CAB/CCB 3				
Preparation or Method Blank Result				
Spike Control Limit				
Sample Identifier for Spiked Sample				
Units for Sample Results				
Non-Spiked Sample Result (SR)				
Spiked Sample Result (SSR)				
Spike Added (SA)				
Spike %R				
Duplicate Sample Control Limit				
Sample Identifier for Sample Run in Duplicate				
Reported Result for the Sample run in Duplicate				
Duplicate Sample Result (D)				
Duplicate Sample RPD				
Distillation Recovery Check Mean				
Distillation Recovery Check Found				
Lower Control Limit For the Distillation Recovery Check				
Upper Control Limit For the Distillation Recovery Check				

**MISCELLANEOUS DETERMINATIONS REPORTING FORM 4 B**

**QC Data Summary for Acid Soluble Sulfide, Total & Amenable Cyanide, TOC, Anions, TRPH, and TPH.**

**Lab Name:** \_\_\_\_\_

**RDG:** \_\_\_\_\_

**Lab Code:** \_\_\_\_\_

**RF Sample ID.:** \_\_\_\_\_

**Lab Project:** \_\_\_\_\_

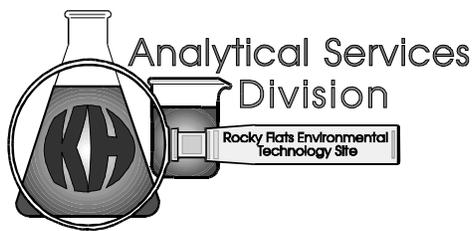
**Lab Sample ID.:** \_\_\_\_\_

**Analytical Batch:** \_\_\_\_\_

**Sample Matrix:** \_\_\_\_\_

	Parameter Name		Parameter Name	
		C / Q qualifier		C / Q qualifier
Initial Verification (IAV/ICV) True				
Initial Verification (IAV/ICV) Found				
Initial Verification (IAV/ICV) %R				
Continuing Verification True				
Continuing Verification Found CAV/CCV 1				
Continuing Verification %R CAV/CCV 1				
Continuing Verification Found CAV/CCV 2				
Continuing Verification %R CAV/CCV 2				
Continuing Verification Found CAV/CCV 3				
Continuing Verification %R CAV/CCV 3				
MDL				
Initial Blank IAB/ICB Found				
Continuing Blank Found CAB/CCB 1				
Continuing Blank Found CAB/CCB 2				
Continuing Blank Found CAB/CCB 3				
Preparation or Method Blank Result				
Spike Control Limit				
Sample Identifier for Spiked Sample				
Units for Sample Results				
Non-Spiked Sample Result (SR)				
Spiked Sample Result (SSR)				
Spike Added (SA)				
Spike %R				
Duplicate Sample Control Limit				
Sample Identifier for Sample Run in Duplicate				
Reported Result for the Sample run in Duplicate				
Duplicate Sample Result (D)				
Duplicate Sample RPD				
Laboratory Control Sample True Value				
Laboratory Control Sample Found Value				
Laboratory Control Sample %R				





# **APPENDIX D**

## **RADIOCHEMISTRY REPORTING FORMS**

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# SAMPLE AND QC RESULTS SUMMARY

LAB NAME: \_\_\_\_\_

RIN NO.: \_\_\_\_\_

RFETS Sample ID	LAB Sample ID	Analyte	Sample Matrix	Results (Units)	2S(tpu)* (Sample Units)	Tracer Recover	MDA (Sample Units)	Aliquot Size Analyzed
RFETS ID-1	Lab Sample ID-1	U-233/234	Water					
		U-235	Water					
		U-238	Water					
RFETS ID-2	Lab Sample ID-2	U-233/234	Water					
		U-235	Water					
		U-238	Water					
RFETS ID-n	Lab Sample ID-n	U-233/234	Water					
		U-235	Water					
		U-238	Water					
<b>Lab Batch ID</b>	< Lab Batch Id >							
<b>BLANK</b>	< Lab Blank Id >	U-233/234	Water					
	< Lab Blank Id >	U-235	Water					
	< Lab Blank Id >	U-238	Water					
<b>LCS</b>	< Lab LCS Id >	U-233/234	Water					
	< Lab LCS Id >	U-235	Water					
	< Lab LCS Id >	U-238	Water					
<b>DUP</b>	< Lab Dup ID >	U-233/234	Water					
	< Lab Dup ID >	U-235	Water					
	< Lab Dup ID >	U-238	Water					

EXAMPLE

RFETS Sample ID	LAB Sample ID	Analyte	Sample Matrix	Results (Units)	2S(tpu)* (Sample Units)	Tracer Recover	MDA (Sample Units)	Aliquot Size Analyzed
RFETS ID-1	Lab ID-1	Pu-239/240	Water					
RFETS ID-2	Lab ID-2	Pu-239/240	Water					
RFETS ID-n	Lab ID-n	Pu-239/240	Water					
<b>Lab Batch ID</b>	< Lab Batch Id >							
<b>BLANK</b>	< Lab Blank Id >	Pu-239/240	Water					
<b>LCS</b>	< Lab LCS Id >	Pu-239/240	Water					
<b>DUP</b>	< Lab Dup ID >	Pu-239/240	Water					

RFETS Sample ID	LAB Sample ID	Analyte	Sample Matrix	Results (Units)	2S(tpu)* (Sample Units)	Tracer Recover	MDA (Sample Units)	Aliquot Size Analyzed
RFETS ID-1	Lab ID-1	Np-237	Water					
RFETS ID-2	Lab ID-2	Np-237	Water					
RFETS ID-n	Lab ID-n	Np-237	Water					
<b>Lab Batch ID</b>	< Lab Batch Id >							
<b>BLANK</b>	< Lab Blank Id >	Np-237	Water					
<b>LCS</b>	< Lab LCS Id >	Np-237	Water					
<b>DUP</b>	< Lab Dup ID >	Np-237	Water					
<b>MATRIX SPIKE</b>	< Lab MS ID >	Np-237	Water					

\* tpu = total propagated uncertainty

## BATCH QC SUMMARY SHEET

<Laboratory Name>

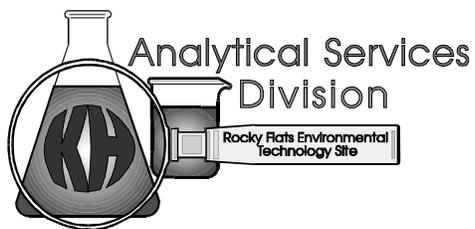
ANALYTE: \_\_\_\_\_ RIN: \_\_\_\_\_ LAB BATCH ID: \_\_\_\_\_

QC Type	Lab Sample ID	Count Date	Observed Result <Units>	± 2S <Sample Units>	Tracer Recovery (.3 - 1.10)	QC TEST
LCS						KNOWN: _____ REL BIAS: _____ (-0.25 to +0.25)
BATCH BLANK						RDL: _____ MDA: _____
Sample <i>(Reported)</i>						Not Applicable
Sample <i>(Duplicate)</i>						Dup Test: _____ Value (<3)
MATRIX SPIKE						Recovery: _____ (0.6 to 1.4)

ANALYTE: \_\_\_\_\_ RIN: \_\_\_\_\_ LAB BATCH ID: \_\_\_\_\_

QC Type	Lab Sample ID	Count Date	Observed Result <Units>	± 2S <Sample Units>	Tracer Recovery (.3 - 1.10)	QC TEST
LCS						KNOWN: _____ REL BIAS: _____ (-0.25 to +0.25)
BATCH BLANK						RDL: _____ MDA: _____
Sample <i>(Reported)</i>						Not Applicable
Sample <i>(Duplicate)</i>						Dup Test: _____ Value (<3)
MATRIX SPIKE						Recovery: _____ (0.6 to 1.4)

Note: A Batch QC Evaluation is not required for U-235.



# **APPENDIX E**

## **EXAMPLE COVER PAGE**

### **FOR**

### **RESUBMITTED ELECTRONIC IMAGE**

### **DATA PACKAGES**

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## REVISED REPORT (7/26/01)

Data Reporting Package 1234567 was revised to incorporate missing data identified by RFETS NCNR01-999. Original undiluted results for samples 01X0555-001.002 and 01X0555-003.002 were inadvertently omitted from the previously submitted electronic image data report. The Table of Contents was updated accordingly.

List of Pages Containing New or Revised Information: 1, 2, 7, 9

The document was repaginated to accommodate the insertion of new or continuation pages.

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

RIN 01X0555

### COVER PAGE

Laboratory Name: ABC Laboratories, Inc.

Lab Report No.: 1234567 Rev. 01

Subcontract No.: KH010001

SOW Identifier: GR03-A.4

LICs Associated with this package: MIS-A-038, MIS-A-039, MIS-A-040

### SAMPLE CROSS REFERENCE TABLE:

Customer ID	Lab ID	Matrix	LICs	Method	Date Received	Date Prepared	Date Analyzed
01X0555-001.002	1234567-04	Water	MIS-A-038	SW-846 9056A	7/4/01	7/10/01	7/10/01
01X0555-002.002	1234567-05	Water	MIS-A-038 MIS-A-039	SW-846 9056A	7/4/01	7/10/01	7/10/01
01X0555-003.002	1234567-06	Water	MIS-A-038 MIS-A-039 MIS-A-040	SW-846 9056A	7/4/01	7/10/01	7/10/01

### SAMPLE RECEIPT COMMENTS

Three bottles were received from the Rocky Flats Environmental Technology Site on July 5, 2001. The sample containers arrived without any visible signs of tampering or breakage. Chain of Custody documentation received with the samples was accurate and contained appropriate signatures. The temperature at receipt was 5°C.

### INVOICE CERTIFICATION STATEMENT

The delivery and receipt of this data deliverable constitutes an invoice for payment for this data deliverable.

### CERTIFICATION STATEMENT

"I certify that this electronic image, and all hardcopies produced from this image accurately represent the data and are in compliance with the BOA and RFETS specific requirements, both technically and for completeness, other than the conditions detailed above or in the sample data package narrative. Release, by submission through email, of the data contained in this electronic image and the computer-readable EDD (as applicable), has been authorized by the Laboratory Manager or the Manager's designee."

Name: Jane Doe

Date: July 26, 2001

Title: Project Manager