

## DATA PACKAGE DELIVERABLES

The following sections describe in detail the types of data packages designed for the Yerington project. These details are provided to all project laboratories to produce data packages that are similar in format, order of presentation, and content.

Data Packages shall include data for analyses of all samples in one Sample Delivery Group (SDG), including field samples, reanalyses, secondary dilutions, blanks, laboratory control samples, matrix spikes, matrix spike duplicates, and/or laboratory duplicates. The complete Sample Data Package is divided into the units as described below. Units for each analytical fraction have been detailed. If the analysis of that fraction was not required for samples in the SDG, the fraction-specific unit is not a required deliverable. The Data Package must be complete before submission and must be consecutively paginated. The data package deliverables are categorized into two distinct levels as follows:

- Level II - Data verification summary package
- Level IV - Data validation fully documented data package

All data packages generated for the Yerington Project must be provided in an Adobe Acrobat (.PDF) file format. The laboratory will be notified of the samples that will undergo full data validation (Level IV). For these samples, the laboratory will be required to generate hard copy data packages as well as the Adobe Acrobat (.PDF) file format. In addition, electronic data deliverables (EDDs) must be provided for all data package deliverables in the project- required format.

The laboratory is required to submit supporting documentation for the reported analytical results. The supporting documentation and the analytical results are required to be reported in one of the data package delivery categories listed above (defined below). The data package deliverables must be submitted in the order in which the deliverables appear in the text. The laboratory need not include the documentation for any fraction not required for a sample delivery group (SDG).

The laboratory is responsible for ensuring that all electronic and hardcopy data deliverables are in parity, including but not limited to significant figures, analyte names, and any qualifiers and/or footnotes used. All electronic data and hardcopy data deliverables are the property of ARC and must be maintained for a minimum of five years. Under no circumstances is the laboratory to discard, dispose of, alter, or destroy any electronic data or hardcopy data deliverables without the express written consent of ARC. In certain cases, state, federal or other regulatory agencies require that the data packages meet certain specific reporting formats. The laboratory is responsible for presenting the laboratory data to meet these regulatory program requirements with prior written notification by ARC or its designated representative.

Prior to issuance to the client, all data must undergo at least an initial technical review by a trained analyst and a second technical review by a supervisor or another trained analyst.

The Data Packages shall be arranged in the following order:

## GENERAL FORMAT FOR LEVEL IV DELIVERABLES

### 1. Documentation

- Cover Letter/Letter of Transmittal signed by Laboratory Project Manager or designee
- Title Page
- Table of Contents
- SDG Narrative signed by Laboratory Project Manager or designee (The SDG Narrative must include a statement or statements relative to compliance with this Quality Assurance Project Plan [QAPP] and description of any deviations.)
- References to preparation and analytical methods performed
- Field and Internal Laboratory Chain-of-Custody Records
- Sample Receipt Information  
Project Correspondence

### 2. GC/MS Volatile Organic Data

#### A. Quality Control (QC) Summary

Surrogate Percent Recovery Summary that must include the following:

- SDG number
- ARC sample number
- Method blank sample number
- MS sample number
- MSD sample number
- LCS identification number
- LCSD identification number (if performed)
- matrix of the summarized samples
- percent recovery for all surrogate compounds
- applicable recovery limits for each surrogate compound

MS/MSD Summary that must include the following:

- SDG number
- matrix of the summarized samples
- ARC sample number of the non-spiked aliquot
- names of the compounds included in the MS solution
- true concentrations and concentration units for each compound in the MS and MSD
- observed compound concentration and concentration units in the non-spiked aliquot
- observed compound concentration and concentration units in the MS aliquot

- observed compound concentration and concentration units in the MSD aliquot
- percent recovery for each compound
- relative percent difference (RPD) between the MS/MSD results
- recovery limits for each compound
- RPD limit for each compound

LCS Summary, which must include the following:

- SDG number
- LCS matrix
- LCS identifier
- names of the compounds included in the LCS solution
- true concentrations and concentration units for each compound in the LCS
- observed compound concentrations and concentration units
- percent recovery for each compound
- recovery limits for each compound

If an LCSD is performed, the LCS Summary must also include:

- LCSD identifier
- observed concentration for each LCSD compound
- percent recovery for each compound
- RPD between the LCS/LCSD results
- RPD limit for each compound

Method Blank Summary: The Method Blank Summaries will be arranged in chronological order by date of analysis of the blank, by instrument and must include the following:

- SDG number matrix of summarized samples
- method blank identifier
- analysis file number for the method blank
- date and time of method blank analysis
- instrument identifier
- ARC sample numbers associated with the method blank
- analysis file number for each associated ARC sample

GC/MS Tuning and Mass Calibration Summary: The tuning summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- matrix of the summarized samples tuning injection file number
- tuning inject date and time of analysis

- instrument identifier
- percent relative abundance for each required mass ion
- acceptance criteria for each relative abundance
- identifier for each associated QC sample
- each associated ARC sample number
- analysis file number, date, and time for each associated QC and ARC sample analysis

Initial Calibration Summary: The initial calibration summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- start and end dates and times of the initial calibration
- analysis file numbers for all initial calibration analyses
- instrument identifier
- compound names for all target compounds and surrogates
- relative response factors (RRFs) for each initial calibration standard performed
- average RRF for each target compound and surrogate
- percent relative standard deviation (%RSD) for each target compound and surrogate
- calibration curve equation and curve plot for each target compound and surrogate (if applicable)

Initial Calibration Verification (ICV) Summary (if ICV is performed): The ICV summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- start and end dates and times of associated initial calibration
- analysis date and time of ICV standard
- analysis file number of the ICV analysis
- instrument identifier
- compound names for all target compounds and surrogates
- initial calibration average RRF or true concentration for each target compound and surrogate
- observed ICV standard RRF or concentration for each target compound and surrogate
- percent difference or percent drift for each target compound and surrogate
- acceptance criteria for each compound

Continuing Calibration Verification (CCV) Summary: The CCV summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- start and end dates and times of associated initial calibration
- analysis date and time of CCV standard
- analysis file number of the CCV analysis

- instrument identifier
- compound names for all target compounds and surrogates
- initial calibration average RRF or true concentration for each target compound and surrogate
- observed continuing calibration standard RRF or concentration for each target compound and surrogate
- percent difference or percent drift for each target compound and surrogate

Internal Standard Area and Retention Time Summary: The internal standard summary will be arranged in chronological order, by instrument and must include the following:

- SDG number CCV standard file number
- CCV standard date and time of analysis
- instrument identifier
- compound name for each internal standard
- observed area and retention time for each internal standard in the CCV standard
  - Project samples and QC sample areas and retention times must be compared to the associated CCV standard
  - CCV standard areas and retention times must be compared to the midpoint standard of the associated initial calibration
- upper acceptance limit for the area and retention time for each internal standard
- lower acceptance limit for the area and retention time for each internal standard
- observed area and retention time for each internal standard from the mid-point standard of the associated initial calibration.
- each associated ARC sample number
- observed area and retention time for each internal standard for associated ARC sample
- identifier for each associated QC sample
- observed area and retention time for each internal standard for associated QC sample

## B. Sample Data

Sample data shall be arranged in individual sample packets (consisting of the Target Compound Analytical Results Summaries followed by the raw data for volatile samples) that must be placed in increasing alphanumeric order by laboratory sample number. The order of each sample packet is as follows:

Target Compound Analytical Results Summary that must include the following:

- SDG number
- ARC sample number
- laboratory sample identifier
- matrix of the ARC sample
- date of sample collection
- date of analysis

- analysis file number
  - sample weight or volume used for analysis
  - sample percent solid content
  - final extract sample volume
  - extract aliquot volume used for analysis
  - dilution factor
  - name and Chemical Abstract Service (CAS) number for each target compound
  - concentration of positive results and project-required quantitation limit and/or MDL for each target compound
  - any applicable flags for target compound results (e.g., “U” to designate a “not-detected” result)
  - concentration units
- Reconstructed total ion chromatogram (RIC) and quantitation report (including initial and re-integrations for manually-integrated data).
  - Copies of raw spectra and copies of background-subtracted mass spectrum of each target compound identified in the sample and corresponding background-subtracted target compound standard mass spectrum
  - Quantitation/Calculation of TIC concentrations (if applicable)
  - Copies of up to 10 non-surrogate and non-internal standard volatile TICs and the associated best-match spectra (best three matches) from the GC/MS library search for each TIC (if requested)

#### C. Standards Data

- Copies of RIC and quantitation report (including initial and re-integrations for manually-integrated data) for each initial calibration standard associated with analyses in the SDG, in chronological order, by instrument.
- Copies of RIC and quantitation report (including initial and re-integrations for manually-integrated data) for each ICV standard associated with analyses in the SDG, in chronological order, by instrument.
- Copies of RIC and quantitation report (including initial and re-integrations for manually-integrated data) for each CCV standard associated with analyses in the SDG, in chronological order, by instrument.

#### D. Raw QC Data

For each GC/MS tuning and mass calibration arranged in chronological order, by instrument:

- Bromofluorobenzene (BFB) bar graph spectrum
- BFB mass listing

Blank Data (including instrument/solvent blank data) arranged in chronological order, by instrument:

- Target Compound Analytical Results Summary (as previously defined)
  - TIC Analytical Results Summary (if applicable, as previously defined)
  - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
  - Copies of raw spectra and copies of background-subtracted mass spectra of each target compound identified in the blank and corresponding background-subtracted target compound standard mass spectra
  - Quantitation/Calculation of TIC concentrations (if applicable)
  - Copies of mass spectra of non-surrogate and non-internal standard volatile tentatively identified compounds (TICs) and the associated best-match spectra (best three matches) from the GC/MS library search for each TIC (if requested)
- LCS Data
- Target Compound Analytical Results Summary (as previously defined)
  - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
- LCSD Data (if performed)
- Target Compound Analytical Results Summary (as previously defined)
  - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
- MS Data
- Target Compound Analytical Results Summary (as previously defined)
  - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
- MSD Data
- Target Compound Analytical Results Summary (as previously defined)
  - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
- E. Preparation Logs
- Toxicity Characteristic Leaching Procedure (TCLP) Extraction Logs (if performed)
  - Volatile Medium-Level (Methanol) Extraction Logs (if performed)

- Volatile Low-Level (En Core®) Sample Preparation Logs (if performed)
- Volatile Sample pH Logs (aqueous samples only)

### 3. GC Volatile Organic Data

#### A. QC Summary

Surrogate Percent Recovery Summary that must include the following:

- SDG number
- ARC sample number
- Method blank sample number
- MS sample number
- MSD sample number
- LCS identification number
- LCSD identification number (if performed)
- matrix of the summarized samples
- percent recovery for all surrogate compounds
- applicable recovery limits for each surrogate compound

MS/MSD Summary that must include the following:

- SDG number
- matrix of the summarized samples
- ARC sample number of the non-spiked aliquot
- names of the compounds included in the MS solution
- true concentrations and concentration units for each compound in the MS and MSD
- observed compound concentration and concentration units in the non-spiked aliquot
- observed compound concentration and concentration units in the MS aliquot
- observed compound concentration and concentration units in the MSD aliquot
- percent recovery for each compound
- RPD between the MS/MSD results
- recovery limits for each compound
- RPD limit for each compound

LCS Summary, which must include the following:

- SDG number
- LCS matrix
- LCS identifier

- names of the compounds included in the LCS solution
- true concentrations and concentration units for each compound in the LCS
- observed compound concentrations and concentration units
- percent recovery for each compound
- recovery limits for each compound
- pound

If an LCSD is performed, the LCS Summary must also include:

- LCSD identifier
- observed concentration for each LCSD compound
- percent recovery for each compound
- RPD between the LCS/LCSD results
- RPD limit for each compound

Method Blank Summary: The Method Blank Summaries will be arranged in chronological order by date of analysis of the blank, by instrument and must include the following:

- SDG number
- matrix of summarized samples
- method blank identifier
- analysis file number for the method blank
- date and time of method blank analysis
- instrument identifier
- ARC sample numbers associated with the method blank
- analysis file number for each associated ARC sample

Initial Calibration Summary: The initial calibration summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- start and end dates and times of the initial calibration
- analysis file numbers for all initial calibration analyses
- instrument identifier
- compound names for all target compounds and surrogates
- RRFs or response factor (RF) for each initial calibration standard performed
- average RRF or average RF for each target compound and surrogate
- %RSD for each target compound and surrogate
- calibration curve equation and curve plot for each target compound and surrogate (if applicable)

Initial Calibration Verification (ICV) Summary: The ICV summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- start and end dates and times of associated initial calibration
- analysis date and time of ICV standard
- analysis file number of the ICV analysis
- instrument identifier
- compound names for all target compounds and surrogates
- initial calibration average RRF, average RF, or true concentration for each target compound and surrogate
- observed ICV standard RRF or RF or concentration for each target compound and surrogate
- percent difference or percent drift for each target compound and surrogate
- acceptance criteria for ICV standard

Continuing Calibration Verification (CCV) Summary: The CCV summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- start and end dates and times of associated initial calibration
- analysis date and time of CCV standard
- analysis file number of the CCV analysis
- instrument identifier
- compound names for all target compounds and surrogates
- initial calibration average RRF, average RF or true concentration for each target compound and surrogate
- observed continuing calibration standard RRF or RF or concentration for each target compound and surrogate
- percent difference or percent drift for each target compound and surrogate

Internal Standard Area and Retention Time Summary (if applicable): The internal standard summary will be arranged in chronological order, by instrument and must include the following:

- SDG number
- CCV standard file number
- CCV standard date and time of analysis
- instrument identifier
- compound name for each internal standard
- observed area and retention time for each internal standard in the CCV standard
  - project samples and QC sample areas and retention times must be compared to the associated CCV standard

- CCV standard areas and retention times must be compared to the midpoint standard of the associated initial calibration
  - upper acceptance limit for the area and retention time for each internal standard
  - lower acceptance limit for the area and retention time for each internal standard
  - observed area and retention time for each internal standard from the mid-point standard of the associated initial calibration.
  - each associated ARC sample number
  - observed area and retention time for each internal standard for associated ARC sample
  - identifier for each associated QC sample
  - observed area and retention time for each internal standard for associated QC sample

## B. Sample Data

Sample data will be arranged in individual sample packets (consisting of the Target Compound Analytical Results Summaries followed by the raw data for volatile samples) that must be placed in increasing alphanumeric order by ARC sample number. The order of each sample packet is as follows:

Target Compound Analytical Results Summary that must include the following:

- SDG number
  - ARC sample number
  - laboratory sample identifier
  - matrix of the ARC sample
  - date of sample collection
  - date of analysis
  - analysis file number
  - sample weight or volume used for analysis
  - sample percent solid content
  - final extract sample volume
  - extract aliquot volume used for analysis
  - dilution factor
  - name and CAS number for each target compound
  - concentration of positives, PRQL and/or MDL for each target compound
  - any applicable flags for target compound results (e.g., “U” to designate a “not-detected” result)
  - concentration units
- Copies of volatile chromatograms (including initial and re-integrations for manually-integrated data).
- Copies of volatile chromatograms (including initial and re-integrations for manually-integrated data) from second gas chromatograph (GC) column confirmation (if performed).

- GC integration reports or data system printouts. All peaks must be included on the integration reports or data system printouts.
- Manual work sheets (including example calculation showing how sample results are calculated using initial calibration standard peak areas/heights and sample peak areas/heights for at least one sample).

#### C. Standards Data

Analytical Sequence Form: The analytical sequence forms will be arranged in chronological order, by GC column, by instrument and must include the following:

- SDG Number
  - instrument identifier
  - ARC sample numbers associated with the sequence
  - QC sample identifiers associated with the sequence
  - analysis file number, date, and time for each ARC sample and QC sample associated with the sequence
  - initial calibration start and end dates and times associated with the sequence
- Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each initial calibration standard associated with SDG in chronological order, by GC column, by instrument
  - Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each ICV standard associated with SDG in chronological order, by GC column, by instrument following the associated initial calibration standards data
  - Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each CCV associated with SDG in chronological order, by GC column, by instrument following the associated initial calibration standards data

#### D. Raw QC Data

- Blank Data (including instrument/solvent blank data) arranged in chronological order, by instrument
  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports (including initial and re-integrations for manually-integrated data). All peaks must be included on the integration reports or data system printouts.
- LCS Data
  - Target Compound Analytical Results Summary (as previously defined)

- chromatograms and integration reports(including initial and re-integrations for manually-integrated data)
- LCSD Data (if performed)
  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports(including initial and re-integrations for manually-integrated data)
- MS Data
  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports(including initial and re-integrations for manually-integrated data)
- MSD Data
  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports(including initial and re-integrations for manually-integrated data)

#### E. Preparation Logs

- TCLP Extraction Logs (if performed)
- Volatile Medium-Level (methanol) Extraction Logs (if performed)
- Volatile Low-Level (En Core<sup>®</sup>) Sample Preparation Logs (if performed)
- Volatile sample pH logs (aqueous samples only)

### 4. GC/MS Semivolatile Organic Data

#### A. QC Summary

Surrogate Percent Recovery Summary that must include the following:

- SDG number
- ARC sample number
- Method blank sample number
- MS sample number
- MSD sample number
- LCS identification number
- LCSD identification number (if performed)
- matrix of the summarized samples

- percent recovery for all surrogate compounds
- applicable recovery limits for each surrogate compound

MS/MSD Summary that must include the following:

- SDG number
- matrix of the summarized samples
- ARC sample number of the non-spiked aliquot
- names of the compounds included in the MS solution
- true concentrations and concentration units for each compound in the MS and MSD
- observed compound concentration and concentration units in the non-spiked aliquot
- observed compound concentration and concentration units in the MS aliquot
- observed compound concentration and concentration units in the MSD aliquot
- percent recovery for each compound
- RPD between the MS/MSD results
- recovery limits for each compound
- RPD limit for each compound

LCS Summary that must include the following:

- SDG number
- LCS matrix
- LCS identifier
- names of the compounds included in the LCS solution
- true concentrations and concentration units for each compound in the LCS
- observed compound concentrations and concentration units
- percent recovery for each compound
- recovery limits for each compound

If an LCSD is performed, the LCS Summary must also include:

- LCSD identifier
- observed concentration for each LCSD compound
- percent recovery for each compound
- RPD between the LCS/LCSD results
- RPD limit for each compound

Method Blank Summary: The Method Blank Summaries will be arranged in chronological order by date of analysis of the blank, by instrument and must include the following:

- SDG number
- matrix of summarized samples

- method blank identifier
- date and time of method blank analysis
- instrument identifier
- ARC sample numbers and QC sample identifiers associated with the method blank
- analysis file number for each associated ARC sample and QC sample
- indication if and what type of sample clean-up was performed.

GC/MS Tuning and Mass Calibration Summary: The tuning summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- matrix of the summarized samples
- tuning injection file number
- tuning inject date and time of analysis
- instrument identifier
- percent relative abundance for each required mass ion
- acceptance criteria for each relative abundance
- identifier for each associated QC sample
- each associated ARC sample number
- analysis file number, date, and time for each associated QC and ARC sample analysis

Initial Calibration Summary: The initial calibration summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- start and end dates and times of the initial calibration
- analysis file numbers for all initial calibration analyses
- instrument identifier
- compound names for all target compounds and surrogates
- RRFs for each initial calibration standard performed
- average RRF for each target compound and surrogate
- %RSD for each target compound and surrogate
- calibration curve equation and curve plot for each target compound and surrogate (if applicable)

Initial Calibration Verification (ICV) Summary (if ICV is performed): The ICV summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- start and end dates and times of associated initial calibration
- analysis date and time of ICV standard
- analysis file number of the ICV analysis

- instrument identifier
- compound names for all target compounds and surrogates
- initial calibration average RRF, average RF, or true concentration for each target compound and surrogate
- observed ICV standard RRF or RF or concentration for each target compound and surrogate
- percent difference or percent drift for each target compound and surrogate
- acceptance criteria for ICV standard

Continuing Calibration Verification (CCV) Summary: The CCV summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- start and end dates and times of associated initial calibration
- analysis date and time of CCV standard
- analysis file number of the CCV analysis
- instrument identifier
- compound names for all target compounds and surrogates
- initial calibration average RRF, average RF, or true concentration for each target compound and surrogate
- observed continuing calibration standard RRF or RF or concentration for each target compound and surrogate
- percent difference or percent drift for each target compound and surrogate

Internal Standard Area and Retention Time Summary: The internal standard summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- CCV standard file number
- CCV standard date and time of analysis
- instrument identifier
- compound name for each internal standard
- observed area and retention time for each internal standard in the CCV standard
  - project samples and QC sample areas and retention times must be compared to the associated CCV standard
  - CCV standard areas and retention times must be compared to the midpoint standard of the associated initial calibration
- upper acceptance limit for the area and retention time for each internal standard
- lower acceptance limit for the area and retention time for each internal standard
- observed area and retention time for each internal standard from the mid-point standard of the associated initial calibration.
- each associated ARC sample number
- observed area and retention time for each internal standard for associated ARC sample

- identifier for each associated QC sample
- observed area and retention time for each internal standard for associated QC sample

## B. Sample Data

Sample data will be arranged in individual sample packets (consisting of the Target Compound Analytical Results Summaries, followed by the raw data for semivolatile samples) that must be placed in increasing alphanumeric order by laboratory sample number. The order of each sample packet is as follows:

Target Compound Analytical Results Summary that must include the following:

- SDG number
  - ARC sample number
  - laboratory sample identifier
  - matrix of the ARC sample
  - date of sample collection
  - date of sample extraction
  - date of sample analysis
  - analysis file number
  - sample weight or volume used for extraction with units
  - sample percent solids
  - sample final extract volume with units
  - sample extract injection volume with units
  - dilution factor
  - indication if and what type of sample cleanup was performed
  - name and CAS number for each target compound
  - concentration of positives and PRQL and/or MDL for each target compound
  - any applicable flags for target compound results (e.g., “U” to designate a “not-detected” result)
  - concentration units
- 
- RIC and quantitation report (including initial and re-integrations for manually-integrated data)
  - Copies of raw spectra and copies of background-subtracted mass spectra of each target compound identified in the sample and corresponding background-subtracted target compound standard mass spectra
  - Quantitation/Calculation of TIC concentrations (if applicable)

- Copies of mass spectra of up to 20 non-surrogate and non-internal standard semivolatiles and the associated best-match spectra (best three matches) from the GC/MS library search for each TIC (if requested)
- UV trace for GPC (if performed)

#### C. Standards Data

- Copies of RIC and quantitation report (including initial and re-integrations for manually-integrated data) for each initial calibration standard associated with analyses in the SDG, in chronological order, by instrument
- Copies of RIC and quantitation report (including initial and re-integrations for manually-integrated data) for each ICV standard associated with analyses in the SDG, in chronological order, by instrument
- Copies of RIC and quantitation report (including initial and re-integrations for manually-integrated data) for each CCV standard associated with analyses in the SDG, in chronological order, by instrument

#### D. Raw QC Data

For each GC/MS tuning and mass calibration arranged in chronological order, by instrument:

- Decafluorotriphenylphosphine (DFTPP) bar graph spectrum
- DFTPP mass listing

Blank Data (including instrument/solvent blank data) arranged in chronological order, by instrument:

- Target Compound Analytical Results Summary (as defined in Section 2.3.b)
  - TIC Analytical Results Summary (as defined in Section 2.3b)
  - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
  - Copies of raw spectra and copies of background-subtracted mass spectra of each target compounds identified in the blank and corresponding background-subtracted target compound standard mass spectra
  - Quantitation/Calculation of TIC concentrations (if applicable)
  - Copies of mass spectra of non-surrogate and non-internal standard semivolatiles tentatively identified compounds (TICs) and the associated best-match spectra (best three matches) from the GC/MS library search for each TIC (if requested)
- LCS Data
    - Target Compound Analytical Results Summary (as previously defined)
    - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
  - LCSD Data (if performed)

- Target Compound Analytical Results Summary (as previously defined)
- RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
- MS Data
  - Target Compound Analytical Results Summary (as previously defined)
  - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
- MSD Data
  - Target Compound Analytical Results Summary (as previously defined)
  - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)

E. Preparation Logs

- TCLP Extract Logs (if performed)
- Semivolatile Extraction Logs

**5. GC Organochlorine Pesticide/PCB Data**

A. QC Summary

Surrogate Percent Recovery Summary that must include the following:

- SDG number
- ARC sample number
- Method blank sample number
- MS sample number
- MSD sample number
- LCS identifier
- LCSD identification number (if performed)
- matrix of the summarized samples
- percent recovery for all surrogate compounds from both columns
- applicable recovery limit for each surrogate compound

MS/MSD Summary that must include the following:

- SDG number
- matrix of the summarized samples
- ARC sample number of the non-spiked aliquot

- names of the compounds included in the MS solution
- true concentrations and concentration units for each compound in the MS and MSD
- observed compound concentration and concentration units in the non-spiked aliquot
- observed compound concentration and concentration units in the MS aliquot
- observed compound concentration and concentration units in the MSD aliquot
- percent recovery for each compound
- RPD between the MS/MSD results
- recovery limits for each compound
- RPD limits for each compound

LCS Summary, which must include the following:

- SDG number
- LCS matrix
- LCS identifier
- names of the compounds included in the LCS solution
- true concentration and concentration units for each compound in the LCS
- observed compound concentration and concentration units
- percent recovery for each compound
- recovery limits for each compound

If LCSD is performed, the summary must also include:

- LCSD identifier
- Observed concentration for each LCSD compound
- Percent recovery for each compound
- RPD between the LCS/LCSD results
- RPD limit for each compound

Method Blank Summary: The Method Blank Summaries will be arranged in chronological order by date of analysis of the blank, by instrument and must include the following:

- SDG number
- matrix of summarized samples
- method blank identifier
- analysis file number for the method blank
- date and time of method blank analysis
- instrument identifier
- column identifiers
- ARC sample numbers associated with the method blank
- analysis file number for each associated ARC sample.

- an indication if and what type of sample clean-up was performed.

Initial Calibration RRF or RF Summary: The initial calibration RRF or RF summaries will be arranged in chronological order, by instrument, by column, and must include the following:

- SDG number
- start and end dates and times of the initial calibration
- file identifiers for all initial calibration analyses
- instrument identifier
- column identifier
- compound names for all target compounds and surrogates
- RRFs or CFs for each initial calibration standard performed
- average RRF or CF for each target compound and surrogate
- %RSD for each target compound and surrogate
- calibration curve equation and curve plot for each target compound and surrogate (if applicable)

Initial Calibration Retention Time Summary: The initial calibration retention time summaries will be arranged in chronological order, by instrument, by column, and must include the following:

- SDG number
- start and end dates and times of the initial calibration
- file identifiers for all initial calibration analyses
- instrument identifier
- column identifier
- compound names for all target compounds and surrogates
- retention times for each initial calibration standard performed
- average retention time for each target compound and surrogate
- upper and lower retention time acceptance limits for each target compound and surrogate

Initial Calibration Verification (ICV) Summary: The ICV summaries will be arranged in chronological order, by instrument, by column, and must include the following:

- SDG number
- start and end dates and times of associated initial calibration
- analysis dated and time of ICV standard
- file number of the ICV analysis
- instrument identifier
- column identifier
- compound names for all target compounds and surrogates
- observed retention times for each target compound and surrogate

- initial calibration average RRF or CF or true concentration for each target compound and surrogate
- acceptance criteria for ICV standard

Continuing Calibration Verification (CCV) Summary: The CCV summaries will be arranged in chronological order, by instrument, by column, and must include the following:

- SDG number
- start and end dates and times of associated initial calibration
- analysis dated and time of CCV standard
- file number of the CCV analysis
- instrument identifier
- column identifier
- compound names for all target compounds and surrogates
- observed retention times for each target compound and surrogate
- initial calibration average RRF or CF or true concentration for each target compound and surrogate
- observed CCV standard RRF or CF or concentration for each target compound and surrogate
- percent difference or percent drift for each target compound and surrogate
- percent breakdown for endrin and 4,4'-DDT

Internal Standard Area and Retention Time Summary (if applicable): The internal standard summaries will be arranged in chronological order, by instrument, by column, and must include the following:

- SDG number
- CCV standard file number
- CCV standard date and time of analysis
- instrument identifier
- column identifier
- compound name for each internal standard
- observed area and retention time for each internal standard in the CCV standard
  - project samples and QC sample areas and retention times must be compared to the associated CCV standard
  - CCV standard areas and retention times must be compared to the midpoint standard of the associated initial calibration
- upper acceptance limit for the area and retention time for each internal standard
- lower acceptance limit for the area and retention time for each internal standard
- observed area and retention time for each internal standard from the midpoint standard of the associated initial calibration
- each associated ARC sample number
- observed area and retention time for each internal standard for associated ARC sample

- identifier for each associated QC sample
- observed area and retention time for each internal standard for associated QC sample

## B. Sample Data

Sample data shall be arranged in individual sample packets (consisting of the Target Compound Analytical Results Summaries followed by the raw data for organochlorine pesticide/PCB samples) that must be placed in increasing alphanumeric order by laboratory sample number. The order of each sample packet is as follows:

Target Compound Analytical Results Summary that must include the following:

- SDG number
  - ARC sample number
  - laboratory sample identifier
  - matrix of the ARC sample
  - date of sample collection
  - date of sample extraction
  - date of sample analysis
  - analysis file number
  - sample weight or volume used for extraction with units
  - sample percent solids
  - sample final extract volume with units
  - sample extract injection volume with units
  - dilution factor
  - indication if and what type of sample cleanup was performed
  - name and CAS number for each target compound
  - concentration of positives and PRQL and/or MDL for each target compound
  - any applicable flags for target compound results (e.g., “U” to designate a “not-detected” result)
  - concentration units
- 
- Copies of organochlorine pesticide/PCB chromatograms
  - Copies of organochlorine pesticide/PCB chromatograms from second GC column confirmation (if performed)
  - RPD between concentrations on columns for positive results.
  - GC integration reports or data system printouts (including initial and re-integrations for manually-integrated data). All peaks must be included on the integration reports or data system printouts.

- Manual work sheets (including example calculation showing how sample results are calculated using initial calibration standard peak areas/heights and sample peak areas/heights for at least one sample)
- UV traces from GPC (if performed)
- If organochlorine pesticides/PCBs are confirmed by GC/MS, the laboratory must submit copies of raw spectra and copies of background-subtracted mass spectra of target compounds that are identified in the sample and corresponding background-subtracted target compound standard mass spectra. For multi-component pesticides/PCBs confirmed by GC/MS, the laboratory must submit mass spectra of three major peaks of multi-component compounds from samples and standards

#### C. Standards Data

Analytical Sequence Form: The analytical sequence forms will be arranged in chronological order, by GC column, by instrument, by column, and must include the following:

- SDG number
  - instrument identifier
  - column identifier
  - ARC sample numbers associated in the sequence
  - QC sample identifiers associated in the sequence
  - analysis file number, date, and time for each ARC sample and QC sample associated in the sequence
  - initial calibration start and end dates and times associated in the sequence
- Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each initial calibration standard associated with SDG in chronological order, by column, by instrument
  - Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each ICV standard associated with SDG in chronological order, by column, by instrument following the associated initial calibration standards data
  - Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each CCV standard associated with SDG in chronological order, by column, by instrument following the associated initial calibration standards data

#### D. Raw QC Data

- Blank Data (including instrument/solvent blank data) arranged in chronological order, by instrument
  - Target Compound Analytical Results Summary (as previously defined)

- chromatograms and integration reports (including initial and re-integrations for manually-integrated data). All peaks must be included on the integration reports or data system printouts.
- LCS Data
  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)
- LCSD Data (if performed)
  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)
- MS Data
  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)
- MSD Data
  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)

E. Preparation Logs

- TCLP Extraction Logs (if performed)
- Organochlorine Pesticide/PCB Extraction Logs

**6. GC Herbicide Data**

A. QC Summary

Surrogate Percent Recovery Summary, which must include the following:

- SDG number
- ARC sample number
- Method blank sample number
- MS sample number
- MSD sample number

- LCS identifier
- LCSD identification number (if performed)
- matrix of the summarized samples
- percent recovery for all surrogate compounds from both columns
- applicable recovery limit for each surrogate compound

MS/MSD Summary that must include the following:

- SDG number
- matrix of the summarized samples
- ARC sample number of the non-spiked aliquot
- names of the compounds included in the MS solution
- true concentrations and concentration units for each compound in the MS and MSD
- observed compound concentration and concentration units in the non-spiked aliquot
- observed compound concentration and concentration units in the MS aliquot
- observed compound concentration and concentration units in the MSD aliquot
- percent recovery for each compound
- RPD between the MS/MSD results
- recovery limits for each compound
- RPD limit for each compound

LCS Summary that must include the following:

- SDG number
- LCS matrix
- LCS identifier
- names of the compounds included in the LCS solution
- true concentration and concentration units for each compound in the LCS
- observed compound concentration and concentration units
- percent recovery for each compound
- recovery limits for each compound

If LCSD is performed, the summary must also include:

- LCSD identifier
- observed concentration for each LCSD compound
- percent recovery for each compound
- RPD between LCS/LCSD results
- RPD limit for each compound

Method Blank Summary: The Method Blank Summaries will be arranged in chronological order by date of analysis of the blank, by instrument and must include the following:

- SDG number
- matrix of summarized samples
- method blank identifier
- analysis file number for the method blank
- date and time of method blank analysis
- instrument identifier
- column identifiers
- ARC sample numbers associated with the method blank
- analysis file number for each associated ARC sample.
- indication if and what type of sample clean-up was performed.

Initial Calibration RRF or RF Summary: The initial calibration RRF or CF summaries will be arranged in chronological order, by instrument, by column, and must include the following:

- SDG number
- start and end dates and times of the initial calibration
- file identifiers for all initial calibration analyses
- instrument identifier
- column identifier
- compound names for all target compounds and surrogates
- RRFs or RFs for each initial calibration standard performed
- average RRF or RF for each target compound and surrogate
- %RSD for each target compound and surrogate
- calibration curve equation and curve plot for each target compound and surrogate (if applicable)

Initial Calibration Retention Time Summary: The initial calibration retention time summaries will be arranged in chronological order, by instrument, by column, and must include the following:

- SDG number
- start and end dates and times of the initial calibration
- file identifiers for all initial calibration analyses
- instrument identifier
- column identifier
- compound names for all target compounds and surrogates
- retention times for each initial calibration standard performed
- average retention time for each target compound and surrogate
- upper and lower retention time acceptance limits for each target compound and surrogate

Initial Calibration Verification (ICV) Summary: The ICV summaries will be arranged in chronological order, by instrument, by column, and must include the following:

- SDG number
- start and end dates and times of associated initial calibration
- analysis dated and time of ICV standard
- file number of the ICV analysis
- instrument identifier
- column identifier
- compound names for all target compounds and surrogates
- observed retention times for each target compound and surrogate
- initial calibration average RRF or CF or true concentration for each target compound and surrogate
- observed ICV standard RRF or CF or concentration for each target compound and surrogate
- percent difference or percent drift for each target compound and surrogate
- acceptance criteria for ICV standard

Continuing Calibration Verification (CCV) Summary: The CCV summaries will be arranged in chronological order, by instrument, by column, and must include the following:

- SDG number
- start and end dates and times of associated initial calibration
- analysis dated and time of CCV standard
- file number of the CCV analysis
- instrument identifier
- column identifier
- compound names for all target compounds and surrogates
- observed retention times for each target compound and surrogate
- initial calibration average RRF or RF or true concentration for each target compound and surrogate
- observed CCV standard RRF or RF or concentration for each target compound and surrogate
- percent difference or percent drift for each target compound and surrogate

Internal Standard Area and Retention Time Summary (if applicable): The internal standard summaries will be arranged in chronological order, by instrument, by column, and must include the following:

- SDG number
- CCV standard file number
- CCV standard date and time of analysis
- instrument identifier
- column identifier

- compound name for each internal standard
- observed area and retention time for each internal standard in the reference standard
  - project samples and QC sample areas and retention times must be compared to the associated CCV standard
  - CCV standard areas and retention times must be compared to the midpoint standard of the associated initial calibration
- upper acceptance limit for the area and retention time for each internal standard
- lower acceptance limit for the area and retention time for each internal standard
- observed area and retention time for each internal standards from the midpoint standard of the associated initial calibration
- each associated ARC sample number
- observed area and retention time for each internal standard for associated ARC sample
- identifier for each associated QC sample
- observed area and retention time for each internal standard for associated QC sample

## B. Sample Data

Sample data shall be arranged in individual sample packets (consisting of the Target Compound Analytical Results Summaries followed by the raw data for herbicide samples) that must be placed in increasing alphanumeric order by laboratory sample number. The order of each sample packet is as follows:

Target Compound Analytical Results Summary that must include the following:

- SDG number
- ARC sample number
- laboratory sample identifier
- matrix of the ARC sample
- date of sample collection
- date of sample extraction
- date of sample analysis
- analysis file number
- sample weight or volume used for extraction with units
- sample percent solids
- sample final extract volume with units
- sample extract injection volume with units
- dilution factor
- indication if and what type of sample cleanup was performed
- name and CAS number for each target compound
- concentration of positives and PRQL and/or MDL for each target compound
- any applicable flags for target compound results (e.g., “U” to designate a “not-detected” result)

- concentration units
- Copies of herbicide chromatograms
- Copies of herbicide chromatograms from second GC column confirmation (if performed)
- GC integration reports or data system printouts (including initial and re-integrations for manually-integrated data). All peaks must be included on the integration reports or data system printouts.
- RPD between concentrations on columns for positive results.
- Manual work sheets (including example calculation showing how sample results are calculated using initial calibration standard peak areas/heights and sample peak areas/heights for at least one sample)
- UV traces from GPC (if performed)
- If herbicides are confirmed by GC/MS, the laboratory must submit copies of raw spectra and copies of background-subtracted mass spectra of target compounds that are identified in the sample and corresponding background-subtracted target compound standard mass spectra.

#### C. Standards Data

Analytical Sequence Form: The analytical sequence forms will be arranged in chronological order, by column, by instrument and must include the following:

- SDG number
- instrument identifier
- column identifier
- ARC sample numbers associated in the sequence
- QC sample identifiers associated in the sequence
- analysis file number, date, and time for each ARC sample and QC sample associated in the sequence
- initial calibration start and end dates and times associated in the sequence
- Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each initial calibration standard associated with SDG in chronological order, by GC column, by instrument
- Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each initial calibration verification standard associated with SDG in chronological order, by GC column, by instrument following the associated initial calibration standards data
- Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each continuing calibration standard associated with SDG in

chronological order, by GC column, by instrument following the associated initial calibration standards data

#### D. Raw QC Data

- Blank Data (including instrument/solvent blank data) arranged in chronological order, by instrument
  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports (including initial and re-integrations for manually-integrated data). All peaks must be included on the integration reports or data system printouts.
- LCS Data
  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)
- LCSD Data (if performed)
  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)
- MS Data
  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)
- MSD Data
  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)

#### E. Preparation Logs

- TCLP Extraction Logs (if performed)
- Herbicide Extractions Logs

### 7. ICP, ICP/MS, and AA Metals Data

- A. Target Analyte Results Summaries: Target analyte results summaries are required for all samples and will be arranged in increasing alphanumeric order by ARC sample number.

The target analyte results summary must include the following:

- SDG Number
- ARC sample number
- laboratory sample identifier
- matrix of the ARC sample
- date of sample collection
- sample percent solids
- name and CAS number for each target analyte
- concentration of positives and project-required detection limit (PRDL) and/or MDL for each target analyte
- any applicable flags for target analyte results (e.g., “U” to designate a “not-detected” result)
- concentration units

#### B. QC and Quarterly Verification of Instrument Parameters Summaries

Initial and Continuing Calibration Verification Summary: The initial and continuing calibration verification summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- names for all target analytes
- instrument identifier
- start and end dates and times of the analytical sequence
- true concentrations for all target analytes for the initial calibration verification (ICV) and continuing calibration verification (CCV) standards
- observed concentrations for all target analytes for each ICV and CCV analyses
- calculated percent recoveries for all target analytes for each ICV and CCV analyses
- control limits for ICV and CCV percent recoveries
- concentration units

Reporting Limit (RL) Standard Summary: The RL standard summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- names for all target analytes
- instrument identifier
- dates and times for the RL standard analyses
- true concentrations for all target analytes
- observed concentrations for all target analytes for each RL standard analysis
- calculated percent recoveries for all target analytes for each RL standard analysis

- control limits for RL standard recoveries
- concentration units

Initial and Continuing Calibration Blank Summary: The initial and continuing calibration blank summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
  - names for all target analytes
  - instrument identifier
  - start and end dates and times of the analytical sequence
  - observed concentration or MDL for each target analyte for each initial calibration blank (ICB) or continuing calibration blank (CCB) analysis
  - acceptance limits for ICB and CCB analyses
  - concentration units
- Preparation Blank Analytical Summary: The preparation blank analytical summaries will be arranged in chronological order, by instrument and must include the information presented in Section 7A.
- ICP and/or ICP/MS Interference Check Sample Summary: The ICP and/or ICP/MS interference check sample summaries will be arranged in chronological order, by instrument and must include the following: [NOTE: Aluminum, Calcium, Iron, and Magnesium results are to be reported even if these are not target analytes.]
- SDG number
  - names for all target analytes
  - instrument identifier
  - dates and times for the ICP interference check standard analyses
  - true concentrations for all target analytes
  - observed concentrations for all target analytes observed in each ICP interference check standard analysis
  - calculated percent recoveries for all target analytes for each ICP interference check standard analysis
  - control limits for ICP interference check standard recoveries
  - concentration units

MS Sample Recovery Summary: The MS sample recovery summaries will be arranged in alphanumeric order by laboratory sample number and must include the following:

- SDG number
- ARC sample number for the spiked sample
- percent solids for the ARC sample
- names for all target analytes
- analyte concentration observed in the non-spiked sample aliquot

- true concentrations for all target analytes in the MS solution
- observed concentrations for all target analytes in the MS sample analysis
- calculated percent recoveries for all target analytes
- control limits for MS sample recoveries
- concentration units

If an MSD is performed, the summary must also include:

- MSD identifier
- observed concentration for each all target analytes in the MSD sample
- percent recovery for all target analytes
- RPD between the MS/MSD results for each analyte
- RPD limit for each analyte

Post-Spike Sample Recovery Summary (if applicable): The post-spike sample recovery summaries will be arranged in alphanumeric order by laboratory sample number and must include the following:

- SDG number
- ARC sample number for the post-spiked sample
- percent solids for the ARC sample
- names for all target analytes
- analyte concentration observed in the non-spiked sample aliquot
- true concentrations for all target analytes in the post-spike solution
- observed concentrations for all target analytes in the post-spike sample analysis
- calculated percent recoveries for all target analytes
- control limits for post-spike sample recoveries
- concentration units

Duplicates Precision Summary: The duplicate precision summaries will be arranged in alphanumeric order by ARC sample number and must include the following:

- SDG number
- ARC sample number for the duplicate sample
- percent solids for the ARC sample
- names for all target analytes
- analyte concentration observed in the original sample aliquot
- observed concentrations for all target analytes in the duplicate sample analysis
- calculated RPD for all target analytes
- control limits for RPD
- concentration units

LCS Recovery Summary: The LCS recovery summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- LCS identifier
- names for all target analytes
- true concentrations for all target analytes in the LCS solution
- observed concentrations for all target analytes in the LCS analysis
- calculated percent recoveries for all target analytes
- control limits for LCS recoveries
- concentration units

Standard Addition Results Summary that must include the following:

- SDG number
- ARC sample number for the sample that underwent the standard additions procedure
- names for all target analytes
- analyte concentration or absorbance observed in the non-spiked sample aliquot
- true concentrations for all target analytes for each standard addition analysis
- observed concentration or absorbance for each standard addition analysis
- calculated concentration for each target analyte
- calculated correlation coefficient for each target analyte
- concentration units

ICP and/or ICP/MS Serial Dilution Summary: The ICP and/or ICP/MS serial dilution summaries will be arranged in alphanumeric order by laboratory sample number and must include the following:

- SDG number
- ARC sample number for the ICP or ICP/MS serial dilution sample
- names for all target analytes
- analyte concentration observed in the original sample aliquot
- observed concentrations for all target analytes in the ICP or ICP/MS serial dilution analysis
- calculated percent difference for all target analytes
- control limits for percent difference
- concentration units

RL and Method Detection Limit (MDL) Summary: The RL and MDL summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- instrument identifier

- date the MDL determination was performed
- names for all target analytes
- determined MDL for all target analytes
- RL for all target analytes
- concentration units

ICP Interelement Correction Factors Summary: The ICP interelement correction factors summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- instrument identifier
- date the ICP interelement correction factors determination was performed
- names for all target analytes
- determined ICP interelement correction factors concentrations for all target analytes
- concentration units

ICP and/or ICP/MS Linear Range Summary: The ICP and/or ICP/MS linear range summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- instrument identifier
- date the ICP linear range determination was performed
- names for all target analytes
- determined ICP linear range concentrations for all target analytes
- concentration units
  - TCLP Preparation Logs (if performed)
  - ARC sample and QC sample preparation logs
  - Analytical Sequence Form: The analytical sequence forms will be arranged in chronological order, by analyte, by instrument and must include the following:
- SDG number
- instrument identifier
- ARC sample numbers associated with the sequence
- QC sample identifiers associated with the sequence
- analysis date and time for each ARC sample and QC sample associated with the sequence
- identification of all target analytes reported from each ARC sample and QC sample analysis
- dilution factor for each ARC sample and QC sample analysis
- start and end dates and times for the sequence

- ICP/MS Data Packages will include the following forms in addition to the requirements listed above.

- ICP/MS Tune Summary

- ICP/MS Internal Standards Relative Intensity Summary [the summary must include the acceptance limits and reference internal standards intensity.]

### C. Raw Data

For each reported value, the laboratory will provide all raw data used to obtain that value; this requirement applies to all required QA/QC measurements and instrument standardization as well as all sample analysis results. This statement does not apply to the Quarterly Verifications Parameters submitted as part of each data package. Raw data must contain all instrument readouts used for the sample results. Each exposure or instrumental reading must be provided, including those readouts that may fall below the RL but greater than the MDL. All ICP, ICP/MS, and AA instruments must provide a legible hardcopy of the direct real-time instrument readout (e.g., strip-charts, printer tapes, etc.). A photocopy of the instrument's direct sequential readout must be included. A hardcopy of the instrument's direct instrument readout for cyanide must be included if the instrumentation has the capability.

## 8. General Chemistry Data

The general chemistry data will be arranged in the following order by individual parameter requested for the samples in the SDG.

- A. Target Analyte Results Summaries: Target analyte results summaries are required for all samples and will be arranged in increasing alphanumeric order by ARC sample number.

The target analyte results summary must include the following:

- SDG Number
- ARC sample number
- laboratory sample identifier
- matrix of the ARC sample
- date of sample collection
- sample percent solids
- name and CAS number for each target analyte
- concentration of positives and PRDL and/or MDL for each target analyte
- any applicable flags for target analyte results (e.g., "U" to designate a "not-detected" result)
- concentration units

### B. QC Summaries

Initial and Continuing Calibration Verification Summary: The initial and continuing calibration verification summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- names for all target analytes

- instrument identifier
- start and end dates and times of the analytical sequence
- true concentrations for all target analytes for the ICV and CCV standards
- observed concentrations for all target analytes for each ICV and CCV analyses
- calculated percent recoveries for all target analytes for each ICV and CCV analyses
- control limits for ICV and CCV percent recoveries
- concentration units

Initial and Continuing Calibration Blank Summary: The initial and continuing calibration blank summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- names for all target analytes
- instrument identifier
- start and end dates and times of the analytical sequence
- observed concentration or MDL for each target analyte for each ICB or CCB analysis
- acceptance limits for ICB and CCB analyses
- concentration units

- Preparation Blank Analytical Summary: The preparation blank analytical summaries will be arranged in chronological order, by instrument and must include the information presented in Section 8A.

MS Sample Recovery Summary: The spike sample recovery summaries will be arranged in alphanumeric order by laboratory sample number and must include the following:

- SDG number
- ARC sample number for the spiked sample
- percent solids for the ARC sample
- names for all target analytes
- analyte concentration observed in the non-spiked sample aliquot
- true concentrations for all target analytes in the spike solution
- observed concentrations for all target analytes in the spike sample analysis
- calculated percent recoveries for all target analytes
- control limits for spike sample recoveries
- concentration units

If an MSD is performed, the summary must also include:

- MSD identifier
- observed concentration for each all target analytes in the MSD sample
- percent recovery for all target analytes

- RPD between the MS/MSD results for each analyte
- RPD limit for each analyte

Duplicates Precision Summary: The duplicate precision summaries will be arranged in alphanumeric order by laboratory sample number and must include the following:

- SDG number
- ARC sample number for the duplicate sample
- percent solids for the ARC sample
- names for all target analytes
- analyte concentration observed in the original sample aliquot
- observed concentrations for all target analytes in the duplicate sample analysis
- calculated RPD for all target analytes
- control limits for RPD
- concentration units

LCS Recovery Summary: The LCS recovery summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- LCS identifier
- names for all target analytes
- true concentrations for all target analytes in the LCS solution
- observed concentrations for all target analytes in the LCS analysis
- calculated percent recoveries for all target analytes
- control limits for LCS recoveries
- concentration units

Analytical Sequence Form: The analytical sequence forms will be arranged in chronological order, by analyte, by instrument and must include the following:

- SDG number
- instrument identifier
- identification of the target analyte
- ARC sample numbers associated with the sequence
- QC sample identifiers associated with the sequence
- analysis date and time for each ARC sample and QC sample associated with the sequence
- start and end dates and times for the sequence

### C. Raw Data

For each reported value, the laboratory will provide all raw data (instrument printouts or logbook pages) used to obtain that value; this requirement applies to all required QA/QC measurements and

instrument standardization, as well as all sample analysis results. Raw data must contain all instrument readouts/logbooks pages used for the sample results. Each exposure or instrumental reading must be provided, including those readouts/logbook pages that may fall below the quantitation limit. A photocopy of the instrument's direct sequential readout must be included if the instrumentation has the capability.

D. General Chemistry Preparation Logs (by parameter)

## 9. Radiological Data

The radiological data will be arranged in the following order by individual parameter requested for the samples in the SDG.

A. Target Analyte Results Summaries: Target analyte results summaries are required for all samples and will be arranged in increasing alphanumeric order by ARC sample number.

The target analyte results summary must include the following:

- SDG Number
- ARC sample number
- laboratory sample identifier
- matrix of the ARC sample
- date of sample collection
- date of sample analysis
- sample activity, uncertainty, and the sample-specific minimum detectable concentration (MDC). The sample-specific MDC will be based on the background of the detector that the sample was counted on. The sample activity (positive or negative), uncertainty, and sample-specific MDC will be reported for positive and "not-detected" results
- any applicable flags for target analyte results (e.g., "U" to designate a "not-detected" result)
- concentration units

B. QC Summaries

Chemical Yield (Tracer/Carrier) Recovery Summary that must include the following:

- SDG number
- ARC sample number
- Method blank sample number
- MS sample number
- MSD sample number
- LCS identification number
- LCSD identification number (if performed)
- percent recovery for all tracers/carriers
- applicable recovery limits for each tracer/carrier

Method Blank Summary: The method blank summaries will be arranged in chronological order, by instrument and method and must include the following:

- SDG number
- names for all target analytes
- observed activity, uncertainty, and MDC for each target analyte for each method blank analysis
- concentration units

MS Sample Recovery Summary: The MS sample recovery summaries will be arranged by instrument and method and must include the following:

- SDG number
- ARC sample number for the spiked sample
- names for all target analytes
- analyte concentration observed in the non-spiked sample aliquot
- true concentrations for all target analytes in the MS solution
- observed concentrations for all target analytes in the MS sample analysis
- calculated percent recoveries for all target analytes
- control limits for MS sample recoveries
- concentration units

If an MSD is performed, the summary must also include:

- MSD identifier
- observed concentration for each all target analytes in the MSD sample
- percent recovery for all target analytes
- RPD/RER between the MS/MSD results for each analyte
- RPD/RER limit for each analyte

Duplicates Precision Summary: The duplicate precision summaries will be arranged by instrument and method and must include the following:

- SDG number
- ARC sample number for the duplicate sample
- names for all target analytes
- analyte activity, uncertainty, and MDC observed in the original sample aliquot
- observed activity, uncertainty, and MDC for all target analytes in the duplicate sample analysis
- calculated RPD/RER for all target analytes
- control limits for RPD/RER
- concentration units

LCS Recovery Summary: The LCS recovery summaries will be arranged by instrument and method and must include the following:

- SDG number
- LCS identifier
- names for all target analytes
- true concentrations for all target analytes in the LCS solution
- observed concentrations for all target analytes in the LCS analysis
- calculated percent recoveries for all target analytes
- control limits for LCS recoveries
- concentration units

Calibration Verification Summary: The calibration verification summaries will be arranged by instrument and method and must include the following:

- SDG number
- names for all target analytes
- instrument identifier
- date the calibration verification was performed. For each method and analyte, the Contracted Laboratories will provide Calibration Verification summaries that include or bracket the analysis dates of the field and QC samples.
- acceptance limits for the calibration verification
- the following calibration verification summaries will be provided for Gas Flow Proportional Counter data
  - (a) Efficiency Checks
  - (b) Background Checks
- the following calibration verification summaries will be provided for Alpha Spectroscopy data
  - (a) Energy Calibration Checks
  - (b) Efficiency Checks
  - (c) Background Checks
  - (d) Resolution (FWHM) Checks
- the following calibration verification summaries will be provided for Alpha Scintillation data
  - (a) Daily Instrument Performance Checks
  - (b) Background Checks

### C. Raw Data

For each reported value, the Contracted Laboratories will provide all raw data (instrument printouts) used to obtain that value. This applies to all required QA/QC measurements (including tracer/carrier

recoveries) as well as all sample analysis results. Raw data must contain all instrument readouts and worksheets used for the sample results. An exhibit work sheet per method (including example calculations showing how sample activity, TPU and MDA are calculated) will be provided.

- D. Preparation Logs (by method)
- E. Traceability Documents (by method)

## 10. GC/MS SIM Polyaromatic Hydrocarbons (PAH) Data

### A. QC Summary

Surrogate Percent Recovery Summary that must include the following:

- SDG number
- ARC sample number
- Method blank sample number
- MS sample number
- MSD sample number
- LCS identification number
- LCSD identification number (if performed)
- matrix of the summarized samples
- percent recovery for all surrogate compounds
- applicable recovery limits for each surrogate compound

MS/MSD Summary that must include the following:

- SDG number
- matrix of the summarized samples
- ARC sample number of the non-spiked aliquot
- names of the compounds included in the MS solution
- true concentrations and concentration units for each compound in the MS and MSD
- observed compound concentration and concentration units in the non-spiked aliquot
- observed compound concentration and concentration units in the MS aliquot
- observed compound concentration and concentration units in the MSD aliquot
- percent recovery for each compound
- RPD between the MS/MSD results
- recovery limits for each compound
- RPD limit for each compound

LCS Summary that must include the following:

- SDG number
- LCS matrix
- LCS identifier
- names of the compounds included in the LCS solution
- true concentrations and concentration units for each compound in the LCS
- observed compound concentrations and concentration units
- percent recovery for each compound
- recovery limits for each compound

If an LCSD is performed, the LCS Summary must also include:

- LCSD identifier
- observed concentration for each LCSD compound
- percent recovery for each compound
- RPD between the LCS/LCSD results
- RPD limit for each compound

Method Blank Summary: The Method Blank Summaries will be arranged in chronological order by date of analysis of the blank, by instrument and must include the following:

- SDG number
- matrix of summarized samples
- method blank identifier
- date and time of method blank analysis
- instrument identifier
- ARC sample numbers and QC sample identifiers associated with the method blank
- analysis file number for each associated ARC sample and QC sample
- indication if and what type of sample clean-up was performed.

Initial Calibration Summary: The initial calibration summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- start and end dates and times of the initial calibration
- analysis file numbers for all initial calibration analyses
- instrument identifier
- compound names for all target compounds and surrogates
- RFs for each initial calibration standard performed
- average RF for each target compound and surrogate
- %RSD for each target compound and surrogate
- calibration curve equation and curve plot for each target compound and surrogate (if applicable)

Initial Calibration Verification (ICV) Summary (if ICV is performed): The ICV summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- start and end dates and times of associated initial calibration
- analysis date and time of ICV standard
- analysis file number of the ICV analysis
- instrument identifier
- compound names for all target compounds and surrogates
- initial calibration average RF, average RF, or true concentration for each target compound and surrogate
- observed ICV standard RF or concentration for each target compound and surrogate
- percent difference or percent drift for each target compound and surrogate
- acceptance criteria for ICV standard

Continuing Calibration Verification (CCV) Summary: The CCV summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- start and end dates and times of associated initial calibration
- analysis date and time of CCV standard
- analysis file number of the CCV analysis
- instrument identifier
- compound names for all target compounds and surrogates
- initial calibration average RF or true concentration for each target compound and surrogate
- observed continuing calibration standard RF or concentration for each target compound and surrogate
- percent difference or percent drift for each target compound and surrogate

Internal Standard Area and Retention Time Summary: The internal standard summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- CCV standard file number
- CCV standard date and time of analysis
- instrument identifier
- compound name for each internal standard
- observed area and retention time for each internal standard in the CCV standard
  - project samples and QC sample areas and retention times must be compared to the associated CCV standard

- CCV standard areas and retention times must be compared to the midpoint standard of the associated initial calibration
  - upper acceptance limit for the area and retention time for each internal standard
  - lower acceptance limit for the area and retention time for each internal standard
  - observed area and retention time for each internal standard from the mid-point standard of the associated initial calibration.
  - each associated ARC sample number
  - observed area and retention time for each internal standard for associated ARC sample
  - identifier for each associated QC sample
  - observed area and retention time for each internal standard for associated QC sample

## B. Sample Data

Sample data will be arranged in individual sample packets (consisting of the Target Compound Analytical Results Summaries, followed by the raw data for semivolatile samples) that must be placed in increasing alphanumeric order by laboratory sample number. The order of each sample packet is as follows:

Target Compound Analytical Results Summary that must include the following:

- SDG number
- ARC sample number
- laboratory sample identifier
- matrix of the ARC sample
- date of sample collection
- date of sample extraction
- date of sample analysis
- analysis file number
- sample weight or volume used for extraction with units
- sample percent solids
- sample final extract volume with units
- sample extract injection volume with units
- dilution factor
- indication if and what type of sample cleanup was performed
- name and CAS number for each target compound
- concentration of positives and PRQL and/or MDL for each target compound
- any applicable flags for target compound results (e.g., “U” to designate a “not-detected” result)
- concentration units

- RIC and quantitation report (including initial and re-integrations for manually-integrated data)

#### C. Standards Data

- Copies of RIC and quantitation report (including initial and re-integrations for manually-integrated data) for each initial calibration standard associated with analyses in the SDG, in chronological order, by instrument
- Copies of RIC and quantitation report (including initial and re-integrations for manually-integrated data) for each ICV standard associated with analyses in the SDG, in chronological order, by instrument
- Copies of RIC and quantitation report (including initial and re-integrations for manually-integrated data) for each CCV standard associated with analyses in the SDG, in chronological order, by instrument

#### D. Raw QC Data

Blank Data (including instrument/solvent blank data) arranged in chronological order, by instrument:

- Target Compound Analytical Results Summary (as defined in Section 2.3.b)
- RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
- LCS Data
  - Target Compound Analytical Results Summary (as previously defined)
  - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
- LCSD Data (if performed)
  - Target Compound Analytical Results Summary (as previously defined)
  - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
- MS Data
  - Target Compound Analytical Results Summary (as previously defined)
  - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
- MSD Data
  - Target Compound Analytical Results Summary (as previously defined)
  - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)

E. Preparation Logs

- TCLP Extract Logs (if performed)
- PAH Extraction Logs

## 11. Cold Vapor Atomic Fluorescence Mercury Data

The Cold Vapor Atomic Fluorescence mercury data will be arranged in the following order for the samples in the SDG.

- A. Target Analyte Results Summaries: Target analyte results summaries are required for all samples and will be arranged in increasing alphanumeric order by ARC sample number.

The target analyte results summary must include the following:

- SDG Number
- ARC sample number
- laboratory sample identifier
- matrix of the ARC sample
- date of sample collection
- sample percent solids
- name and CAS number for the target analyte
- concentration of positives and PRDL and/or MDL for the target analyte
- any applicable flags for target analyte results (e.g., “U” to designate a “not-detected” result)
- concentration units

B. QC Summaries

Initial Calibration Summary: The initial calibration summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- start and end dates and times of the initial calibration
- instrument identifier
- name of the target analyte
- RSD for the target compound and control limit for the RSD
- calculated percent recovery for the lowest initial calibration standard and recovery control limit
- concentration units
- calibration curve equation

Quality Control Sample/Initial Calibration Verification (QCS/ICV) and Ongoing Precision and Recovery/Continuing Calibration Verification (OPR/CCV) Summary: The QCS/ICV and OPR/CCV summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- name of the target analyte
- instrument identifier
- start and end dates and times of the analytical sequence
- true concentrations of the target analyte for the QCS/ICV and OPR/CCV standards
- observed concentrations of the target analyte for each QCS/ICV and OPR/CCV analyses
- calculated percent recoveries of the target analyte for each QCS/ICV and OPR/CCV analyses
- control limits for QCS/ICV and OPR/CCV percent recoveries
- concentration units

Initial and Continuing Calibration Blank Summary: The initial and continuing calibration blank summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- name of the target analyte
- instrument identifier
- start and end dates and times of the analytical sequence
- observed concentration or MDL for the target analyte for each ICB or CCB analysis
- acceptance limits for ICB and CCB analyses
- concentration units

- Method Blank Analytical Summary: The method blank analytical summaries will be arranged in chronological order, by instrument and must include the information presented in Section 11A.

MS Sample Recovery Summary: The spike sample recovery summaries will be arranged in alphanumeric order by laboratory sample number and must include the following:

- SDG number
- ARC sample number for the spiked sample
- percent solids for the ARC sample
- name of the target analyte
- analyte concentration observed in the non-spiked sample aliquot
- true concentration of the target analyte in the spike solution
- observed concentration of the target analyte in the spike sample analysis
- calculated percent recovery of the target analyte
- control limits for spike sample recoveries
- concentration units

If an MSD is performed, the summary must also include:

- MSD identifier
- observed concentration of the target analyte in the MSD sample
- percent recovery of the target analyte
- RPD between the MS/MSD results
- RPD limit

LCS Recovery Summary: The LCS recovery summaries will be arranged in chronological order, by instrument and must include the following:

- SDG number
- LCS identifier
- name of the target analyte
- true concentration of the target analyte in the LCS solution
- observed concentration of the target analyte in the LCS analysis
- calculated percent recovery of the target analyte
- control limits for LCS recoveries
- concentration units

Analytical Sequence Form: The analytical sequence forms will be arranged in chronological order, by analyte, by instrument and must include the following:

- SDG number
- instrument identifier
- identification of the target analyte
- ARC sample numbers associated with the sequence
- QC sample identifiers associated with the sequence
- analysis date and time for each ARC sample and QC sample associated with the sequence
- start and end dates and times for the sequence

#### C. Raw Data

For each reported value, the laboratory will provide all raw data (instrument printouts or logbook pages) used to obtain that value; this requirement applies to all required QA/QC measurements and instrument standardization, as well as all sample analysis results. Raw data must contain all instrument readouts/logbooks pages used for the sample results. Each exposure or instrumental reading must be provided, including those readouts/logbook pages that may fall below the quantitation limit. A photocopy of the instrument's direct sequential readout must be included if the instrumentation has the capability.

#### D. Sample Preparation Logs

## GENERAL FORMAT FOR LEVEL II DELIVERABLES

### 1. Documentation

- Cover Letter/Letter of Transmittal signed by Laboratory Project Manager or designee
- SDG Narrative signed by Laboratory Project Manager or designee (The SDG Narrative must include a statement or statements relative to compliance with this QAPP and description of any deviations.)
- References to preparation and analytical methods performed
- Field and Internal Laboratory Chain-of-Custody Records
- Sample Receipt Information
- Project Correspondence

### 2. GC/MS Volatile Organic Data

Analytical results summaries for all samples, method blanks, matrix spike (MS) samples, MS duplicate (MSD) samples, laboratory control samples (LCSs), and LCS duplicates (LCSDs); MS/MSD recovery and precision summaries; LCS/LCSD recovery and precision summaries; surrogate percent recovery summary; and method blank summaries (summaries defined in Level IV Deliverables Section 2).

### 3. GC Volatile Organic Data

Analytical results summaries for all samples, method blanks, MS samples, MSD samples, LCSs, and LCSDs; MS/MSD recovery and precision summaries; LCS/LCSD recovery and precision summaries; surrogate percent recovery summary; and method blank summaries (summaries defined in Level IV Deliverables Section 3).

### 4. GC/MS Semivolatile Organic Data

Analytical results summaries for all samples, method blanks, MS samples, MSD samples, LCSs, and LCSDs; MS/MSD recovery and precision summaries; LCS/LCSD recovery and precision summaries; surrogate percent recovery summary; and method blank summaries (summaries defined in Level IV Deliverables Section 4).

### 5. GC Organochlorine Pesticide/PCB Data

Analytical results summaries for all samples, method blanks, MS samples, MSD samples, LCSs, and LCSDs; MS/MSD recovery and precision summaries; LCS /LCSD recovery and precision summaries; surrogate percent recovery summary; and method blank summaries (summaries defined in Level IV Deliverables Section 5).

## **6. GC Herbicide Data**

Analytical results summaries for all samples, method blanks, MS samples, MSD samples, LCSs, and LCSDs; MS/MSD recovery and precision summaries; LCS /LCSD recovery and precision summaries; surrogate percent recovery summary; and method blank summaries (summaries defined in Level IV Deliverables Section 6).

## **7. Metals (including ICP, ICP/MS, and CVAA) Data**

Analytical results summaries for all samples and preparation blanks; MS/MSD recovery and precision summaries; post-digestion MS recovery summaries; laboratory duplicate precision summaries; and LCS recovery summaries (summaries defined in Level IV Deliverables Section 7).

## **8. General Chemistry Data**

By parameter: analytical results summaries for all samples and preparation blanks; MS/MSD recovery and precision summaries; laboratory duplicate precision summaries; and LCS recovery summaries (summaries defined in Level IV Deliverables Section 8).

## **9. Radiological Data**

Analytical results summaries for all samples and preparation blanks; MS/MSD recovery and precision summaries; laboratory duplicate precision summaries; LCS recovery summaries; and chemical yield (tracer/carrier) recovery summaries (summaries defined in Level IV Deliverables Section 9).

## **10. GC/MS SIM Polyaromatic Hydrocarbons (PAH) Data**

Analytical results summaries for all samples, method blanks, MS samples, MSD samples, LCSs, and LCSDs; MS/MSD recovery and precision summaries; LCS/LCSD recovery and precision summaries; surrogate percent recovery summary; and method blank summaries (summaries defined in Level IV Deliverables Section 10).

## **11. Cold Vapor Atomic Fluorescence Mercury Data**

Analytical results summaries for all samples and method blanks; MS/MSD recovery and precision summaries; and LCS recovery summaries (summaries defined in Level IV Deliverables Section 11).