USEPA ANALYTICAL SERVICES BRANCH

STATEMENT OF WORK

FOR

ANALYSIS OF
CHLORINATED DIBENZO-P-DIOXINS (CDDs) AND
CHLORINATED DIBENZOFURANS (CDFs)

Multi-Media, Multi-Concentration

DLM02.2
DECEMBER 2009

STATEMENT OF WORK

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EXHIBIT A

SUMMARY OF REQUIREMENTS

Exhibit A - Summary of Requirements

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1.0 PURPOSE

The purpose of the multi-media, multi-concentration dioxin/furan analytical service is to provide analytical data for use by the U.S. Environmental Protection Agency, hereafter referred to as USEPA, in support of the investigation and clean-up activities under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA). Other USEPA Program Offices, as well as customers outside the Agency, that have similar analytical data needs also use this service.

2.0 DESCRIPTION OF SERVICE

The dioxin/furan analytical service provides a contractual framework for laboratories to apply USEPA analytical methods for the isolation, detection, and quantitative measurement of seventeen 2,3,7,8-substituted tetra through octachlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs) in water, soil, sediment, sludge, tissue (no human tissue), ash, oil, and oily matrices. The analytical service provides the methods to be used and the specific contractual requirements by which the Government will evaluate the data. This service uses a High Resolution Gas Chromatography/High Resolution Mass Spectrometry (HRGC/HRMS) method to analyze the target compounds.

3.0 DATA USES

This analytical service provides data used for a variety of purposes such as: determining the nature and extent of contamination at a hazardous waste site; assessing priorities for response based on risks to human health and the environment; determining appropriate clean-up actions; and determining when remedial actions are complete. The data may be used in all stages in the investigation of hazardous waste sites, including: site inspections; Hazard Ranking System (HRS) scoring; remedial investigation/feasibility studies; remedial design; treatability studies; and removal actions. In addition, this service provides data that are available for use in Superfund enforcement/litigation activities. The Contractor must be aware of the importance of maintaining the integrity of the data generated under this contract, since it is used to make major decisions regarding public health and environmental welfare.

4.0 SUMMARY OF REQUIREMENTS

4.1 Introduction to the Dioxin/Furan Statement of Work (SOW)

This SOW is designed as part of the documentation for a contract between USEPA and a commercial laboratory performing analyses in support of USEPA Superfund activities. The SOW is comprised of eight exhibits. Exhibit A provides an overview of the SOW and its general requirements. Exhibit B contains a description of the reporting and deliverables requirements, in addition to the data reporting forms and instructions. Exhibit C specifies the chlorinated dibenzo-p-dioxin/chlorinated dibenzofuran (CDD/CDF) Target Compound List (TCL) for this SOW with the Contract Required Quantitation Limits (CRQLs) for the sample matrices. Exhibit D details the required analytical procedures to be used with this SOW and resulting contracts. Exhibit E provides descriptions of required Quality Assurance/Quality Control (QA/QC), Standard Operating Procedures (SOPs), QA/QC performance, and the reporting of data.

Exhibit F contains chain-of-custody and sample documentation requirements which the Contractor shall follow. To ensure proper understanding of the terms utilized in this SOW, a glossary can be found in Exhibit G. When a term is used in the text without explanation, the glossary meaning shall be applicable. Specifications for reporting electronic data appear in Exhibit H.

4.2 Overview of Major Task Areas

For each sample, the Contractor shall perform the tasks described in each section. Specific requirements for each task are detailed in the exhibits referenced.

4.2.1 Task I: Sample Receiving, Storage, and Disposal

4.2.1.1 Chain-of-Custody

The Contractor shall receive and maintain samples under proper chain-of-custody procedures. All associated document control and inventory procedures shall be developed and followed. Documentation described herein shall be required to show that all procedures are strictly followed. This documentation shall be reported as the Complete Sample Delivery Group (SDG) File (CSF) (See Exhibit B). The Contractor shall establish and use appropriate procedures to handle confidential information received from USEPA. See Exhibit F for specific requirements.

4.2.1.2 Sample Scheduling/Shipments

Sample shipments to the Contractor’s facility will be scheduled and coordinated by the Contract Laboratory Program (CLP) Sample Management Office (SMO). The Contractor shall communicate with SMO personnel by telephone, as necessary, throughout the process of sample scheduling, shipment, analysis, and data reporting, to ensure that samples are properly processed.

4.2.1.2.1 Samples will be shipped routinely to the Contractor through an overnight delivery service. However, as necessary, the Contractor shall be responsible for any handling or processing of the receipt of sample shipments. This includes the pick-up of samples at the nearest servicing airport, bus station, or other carrier within the Contractor’s geographical area. The Contractor shall be available to receive sample shipments at any time the delivery service is operating, including weekends.

4.2.1.2.2 If there are problems with the samples (e.g., mixed media, containers broken or leaking) or sample documentation and paperwork [e.g., Traffic Reports/Chain of Custody Records (TR/COCs) not with shipment, sample and TR/COC do not correspond], the Contractor shall immediately contact SMO for resolution. The Contractor shall immediately notify SMO regarding any problems and laboratory conditions that affect the timeliness of analyses and data reporting. In particular, the Contractor shall immediately notify SMO personnel in advance regarding sample data that will be delivered late and shall specify the estimated delivery date.

4.2.1.2.3 To monitor the temperature of the sample shipping cooler more effectively, a sample shipping cooler temperature indicator bottle may be included with each cooler shipped. The temperature blank will be clearly labeled: COOLER TEMPERATURE INDICATOR.

4.2.1.2.3.1 When a cooler temperature indicator bottle is included in the sample shipping cooler, the Contractor shall use the supplied cooler temperature indicator bottle to determine the cooler temperature. The temperature of the cooler shall be measured at the time of sample receipt by the Contractor. The Contractor shall record the presence or absence of the cooler temperature indicator bottle on Form DC-1, Item 8 – Cooler Temperature Indicator Bottle (Exhibit B).

4.2.1.2.3.2 The temperature of the sample shipping cooler shall be measured and recorded immediately upon opening the cooler, and prior to unpacking the samples or removing the packing material.

4.2.1.2.3.3 To determine the temperature of the cooler, the Contractor shall locate the cooler temperature indicator bottle in the sample shipping cooler, invert it several times, remove the cap, and insert a calibrated thermometer into the cooler temperature indicator bottle. Prior to recording the temperature, the Contractor shall allow a minimum of 3 minutes, but not greater than 5 minutes, for the thermometer to equilibrate with the liquid in the bottle. At a minimum, the calibrated thermometer (±1°C) shall have a measurable range of 0-50°C. Other devices which can measure temperature may be used if they can be calibrated to ±1°C and have a range of 0-50°C. If a temperature indicator bottle is not present in the cooler, an alternative means of determining cooler temperature shall be used. Under no circumstances shall a thermometer or any other device be inserted into a sample bottle for the purpose of determining cooler temperature. The Contractor shall contact SMO and inform them that a temperature indicator bottle was not present in the cooler. The Contractor shall document the alternative technique used to determine cooler temperature in the SDG Narrative.

4.2.1.2.3.4 If the temperature of the sample shipping cooler’s temperature indicator exceeds 10°C, the Contractor shall contact SMO and inform them of the temperature deviation. SMO will contact USEPA for instructions on how to proceed. USEPA will either require that no sample analysis(es) be performed or that the Contractor proceed with the analysis(es). SMO will in turn notify the Contractor of USEPA’s decision. The Contractor shall document USEPA’s decision and the EPA Sample Numbers of all samples for which temperatures exceeded 10°C in the SDG Narrative.

4.2.1.2.3.5 The Contractor shall record the temperature of the cooler on Form DC-1, under Item 9 - Cooler Temperature, and in the SDG Narrative.

4.2.1.2.4 The Contractor shall accept all samples scheduled by SMO, provided that the total number of samples received in any calendar month does not exceed the monthly limitation expressed in the contract. Should the Contractor elect to accept additional samples, the Contractor shall remain bound by all contract requirements for analysis of those samples accepted.

4.2.1.2.5 The Contractor is required to retain unused sample volume in the original containers for a period of six (6) months after data submission. From time of receipt until analysis, the Contractor shall maintain all water/aqueous (preserved and unpreserved) and/or soil/sediment samples at 4°C (±2°C), and tissue samples at <-10°C.

4.2.1.2.6 The Contractor shall be required to routinely return sample shipping containers (e.g., coolers) to the appropriate sampling office or as specified in individual task orders.

4.2.2 Task II: Sample Preparation and Analysis

4.2.2.1 Overview

The Contractor is advised that the samples received under this contract are usually from known or suspected hazardous waste sites and may contain high levels of organic and inorganic materials of a potentially hazardous nature and of unknown structure and concentration. Samples should be handled throughout the analysis with appropriate caution. It is the Contractor's responsibility to take all necessary measures to ensure laboratory safety.

4.2.2.2 Sample analyses will be ordered by groups of samples, each defined as a Case and identified by a unique USEPA Case Number assigned by SMO. A Case signifies a group of samples collected at one site or geographical area over a finite time period, and will include one or more field samples with associated blanks. Samples may be shipped to the Contractor in a single shipment or multiple shipments over a period of time, depending on the size of the Case.

4.2.2.2.1 A Case consists of one or more SDGs. An SDG is defined by the following, whichever is most frequent:

- Each Case of field samples received; or
- Each 20 samples [excluding Performance Evaluation (PE) samples] within a Case; or
- Each 7 calendar day period during which field samples in a Case are received (said period beginning with receipt of the first sample in the SDG).

4.2.2.2.2 If Performance Evaluation (PE) samples are received within a Case, they will be assigned to an SDG containing field samples for that Case. Such assignment shall be made at the time the samples are received and shall <u>not</u> be made retroactively.

4.2.2.2.3 Each sample received by the Contractor will be labeled with an EPA Sample Number and accompanied by a Traffic Report/Chain of Custody Record (TR/COC) bearing the Sample Number and descriptive information regarding the sample. The Contractor shall complete and sign the TR/COC, recording the date of sample receipt and sample condition on receipt for each sample container.

4.2.2.2.4 The Contractor shall submit signed copies of TR/COCs for all samples in an SDG to SMO within **three (3) working days** following receipt of the last sample in the SDG. TR/COCs shall be submitted in SDG sets (e.g., all TR/COCs for an SDG shall be clipped together) with a Traffic Report/Chain of Custody Record Cover Sheet containing information regarding the SDG, as specified in Exhibit B.

4.2.2.2.5 USEPA Case numbers, SDG numbers, and EPA Sample Numbers shall be used by the Contractor in identifying samples received under this contract, both verbally and in reports/correspondence.

4.2.2.3 Preparation Techniques

The Contractor shall prepare samples as described in Exhibit D.

4.2.2.3.1 If insufficient sample volume (less than the required amount) is received to perform the analysis, the Contractor shall contact SMO and apprise them of the problem. SMO will contact USEPA for instructions on how to proceed. USEPA will either approve that no sample analysis(es) be performed or require that a reduced volume be used for the sample analysis. SMO will in turn notify the

Contractor of USEPA's decision. The Contractor shall document USEPA's decision in the SDG Narrative.

4.2.2.4 Analytical Techniques

The target compounds listed in Exhibit C shall be identified, as described in the methodologies given in Exhibit D. Automated computer programs may be used to facilitate the identification of compounds.

4.2.2.5 Qualitative Verification of Compounds

The dioxin and furan compounds identified by High Resolution Gas Chromatography/High Resolution Mass Spectrometry (HRGC/HRMS) techniques shall be verified by an analyst competent in the interpretation of mass spectra. The analyst will compare the HRGC Retention Time (RT) and ion abundance ratio of two exact mass-to-charge (m/z) ratios with the corresponding RT of an authentic standard and the theoretical ion abundance ratio of the two exact m/z ratios.

4.2.2.5.1 If a compound initially identified by HRGC/HRMS techniques cannot be verified, but in the technical judgment of the mass spectral interpretation specialist the identification is correct, the Contractor shall report that identification as an Estimated Maximum Possible Concentration (EMPC) and proceed with quantitation.

4.2.2.6 Quantitation of Verified Compounds

The Contractor shall quantitate components identified by HRGC/HRMS techniques using Selected Ion Current Profile (SICP) areas in one of the methods described in Exhibit D, Section 2.3.

4.2.2.7 QA/QC Procedures

4.2.2.7.1 The Contractor shall strictly adhere to all specific QA/QC procedures prescribed in Exhibits D and E. Records documenting the use of the protocol shall be maintained in accordance with the document control procedures prescribed in Exhibit F, and shall be reported in accordance with Exhibits B and H.

4.2.2.7.2 The Contractor shall maintain a Quality Assurance Plan (QAP) with the objective of providing sound analytical chemical measurements. This program shall incorporate the QC procedures, any necessary corrective action, and all documentation required during data collection, as well as the QA measures performed by management to ensure acceptable data production.

4.2.2.7.3 Additional QC shall be conducted in the form of the analysis of PE samples submitted to the laboratory by USEPA. Unacceptable results of all such QC or PE samples may be used as the basis for an equitable adjustment to reflect the reduced value of the data to USEPA or rejection of the data for specific analyte(s) within an SDG or the entire SDG. Also, unacceptable results may be used as the basis for contract action. "Compliant performance" is defined as that which yields correct analyte identification and concentration values as determined by USEPA, as well as meeting the contract requirements for analysis (Exhibit D), QA/QC (Exhibit E), data reporting and other deliverables (Exhibits B and H), and sample custody, sample documentation, and SOP documentation (Exhibit F). As an alternative to data rejection, USEPA may require re-analysis of noncompliant samples. Re-analysis will be performed by the Contractor at no additional cost to USEPA, unless it is determined that the laboratory evaluation sample(s) was defective.

4.2.2.8 Modified Analysis

The Contractor may be requested by USEPA to perform modified analyses. These modifications may include, but are not limited to: additional compounds; sample matrices other than those present in the SOW; and lower quantitation limits. These requests will be made in writing, prior to sample scheduling. All contract requirements specified in the SOW/Specifications will remain in effect unless specifically modified.

4.2.3 Task III: Sample Reporting and Resubmission of Data

4.2.3.1 Required formats for the reporting of data are found at Exhibits B and H. The Contractor shall be responsible for completing and submitting analysis data sheets and electronic data as requested in a format specified in this SOW and within the time specified in Exhibit B, Section 1.1 or as specified in individual task orders.

4.2.3.2 Use of formats other than those approved will be deemed as noncompliant. Such data are unacceptable. Resubmission in the specified format will be required, at no additional cost to the Government.

4.2.3.3 Computer-generated forms may be submitted in the hardcopy Sample Data Package(s), provided that the forms provide equivalent information as the USEPA format. This means that the order of data elements is the same as on each USEPA-required form, including form numbers and titles, page numbers, and header information.

4.2.3.4 If the submitted data package does not conform to the specified contractual or technical criteria, the Contractor shall resubmit the data package with all deficiencies corrected at its own expense. The Contractor will respond within 7 days to requests for additional information or explanations that result from inspection activities. If the Contractor is required to submit or resubmit data as a result of a request, the data shall be clearly marked as ADDITIONAL DATA. The Contractor shall include a cover letter that describes which data are being delivered, to which project the data pertain, and who requested the data. Any and all resubmissions must be in accordance with the documentation requirements of this SOW.

4.2.3.5 The data reported by the Contractor on the hardcopy data forms and the associated electronic data submitted by the Contractor shall contain identical information. If discrepancies are found during inspection, the Contractor shall be required to resubmit either the hardcopy forms or the electronic data, or both sets of data, as requested by the Government, at no additional cost to USEPA.

4.2.3.6 In addition, the Contractor must be aware of the importance of maintaining the integrity of data generated under the contract, since it is used to make major decisions regarding public health and environmental welfare. The data may also be used in litigation against Potentially Responsible Parties (PRPs) in the enforcement of Superfund legislation.

EXHIBIT B

REPORTING AND DELIVERABLES REQUIREMENTS

Exhibit B - Reporting and Deliverables Requirements

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1.0 CONTRACT REPORTS/DELIVERABLES DISTRIBUTION

1.1 Report Deliverable Schedule

The following table reiterates the contract reporting and deliverables requirements and specifies the distribution that is required for each deliverable unless revised in individual task orders.

NOTE: Specific recipient names and addresses are subject to change during the term of the contract. The Contracting Officer (CO) will notify the Contractor, in writing, of such changes when they occur.

TABLE 1

Item		No. of Copies[A]	Delivery Schedule	Distribution		
				TOPO	SMO	PO
A.	Sample Traffic Reports/Chain of Custody Records	1	3 working days after receipt of last sample in the SDG[1].	X	X	
B.[2]	Complete Sample Delivery Group (SDG) File (CSF)[B]	1	35 days after the time of sample receipt[1] of last sample in the SDG.	X		
C.	Copy of CSF	1	35 days after the time of sample receipt of last sample in the SDG.		X	
D.[3]	Electronic Data Deliverable	1	35 days after the time of sample receipt [1] of last sample in the SDG.		X	
E.[5]	Results of Intercomparison Study/PE Sample Analysis Study	1	35 days after the time of sample receipt [1] of last sample in the SDG.	As Directed		
F.[5]	Quality Assurance Plan (QAP)	1	Revise within 30 days after contract award and receipt of USEPA comments. Submit latest version within 7 days of receipt of written request to recipients, as directed. (See Exhibit E, Section 5) Submit the amended document within 14 days of amended QAP as directed in Exhibit E, Section 5.	As Directed		

TABLE 1 (Con't)

Item		No. of Copies[A]	Delivery Schedule	Distribution		
				TOPO	SMO	PO
G.[5]	Standard Operating Procedures (SOPs)	1	Revise within 30 days after contract award and receipt of USEPA comments. Submit within 7 days of receipt of written request to recipients, as directed. (See Exhibit E, Section 6) Submit the amended document within 14 days of amended SOP(s) as directed in Exhibit E, Section 6.	As Directed		
H.	Instrument Electronic Data	Lot	Retain for 3 years after data submission. Submit within 7 days after receipt of written request from the CO or PO.	As Directed		
I.	Extracts	Lot	Retain for one (1) year after data submission. Submit within 7 days after receipt of written request by the TOPO or SMO at USEPA's direction.	As Directed		
J.	Copy of CSF and Hardcopy Data in PDF Format	1	35 days after the time of sample receipt of last sample in the SDG.		X	

Footnotes:

[A] The number of copies specified is the number of copies required to be delivered to each recipient.

[B] Contractor-concurrent delivery to a Government designated recipient may be required upon request by the TOPO. Retain for one (1) year after data submission, and submit as directed within 7 days after receipt of written request by the TOPO.

[1] The time of sample receipt is the date of sample receipt at the Contractor's facility, as recorded on the shipper's delivery receipt and sample Traffic Report/Chain of Custody Record.

[2] The Sample Delivery Group (SDG) will be defined in individual task orders if different from the definition in this SOW.

[3] **DELIVERABLES ARE TO BE REPORTED TOTAL AND COMPLETE**. Concurrent delivery is required. This includes resubmission of both the hardcopy and electronic deliverable. The date of delivery of the SDG, or of any sample within the SDG, is the date all samples have been delivered. **If the deliverables are due on a Saturday, Sunday, or Federal holiday, then they shall be delivered on the next business day. Deliverables received after this time shall be considered late.**

[4] A complete SDG file will contain the original Sample Data, plus all the original documents described in Exhibit B, Section 2.6, and Exhibit E.

[5] See Exhibit E and F for more description; time is cited in calendar days.

1.2 Distribution

The following addresses correspond to the "Distribution" column in Table 1 of Section 1.1.

SMO: USEPA Sample Management Office (SMO)[6]
15000 Conference Center Drive
Chantilly, VA 20151-3808

Task Order Project Officer (TOPO): As identified in individual task orders.

QATS: USEPA Contract Laboratory Program (CLP)
Quality Assurance Technical Support (QATS) Laboratory
2700 Chandler Avenue, Building C
Las Vegas, NV 89120
Attn: Data Audit Staff

OSRTI ASB Dioxin Project Manager (PM):

Mailing Address: USEPA OSRTI Analytical Services Branch
Ariel Rios Building (5204G)
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460
Attn: Dioxin Program Manager

Fed-Ex/Overnight Delivery: USEPA OSRTI Analytical Services Branch
One Potomac Yard (South Building)
2777 South Crystal Drive 4th Floor,
Arlington, VA 22202
Attn: Dioxin Program Manager

[6] SMO is a Contractor-operated facility operating under the Sample Management Office (SMO) contract awarded and administered by USEPA.

2.0 REPORTING REQUIREMENTS AND ORDER OF DATA DELIVERABLES

2.1 Introduction

The Contractor shall provide reports and other deliverables as specified in the Contract Schedule. The required content and form of each deliverable are described in this exhibit. All reports and documentation must be:

- Legible;
- Clearly labeled and completed in accordance with instructions in this exhibit;
- Arranged in the order specified in this section;
- Paginated sequentially in ascending order starting from the Sample Delivery Group (SDG) Narrative; and
- Double-sided.
- Information reported on the forms listed in this Exhibit (excluding the Sample Log-In Sheet (DC-1) and the Complete SDG File (CSF) Inventory Sheet (DC-2) must be either typewritten or computer-generated.

2.1.1 Requirements for each deliverable item are specified in Sections 2.3 through 2.10. Prior to submission, the Contractor shall arrange items and the components of each item in the order listed in these sections.

2.1.2 The Contractor shall use EPA Case numbers, SDG numbers, EPA Sample Numbers, and Task Order numbers (if applicable) to identify samples received under this contract, verbally, electronically, and in reports and correspondence. The Contract number, the SOW number, and task order number if applicable shall be specified in all correspondence. The Modification Reference Number shall also be included for all Modified Analyses.

2.1.3 Section 4 of this Exhibit contains the required Data Reporting Forms in Agency-specified format. Section 3 of this Exhibit contains instructions to the Contractor for properly completing all data reporting forms to provide USEPA with all required data. Data elements and instructions for reporting data in computer-readable format are contained in Exhibit H.

2.2 Resubmission of Data

2.2.1 If submitted documentation does not conform to the instructions in this exhibit, the Contractor shall be required to resubmit such documentation with deficiency(ies) corrected within 6 business days, at no additional cost to USEPA.

2.2.2 Whenever the Contractor is required to submit or resubmit data as a result of an onsite laboratory evaluation, or through Project Officer (PO) action or request, the data must be clearly marked as ADDITIONAL DATA and must be sent to all contractual data recipients as well as designated recipients. A cover letter will be included, by the Contractor describing what data are being delivered, to which USEPA Case(s) the data pertains, and who requested the data.

2.2.3 Whenever the Contractor is required to submit or resubmit data as a result of Contract Compliance Screening (CCS) review by SMO, the data shall be sent to all contractual data recipients as well as designated recipients when a written request for a copy of the CSF has been made. In all instances, the Contractor shall include a cover sheet (Laboratory

Response to Results of Contract Compliance Screening). Electronic deliverables shall be submitted or resubmitted to SMO only. Revised DC-1 and DC-2 forms shall be submitted to SMO and the TOPO.

2.3 Quality Assurance (QA) Plan and Standard Operating Procedures (SOPs)

The Contractor shall adhere to the requirements in Exhibits E and F.

2.4 Sample Traffic Reports/Chain of Custody Records

2.4.1 Each sample received by the Contractor shall be labeled with an EPA Sample Number and will be accompanied by a Sample Traffic Report/Chain of Custody Record bearing the Sample Number and descriptive information regarding the sample. The CLP Traffic Report/Chain of Custody Record is one form divided into two sections: the Traffic Report section and the Chain of Custody Record section. The Contractor shall complete the Traffic Report/Chain of Custody Record (marked “Lab Copy for Return to SMO”), recording the date of sample receipt, verifying the number of samples, and signing the CLP Traffic Report/Chain of Custody.

Upon receipt, the Contractor shall sign for receipt of samples in the Chain of Custody Record section. The laboratory sample custodian or designated recipient opening and verifying the contents of the cooler shall then verify receipt of all samples identified within the CLP Traffic Report section and sign and date the signature box located in the CLP Traffic Report section. If a non-CLP Traffic Report/Chain of Custody Record is submitted along with the samples, for example a Regional Traffic Report/Chain of Custody Record, then the Contractor shall (1) sign and date receipt of the samples to maintain the chain-of-custody and (2) the sample custodian or designated recipient shall sign and date the Traffic Report/Chain of Custody Record to verify sample information.

The Contractor shall also enter the Sample Delivery Group (SDG) number, Case number, and laboratory contract number on the CLP Traffic Report/Chain of Custody Record in the appropriate boxes. The EPA sample number of the first sample received in the SDG is the SDG number. When several samples are received together in the first SDG shipment, the SDG number shall be the lowest sample number (considering both alpha and numeric designations) in the first group of samples received under the SDG. Under no circumstances should any SDG number be replicated within a Case. If necessary, select an alternative sample number for the SDG number. The SDG number is also reported on all data reporting forms (see Exhibit B, Section 3 – Form Instructions). If the laboratory is requested to transfer samples to another facility, the Contractor shall date and enter the name of the facility to where the samples will be transferred on the CLP Traffic Report/Chain of Custody Record.

2.4.2 The Contractor shall submit Traffic Reports/Chain of Custody Records in SDG sets (i.e., Traffic Reports/Chain of Custody Records for all samples in an SDG shall be clipped together), with an SDG Cover Sheet attached. The SDG Cover Sheet shall contain the following items:

- Laboratory name;
- Contract number and Task Order number;
- Modified Analysis number;
- Sample analysis price (full sample price from the contract);
- Case number; and

- List of EPA Sample Numbers of all samples in the SDG, identifying the **first** and **last** samples received, and their Laboratory Receipt Dates (LRDs).

NOTE: When more than one sample is received in the first or last SDG shipment, the "first" sample received would be the sample with the lowest sample number (considering both alpha and numeric designations); the "last" sample received would be the sample with the highest sample number (considering both alpha and numeric designations).

2.4.3 EPA field sample numbers are continuous, without spaces or hyphens. The original Sample Traffic Report/Chain of Custody Record page marked "Lab Copy for Return to SMO" with laboratory receipt information and signed with original Contractor signature shall be submitted for each sample in the SDG.

2.4.4 If samples are received at the laboratory with multi-sample Traffic Reports/Chain of Custody Records, all the samples on one multi-sample Traffic Report/Chain of Custody Record may not necessarily be in the same SDG. In this instance, the Contractor must make the appropriate number of photocopies of the Traffic Report/Chain of Custody Record and submit one copy with each SDG Cover Sheet.

2.5 Sample Data

The Sample Data shall include data for analyses of all samples in one SDG, including field samples, dilutions, re-analyses, blanks, and Laboratory Control Samples (LCSs). The Sample Data shall be complete before submission, and shall be consecutively paginated (starting with page number one and ending with the number of all pages in the package). The sample data shall include the following:

2.5.1 SDG Narrative

2.5.1.1 This document will be clearly labeled "SDG Narrative" and will contain: Laboratory name; Case number; EPA Sample Numbers, differentiating between initial analyses and re-analyses; SDG number; Contract number; Task Order number; and detailed documentation of any quality control, samples, shipment and/or analytical problems encountered in processing the samples reported in the data package.

All Gas Chromatograph (GC) columns used for analysis shall be documented in the SDG Narrative. List the GC Column identification: brand-name, internal diameter in mm, and length in meters, coating material, and film thickness.

NOTE: If a column is used that has different first and last eluting isomers than the DB-5 column, the Contractor shall fully document, in the SDG Narrative, the order of elution of the isomers and identify the first and last eluting isomers for that particular column for the Window Defining Mix (WDM) and the Mid-Point Calibration Standard (CS3) Solution.

2.5.1.2 Whenever data from sample re-analyses are submitted, the Contractor shall state the reason in the SDG Narrative for <u>each</u> re-analysis. The Contractor must also include any problems encountered, both technical and administrative, the corrective actions taken and the resolutions, and an explanation for all flagged edits (i.e., manual edits) on quantitation lists. This includes documenting the alternative technique used to determine cooler temperature if a temperature indicator bottle is not present in the cooler. The Contractor shall

also provide, in the SDG Narrative, sufficient information including equations or curves to allow the recalculation of sample results from raw instrument output. The Contractor shall also include a discussion of any requested Statement of Work (SOW) modifications or Modified Analyses. This includes attaching a copy of the approved modification form, either the Task Order or the modification form, to the SDG Narrative.

2.5.1.3 The SDG Narrative shall contain the following statement, verbatim: **"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature."** This statement shall be directly followed by the original signature of the Laboratory Manager or his/her designee with a typed line below it containing the signer's name and title, and the date of signature. All copies of the SDG Narrative shall be signed in an original signature.

2.5.2 Traffic Reports/Chain of Custody Records

2.5.2.1 The Contractor shall include a copy of each Traffic Report/Chain of Custody Record submitted in Section 2.4 for all of the samples in the SDG. The Traffic Reports/Chain of Custody Records shall be arranged in increasing Sample Number order, considering both letters and numbers in ordering samples. Copies of the SDG Cover Sheet shall be included with the copies of the Traffic Reports/Chain of Custody Records.

2.5.2.2 If samples are received at the laboratory with multi-sample Traffic Reports/Chain of Custody Records, all the samples on one multi-sample Traffic Report/Chain of Custody Record may not necessarily be in the same SDG. In this instance, the Contractor must make the appropriate number of photocopies of the Traffic Report/Chain of Custody Record so that a copy is submitted with each applicable data package.

2.5.2.3 In any instance where samples from more than one multi-sample Traffic Report/Chain of Custody Record are in the same data package, the Contractor must submit a copy of the SDG Cover Sheet with copies of the Traffic Reports/Chain of Custody Records.

2.5.3 CDD/CDF Data

2.5.3.1 CDD/CDF Sample Data

Sample data shall be arranged in packets with the CDD/CDF Sample Data Summary (Forms I-HR CDD-1, I-HR CDD-2 or I-CDD-4, and I-CDD-3 if applicable), followed by the raw data for the sample and Form II-HR CDD. These sample packets shall be placed in order of increasing designated Sample Number, considering both letters and numbers.

2.5.3.1.1 Sample Data Summary (Form I-HR CDD-1)

Tabulated results (identification and quantification) of the specified target analytes and recoveries of the associated labeled compounds shall be included. The validation and release of these results are authorized by a specific, signed statement in the SDG Narrative (see Section 2.5.1.3). In the event that the Laboratory Manager cannot verify all data reported for each sample, the Laboratory Manager shall provide a detailed description of the problems associated with the sample in the SDG Narrative.

2.5.3.1.2 Toxicity Equivalence Summary (Form I-HR CDD-2)

Tabulated adjusted concentrations for the target analytes based on toxicity equivalent factors. This form shall be included, even if no target analytes are positively identified.

2.5.3.1.3 Second Column Confirmation (Form I-HR CDD-3)

Tabulated results (identification and quantitation) of 2,3,7,8-TCDF and the recoveries of its corresponding labeled compound on a second GC column if original analysis was performed on a DB-5 GC column, or equivalent.

2.5.3.1.4 TEF Adjusted Concentration (Mammal/Fish/Bird) (Form I-HR CDD-4) (Optional)

Tabulated adjusted concentrations for the target analytes based on toxicity equivalent factors for each category. This form shall be included, even if no target analytes are positively identified.

2.5.3.1.5 Selected Ion Current Profile (SICP) for each sample or sample extract, including dilutions and re-analyses.

SICPs must be presented so the two quantitation ions, any relevant labeled compounds, and diphenyl ether interferents are on one page. The internal standards can be presented on another page. The SICPs for the lock mass ions (PFK) may be presented on another page. The SICP must show the full time window scanned for each ion. Enlarge any SICP peak for any 2,3,7,8-substituted congener present below the signal-to-noise (S/N) ratio of 10 or below the Contract Required Quantitation Limit (CRQL). Each SICP must contain the following header information:

- EPA Sample Number;
- Date and time of analysis;
- Absolute Retention Time (RT) (and scan number if available) and/or name of identified compounds;
- High Resolution Gas Chromatography/High Resolution Mass Spectrometry (HRGC/HRMS) Instrument ID;
- Lab File ID; and
- Analyst ID.

2.5.3.1.6 If automated data system procedures are used for preliminary identification and/or quantitation of the target compounds, the complete data system report, including but not limited to quantitation reports and area summaries, shall be provided in all Sample Data Packages, in addition to the SICPs. The complete data system report shall include all of the information listed below. For laboratories which do not use the automated data system procedures, a laboratory "raw data sheet" containing the following information shall be included in the Sample Data Package, in addition to the SICP:

- EPA Sample Number;
- Date and time of analysis;
- RT (and scan number if available) and/or name of identified target compounds;
- Ions used for quantitation with measured areas;

- Copy of area table from data system;
- On column concentration/amount including units;
- Signal-to-noise ratio;
- HRGC/HRMS Instrument ID;
- Lab File ID; and
- Analyst ID.

2.5.3.1.7 In all instances where the data system report has been edited, or where manual integration or quantitation has been performed, the HRGC/HRMS operator shall identify the changes made to the report, by initialing and dating all handwritten changes, and shall include the integration scan range. In addition, a hardcopy printout of the chromatogram displaying the manual integration shall be included in the raw data.

NOTE: Second column confirmation is required for all samples in which 2,3,7,8-TCDF is positively identified at, or above, the CRQL by analysis on a DB-5 (or equivalent) HRGC column, or if 2,3,7,8-TCDF is reported as an Estimated Maximum Possible Concentration (EMPC) at, or above, the CRQL.

2.5.3.1.8 Total Homologue Concentration Summary (Form II-HR CDD)

Tabulated total homologue concentrations shall be completed for each sample, blank, and Quality Control (QC) sample analyzed. EMPC values shall be flagged "*", and the Estimated Detection Limit (EDL) shall be qualified "U" on the form.

2.5.3.2 Quality Control Data

2.5.3.2.1 Lab Control Sample Summary (Form III-HR CDD) - in order by designated Sample Number assigned to the LCS.

2.5.3.2.2 Method Blank Summary (Form IV-HR CDD) - in order by designated Sample Number assigned to the blanks.

2.5.3.2.3 Window Defining Mix Summary (Form V-HR CDD-1) - in order by designated Sample Number assigned to the WDM.

A Window Defining Mix Summary must be completed for each 12-hour period. The retention time for the first and last eluting CDD and CDF isomers are included on this form.

2.5.3.2.4 Chromatographic Resolution Summary (Form V-HR CDD-2) - in order by designated Sample Number assigned to the standard used to evaluate the column resolution.

A Chromatographic Resolution Summary must be completed for each 12-hour period.

2.5.3.2.5 Analytical Sequence Summary (Form V-HR CDD-3) - This form is used to report the analytical sequence for CDD/CDF analysis for all GC columns and instruments.

2.5.3.3 Calibration Data

2.5.3.3.1 Initial Calibration Data (Form VI-HR CDD-1, CDD-2) - in order by instrument, if more than one instrument is used.

2.5.3.3.1.1 Perfluorokerosene (PFK) mass resolution for initial calibration shall be provided and labeled with designated Sample Number, date and time, HRGC/HRMS Instrument ID, Lab File ID, and Analyst ID.

2.5.3.3.1.2 CDD/CDF standard(s), SICPs, and complete data system reports including area summaries for the initial (five-point) calibration shall be labeled as stated in Sections 2.5.3.1.5 and 2.5.3.1.6.

2.5.3.3.1.3 When more than one initial calibration is performed, the data must be arranged in chronological order by instrument.

2.5.3.3.2 Continuing Calibration Data (Form VII-HR CDD-1, CDD-2) - in order by instrument, if more than one instrument is used.

2.5.3.3.2.1 PFK mass resolution for continuing calibration shall be provided for each 12-hour period and labeled with designated Sample Number, date and time, HRGC/HRMS Instrument ID, Lab File ID, and Analyst ID.

2.5.3.3.2.2 CDD/CDF standard(s), SICPs, and complete data system reports including area summaries for all continuing calibrations shall be labeled as specified in Sections 2.5.3.1.5 and 2.5.3.1.6.

2.5.3.3.2.3 When more than one continuing calibration is performed, the data must be arranged in chronological order, by instrument.

2.5.3.3.2.4 In all instances where the data system report has been edited, or where manual integration or quantitation has been performed, the HRGC/HRMS operator shall identify such edits or manual procedures by initialing and dating the changes made to the report, and shall include the integration scan page. In addition, a hardcopy printout of the chromatogram of the quantitation ion(s) displaying the manual integration shall be included in the raw data. This applies to all compounds listed in Exhibit C, labeled compounds, and internal standards.

2.5.3.4 Raw Quality Control Data

2.5.3.4.1 Blank Data shall be included in order by designated Sample Number assigned to the blank.

- Form I-HR CDD-1, CDD-2, and CDD-3, if applicable.
- SICPs and a complete data system report including area summaries shall be submitted for each blank analyzed, and labeled as specified in Sections 2.5.3.1.5 and 2.5.3.1.6.

2.5.3.4.2 Laboratory Control Sample Data

- Tabulated results (FORM I-HR CDD-1 and CDD-2).
- SICPs and a complete data system report including area summaries labeled as specified in Sections 2.5.3.1.5 and 2.5.3.1.6.

2.6 Complete Sample Delivery Group (SDG) File (CSF)

2.6.1 As specified in the Delivery Schedule, one CSF, including the original Sample Data, shall be delivered to the TOPO concurrently with delivery of a copy to SMO. The contents of the CSF shall be numbered according to the specifications described in Sections 3.6. The CSF shall contain all original documents specified in Sections 3 and 4, and on Form DC-2. No copies shall be placed in the CSF unless the originals were initially written in a bound notebook maintained by the laboratory, or the originals were previously submitted to the Government with another SDG in accordance with the requirements described in Exhibit F.

2.6.2 The CSF shall consist of the following original documents, in addition to the documents in the Sample Data:

- Original Sample Data;
- A completed and signed CDD/CDF CSF Inventory Sheet (Form DC-2);
- All original shipping documents including, but not limited to, the following:
  - Traffic Reports/Chain of Custody Records;
  - Airbills (if an airbill is not received, include a hardcopy receipt from the shipping company or a printout of the shipping company's electronic tracking information); and
  - Sample tags (if present) sealed in plastic bags.
- All original receiving documents including, but not limited to, the following:
  - Form DC-1;
  - Other receiving forms or copies of receiving logbooks, and
  - SDG Sheet.
- All original laboratory records not already submitted in the Sample Data Package of sample transfer, preparation, and analysis including, but not limited to, the following documents:
  - Original preparation and analysis forms or copies of preparation and analysis logbook pages;
  - Internal sample and sample extract transfer Chain of Custody Records;
  - Screening records; and
  - All instrument output, including strip charts from screening activities.
- All other original SDG-specific documents in the possession of the Contractor, including, but not limited to, the following documents:
  - Telephone contact logs;
  - Copies of personal logbook pages;
  - All hand-written SDG-specific notes; and
  - Any other SDG-specific documents not covered by the above.

  NOTE: All Case-related documentation may be used or admitted as evidence in subsequent legal proceedings. Any other SDG-specific documents generated after the CSF are sent to the TOPO, as well as copies that are altered in any fashion, are also deliverables to the Government (original to the TOPO and copies to SMO).

2.6.3 If the Contractor does submit SDG-specific documents to the Government after submission of the CSF, the documents shall be identified with unique accountable numbers, a revised Form DC-2 shall be submitted, and the unique accountable numbers and locations of the documents in the CSF shall be recorded in the "Other Records" section on the revised Form DC-2. Alternatively, the Contractor may number the newly submitted SDG-specific documents to the Government as a new CSF and submit a new Form DC-2. The revised Form DC-2 or new Form DC-2 should be submitted to the TOPO only.

2.7 Data in Electronic Format

The Contractor shall provide an electronic data deliverable for all samples in the SDG, as specified in Exhibit H, and delivered as specified in Section 1 of this exhibit.

2.8 High Resolution Gas Chromatography/High Resolution Mass Spectrometry (HRGC/HRMS) Instrument Electronic Data

The Contractor shall store all raw and processed HRGC/HRMS data in the appropriate instrument manufacturer's format. This data must include data for samples, LCSs, blanks, initial and continuing calibrations, as well as all laboratory-generated quantitation reports and SICPs required to generate the data package. The Contractor shall maintain a written reference logbook of data files to designate Sample Number, calibration data, standards, and blanks. The logbook shall include EPA Sample Numbers and Standard and Blank IDs, identified by Case, Task Order number, and SDG. The Contractor is required to retain the HRGC/HRMS data for three (3) years after submission of the reconciled complete data package. During that time, the Contractor shall submit instrument data and associated logbook pages within 7 days after receipt of a written request from the TOPO or OSRTI ASB Dioxin PM.

2.8.1 When submitting HRGC/HRMS data to USEPA, the following materials shall be delivered in response to the request:

- All associated raw data files for samples, blanks, QC samples, LCSs, and initial and continuing calibration standards;
- All processed data files and quantitation output files associated with the raw data files described above;
- All associated identifications and calculation files used to generate the data submitted in the data package; and
- A copy of the Contractor's written reference logbook relating tape files to Sample Number, calibration data, standards, blanks, and LCSs. The logbook shall include Sample Numbers and laboratory file identifiers for all samples, blanks, and standards, identified by Case and SDG.

2.8.2 The laboratory shall also provide a statement attesting to the completeness of the HRGC/HRMS instrument data submission, signed and dated by the Laboratory Manager and/or designee. This statement shall be part of a cover sheet that includes the following information relevant to the submission:

- Laboratory name;
- Date of submission;
- Case number;
- Task Order number;
- SDG number;
- HRGC/HRMS make and model number;
- Software version;
- Names and telephone numbers of two laboratory contacts for further information regarding the submission.

2.9 Extracts

The Contractor shall preserve sample extracts in the dark at <-10° in bottles/vials with polytetrafluoroethylene (PTFE)-lined septa. Extract bottles/vials shall be labeled with the EPA Sample Number, Case number, SDG number, and Task Order number. A logbook of stored extracts, listing designated Sample Numbers and associated Case and SDG numbers, shall be maintained.

2.9.1 The Contractor is required to retain extracts for one (1) year following submission of reconciled complete data package. During that time, the Contractor shall submit extracts and associated logbook pages within 7 days following receipt of a written request from the TOPO or OSRTI ASB Dioxin PM.

2.10 Delivery of Hardcopy Data in PDF Format

In addition to all required deliverables identified in the laboratory's contract and the DLM02.2 SOW, the laboratory shall provide a complete copy of the hardcopy deliverable in PDF on a Compact Disc (CD).

2.10.1 The PDF file shall be organized in accordance with the directions provided in Exhibit B, "Reporting Requirements and Order of Data Deliverables" of the DLM02.2 SOW. The PDF shall be bookmarked as described below for ease of data retrieval and navigation.

2.10.2 Data shall be bookmarked using a hierarchical bookmark structure (i.e., an overview or "parent" bookmark, and a subordinate or "child" bookmark nested underneath the "parent" bookmark). The required hierarchical structure is shown in Table 2.

TABLE 2. Hierarchical Bookmark Structure

Group Bookmark	**Parent Bookmark**	**Child Bookmark**
SDG Narrative, Form DC-1,Form DC-2, and Sample TR/COCs		
Sample Data	QC Summary	Analysis Data Sheets
		Homologues
		LCS
		Method Blanks
		Window Defining Mix
		Chromatographic Resolution
		Analytical Sequence
	Standard Data	Initial Calibration Summary
		Continuing Calibration Verification
	Raw Data	CDD/CDF
		Extraction Logs
Receiving Documents, Transfer Records, Miscellaneous	Additional Documents	Receiving Logbooks
		Preparation and Analysis Logbooks
		Internal Sample, Extract Transfer Chain-of-Custody Records
		PE Instruction Forms
		Communication Logs

3.0 GENERAL FORM INSTRUCTIONS

3.1 Introduction

This section contains general instructions for completion of all required chlorinated dibenzo-p-dioxins/chlorinated dibenzofurans (CDD/CDF) Data Reporting Forms.

3.2 General Information

3.2.1 The data reporting forms presented in Exhibit B, Section 4.0, have been designed in conjunction with the electronic data format specified in Exhibit H. Information entered on these forms shall **not** exceed the size of the field given on the form, including such laboratory generated items as "Lab Name" and "Lab Sample ID".

3.2.2 All characters which appear on the data reporting forms presented in Section 4 must be reproduced by the Contractor when submitting data, and the format of the forms submitted shall provide exactly the same information as that shown in the contract. No information may be added, deleted, or moved from its specified position without prior written approval of USEPA. The names of the various fields and compounds (e.g., "Lab Code", "2378-TCDD") must appear as they do on the forms in the contract, including the options specified in the form (i.e., "Matrix: (Soil/Water/Ash/Tissue/Oil)" must appear, not just "Matrix").

3.3 Header Information

Six pieces of information are common to the header section of each data reporting form. They are Lab Name, Contract, Lab Code, Case No., Task Order No., and SDG No. Except as noted below for Task Order No., this information must be entered on every form and must match on every form.

3.3.1 "Lab Name" will be the name chosen by the Contractor to identify the laboratory. It may not exceed 25 characters.

3.3.2 "Lab Code" is an alphanumeric abbreviation of up to six letters and numbers assigned by USEPA to identify the laboratory and aid in data processing. This lab code will be assigned by USEPA at the time a contract is awarded and shall not be modified by the Contractor, except at the direction of the Contracting Officer (CO). If a change of name or ownership occurs at the laboratory, the lab code will remain the same unless and until the Contractor is directed by the CO to use another USEPA-assigned lab code.

3.3.3 "Case No." is the assigned Case number associated with the sample and reported on the Chain of Custody Record/Traffic Report or sample shipping paperwork.

3.3.4 "Contract" is the number of the contract under which the analyses were performed.

3.3.5 "SDG No." is the designated Sample Number of the first sample received in the Sample Delivery Group (SDG). When several samples are received together in the first SDG shipment, the SDG number shall be the lowest Sample Number (considering both alpha and numeric designations) in the first group of samples received under the SDG.

3.3.6 The "TO NO." is the Task Order number under which the analyses were performed.

3.3.7 Sample No. The “EPA Sample Number” appears either in the upper right-hand corner of the form, or as the left column of a table summarizing data from a number of samples.

3.3.7.1 All samples, Laboratory Control Samples (LCSs), blanks, and standards shall be identified with an EPA Sample Number. For field samples, the EPA Sample Number is based on the unique identifying number given in the Traffic Report/Chain of Custody Record or sample shipping records for that sample.

3.3.7.2 In order to facilitate data assessment, the following suffixes must be used:

XXXXX = Sample Number
XXXXXRE = Re-extracted and re-analyzed aliquot of sample "XXXXX"
XXXXXDL = Diluted analysis of sample "XXXXX"

3.3.7.3 Form V-HR CDD-3 requires that all samples analyzed in a given 12-hour analytical sequence be listed, regardless of whether or not they are part of the SDG being reported, and regardless of whether or not they are Government samples. Therefore, use "ZZZZZZ" as the Sample Number for any sample analysis that is not associated with the SDG being reported.

3.3.7.4 For blanks and standards, the following identification scheme must be used as the "Sample No.":

- Method blanks shall be identified as DFBLK##;
- Calibration standards shall be identified as CS1##, CS2##, CS3##, CS4##, and CS5##, and shall correspond to the calibration solutions identified in Exhibit D;
- The Window Defining Mixture (WDM) shall be identified as WDM##;
- The Isomer Specificity Check (ISC) shall be identified as ISC##;
- If combined, the WDM and ISC shall be identified as CPS##;
- The LCS shall be identified as DLCS##; and
  - The perfluorokerosene (PFK) mass resolution check shall be identified as PFK##.

3.3.7.5 "Sample No." must be unique within an SDG. Therefore, the Contractor must replace the two-character "##" terminator of the identifier with one or two characters or numbers, or a combination of both, to create a unique Sample Number for each blank and standard within the SDG.

For example, possible identifiers for method blanks would be DFBLK01, DFBLK02, DFBLKA1, DFBLKB2, DFBLKAB, etc.

3.3.8 Other Common Fields

Other pieces of information are common to many of the data reporting forms. These include "Matrix", "Lab Sample ID", "Lab File ID", "Instrument ID", and "GC Column".

3.3.8.1 For "Matrix", enter "Soil" for a soil/sediment/sludge sample, "Water" for an aqueous sample, "Tissue" for tissue, "Oil" for oil and oil matrix, and "Ash" for fly ash samples.

3.3.8.2 "Lab Sample ID" is an optional laboratory generated internal identifier. Up to 12 alphanumeric characters may be reported here. If the Contractor does not have a Lab Sample ID, this field may be left blank. However, if this identifier is used on any of the forms

or accompanying hardcopy data deliverables, it must be reported on all the appropriate forms.

3.3.8.3 "Lab File ID" is the laboratory generated name of the High Resolution Gas Chromatography/High Resolution Mass Spectrometry (HRGC/HRMS) data system file containing information pertaining to a particular analysis. Up to 14 alphanumeric characters may be used here.

3.3.8.4 "Instrument ID" is common to many of the forms, particularly those containing calibration data. The identifier used by the laboratory must include some indication of the manufacturer and/or model of the instrument, and contain additional characters or numbers that differentiate between all instruments of the same type in the laboratory. The instrument identifier must be consistent on all forms within the SDG.

3.3.8.5 "GC Column" and "ID (mm)" are common to various other forms. These two fields are to be used to identify the stationary phase of the Gas Chromatograph (GC) column, and the internal diameter of the GC column in millimeters (mm).

3.3.9 Rounding Rule

For rounding off numbers to the appropriate level of precision, observe the following common rules. If the figure following those to be retained is less than 5, drop it (round down). If the figure is greater than or equal to 5, drop it and increase the last digit to be retained by 1 (round up).

3.4 Chlorinated Dibenzo-P-Dioxin/Dibenzofuran (CDD/CDF) Data Reporting Forms

3.4.1 CDD/CDF Sample Data Summary High Resolution [Form I-HR CDD-1]

3.4.1.1 This form is used for tabulating and reporting the sample analysis results for target analytes in samples, blanks, and LCSs. It is related to Form I-HR CDD-2 (or the optional Form I-HR CDD-4), and for each sample for which there is a Form I-HR CDD-1, there must be a corresponding Form I-HR CDD-2 (or optional Form I-HR CDD-4). In addition, a Form I-HR CDD-3 may be associated.

3.4.1.2 Complete all header information according to the instructions in Section 3.3 and as follows:

3.4.1.2.1 Enter the "Matrix" of the sample being analyzed. The designation of matrix must reflect which one of the matrix-specific extraction procedures in Exhibit D was used for extraction of the sample.

3.4.1.2.2 For "Sample wt/vol", enter the number of grams (for soil, tissue, oil, and ash) or milliliters (for water) of sample used in the first blank line, and the units, either "g" or "mL", in the second blank.

3.4.1.2.3 For water samples, indicate the extraction procedure used by entering "SEPF" for Separatory Funnel Extraction or "SPE" for Solid Phase Extraction in the field labeled "Water Sample Prep".

3.4.1.2.4 Enter the actual volume of the most concentrated sample extract, in microliters, under "Concentrated Extract Volume". This volume will typically be 20 µL after the addition of the internal standard solution.

3.4.1.2.5 Enter "GC Column", "ID (mm)", "Lab Sample ID", and "Lab File ID", as described in Section 3.3.

3.4.1.2.6 "Date Received" is the date of sample receipt at the laboratory, as noted on the Traffic Report/Chain of Custody Record for that sample. It must be entered as MM/DD/YYYY.

3.4.1.2.7 "Date Extracted" and "Date Analyzed" must also be entered as MM/DD/YYYY.

3.4.1.2.8 "Date Analyzed" must be the date of the analysis for which the results are reported on Form I-HR. (If the sample requires a second column confirmation and is reported on Form I-HR CDD-3, the "Date Analyzed" on Form I-HR CDD-3 must be the date of the second analysis, while the date on Form I-HR CDD-1 and CDD-2 (or CDD-4) shall be the date of the first analysis.)

3.4.1.2.9 If the sample has been diluted for analysis, enter the "Dilution Factor" as a single number, not a fraction. For example, enter "100.0" for a 1 to 100 dilution of the extract. Enter "0.1" for a concentration of 10 to 1. If the sample was not diluted, enter "1.0".

3.4.1.2.10 Enter the volume of the sample extract injected into the HRGC in the "Injection Volume" field. Report this volume in µL.

3.4.1.2.11 Enter the value for Percent Solid (%S) as described in Exhibit D for soil/sediment/sludge samples in the "% Solids/Lipids" field. For tissue samples, enter the value for Percent Lipids (% Lipids), as determined in Exhibit D, in this field. For all other matrices, leave this field blank.

3.4.1.2.12 The appropriate concentration units, "pg/L" for water samples, or "ng/kg" for all other matrices, must be entered in the field for "Concentration Units".

3.4.1.2.13 For each analyte detected in a sample, enter the Absolute Retention Time (RT) of the detected peak under "Peak RT". Enter the RT in minutes and decimal minutes, not seconds or minutes and seconds. The RT must be entered, even if the peak did not meet all of the identification criteria in Exhibit D.

3.4.1.3 Enter the ion abundance ratio for the two mass-to-charge (m/z) ratios (listed under "Selected Ions") in the column labeled "Ion Ratio". If the ion abundance ratio falls outside the acceptance limits listed in Exhibit D, place an asterisk (*) in the column under the number (#) symbol. For target analytes that meet all the identification criteria in Exhibit D, the Contractor shall report the concentrations detected as uncorrected for blank contaminants in the column labeled "Concentration". Report all results to three significant figures.

3.4.1.4 Under the column labeled "Q" for qualifier, flag each result with the specific data reporting qualifiers listed below. The Contractor is encouraged to use additional flags as needed, but the definition of such flags must be explicit, must not contradict the qualifiers listed below, and must be included in the accompanying SDG Narrative.

3.4.1.5 For reporting results, the following contract-specific qualifiers are to be used. The seven qualifiers listed below are not subject to modification by the laboratory. Up to five qualifiers may be reported on Form I for each analyte. The seven defined qualifiers to be used are as follows:

3.4.1.5.1 U - Indicates compound was analyzed for, but not detected. The "Concentration" column is left blank in this instance, and an Estimated Detection Limit (EDL) must be calculated based on the signal-to-noise (S/N) ratio, as described in Exhibit D. This

calculation takes into account the sample weight/volume extracted, the volume of the most concentrated extract, the injection volume, and dilution of the most concentrated extract prior to analysis.

3.4.1.5.2 J - Indicates an estimated value. This flag is used when the mass spectral data indicate the presence of an analyte meeting all the identification criteria in Exhibit D, but the result is less than the Contract Required Quantitation Limit (CRQL), as listed in Exhibit C, but greater than zero.

3.4.1.5.3 B - This flag is used when the analyte is found in the associated blank, as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

3.4.1.5.4 E - This flag identifies analytes whose concentrations exceed the calibration range of the HRGC/HRMS instrument for that specific analysis. If one or more compounds have a response greater than fullscale, except as noted in Exhibit D, a smaller sample size must be extracted and analyzed according to the specifications in Exhibit D. All such compounds with a response greater than full scale should have the concentration flagged "E" on the Form I for the original analysis. If the dilution causes any compounds identified in the first analysis to be below the calibration range in the second analysis, the results of both analyses shall be reported on separate copies of Form I. The Form I for the diluted sample shall have the "DL" suffix appended to the designated Sample Number.

3.4.1.5.5 D - This flag indicates all compounds identified in an analysis at a secondary dilution factor. If a smaller sample size is analyzed, as in the "E" flag above, the "DL" suffix is appended to the designated Sample Number on the Form I for the diluted sample, and <u>all</u> concentration values reported on that Form I are flagged with the "D" flag. This flag alerts data users that any discrepancies between the concentrations reported may be due to dilution of the sample extract.

3.4.1.5.6 H - This flag indicates that the analyte in question was quantitated using peak <u>heights</u> rather than peak areas for both the analyte and its internal standard (see Exhibit D, Section 11).

3.4.1.5.7 X - Other specific flags may be required to properly define the results. If used, they must be fully described, and such description must be attached to the Sample Data Package and the SDG Narrative. Begin using "X". If more than one flag is needed, use "Y" and "Z" as needed. The laboratory-defined flags are <u>limited</u> to the letters "X", "Y", and "Z".

3.4.1.6 The combination of flags "BU" or "UB" is expressly prohibited. Blank contaminants are flagged "B" <u>only</u> when they are detected in the sample associated with the blank.

3.4.1.7 If a peak detected in the sample meets all of the identification criteria <u>except</u> the ion abundance ratio, flag the ion ratio as indicated above, and report the Estimated Maximum Possible Concentration (EMPC), as calculated in Exhibit D under the "EMPC/EDL" column. Do <u>not</u> report the value of the EMPC under the column labeled "Concentration", as that column is only for analytes meeting <u>all</u> the identification criteria.

3.4.1.8 If an analyte was not detected in the sample, enter "U" in the qualifier column, as described above, and report the EDL as calculated in Exhibit D under the "EMPC/EDL" column. Do not report the value of the EDL if there is an entry under "Concentration". The presence of the "U" alerts the data user that the reported value is an EDL, otherwise it is assumed to be an EMPC. EMPC values must be reported with Peak Retention Times and Ion Ratios with a flag in the "Q" column.

The bottom portion of Form I-HR CDD-1 contains the fields for reporting the recoveries of the labeled compounds and the cleanup standard. The recoveries of these standards are crucial in evaluating the effectiveness of the isotope dilution method. For each labeled compound and the cleanup standard, enter the absolute RT of the standard in the sample in minutes and decimal minutes. Report the ion abundance ratio under the "Ion Ratio" column. Flag any ion ratios that fall outside the ion ratio limits listed on the form by placing an asterisk (*) in the column under the number (#) symbol. There is no ion abundance ratio for the cleanup standard, as only one ion is monitored. Report the Percent Recovery (%R) of the labeled compounds and the cleanup standard, calculated according to Exhibit D, under the "% Rec" column. The Quality Control (QC) limits for recovery are listed on the form. Flag any recovery outside those limits by placing an asterisk (*) under the number (#) symbol in the recovery column. Requirements for re-analysis of samples due to poor recoveries are provided in Exhibit D.

3.4.2 CDD/CDF Toxicity Equivalence Summary High Resolution [Form I-HR CDD-2]

This page of Form I-HR reports the results of the toxicity equivalence calculations for each sample analyzed. The concentration of each of the 2,3,7,8-substituted CDD and CDF isomers is multiplied by a Toxicity Equivalence Factor (TEF) to arrive at an equivalent toxicity concentration of 2,3,7,8-TCDD.

3.4.2.1 Complete the header information as specified in Section 3.3. The header of Form I-HR CDD-2 must match the header of Form I-HR CDD-1 for the same sample.

3.4.2.2 For each 2,3,7,8-substituted isomer positively identified in the sample, enter the concentration found in the column labeled "Concentration". If an isomer was not detected (e.g., flagged "U" on Form I CDD-1) for the purposes of this calculation, enter 0.0 (zero) (EDLs and EMPCs are entered as 0.0) as the concentration. Multiply each concentration times the TEF listed on the form for that isomer, and enter the product of the two in the column labeled "TEF-Adjusted Concentration". Add all 17 TEF-adjusted concentrations together, including any zeros for non-detected compounds, and enter the total on the line at the bottom of the form.

3.4.3 CDF Second Column Confirmation High Resolution [Form I-HR CDD-3]

This page of Form I reports the results of all second column confirmation analyses performed. The requirements for second column confirmation are discussed in Exhibit D. Each time a second column confirmation is performed, the results are reported on Form I-HR CDD-3. Second column confirmation is not required for LCSs, therefore Form I-HR CDD-3 is not submitted for LCSs.

3.4.3.1 Complete the header information as specified in Section 3.3, except note that the field for "GC Column" must correspond to the second column confirmation analysis (i.e., it must not match that in the header of Form I-HR CDD-1 or CDD-2). Other fields such as "Date Analyzed", "Dilution Factor", and "Lab File ID" may also differ and must correspond to the second column confirmation analysis.

3.4.3.2 Complete the information in the lower portion of the form in a fashion similar to that for Form I-HR CDD-1, but enter the results of the second column confirmation.

3.4.3.3 Enter data on the recovery of the labeled compound and cleanup standard from the second column confirmation analysis in a fashion similar to that for the original analysis.

3.4.4 CDD/CDF Toxicity Equivalence Summary (Mammal, Fish, Bird) High Resolution [Form I-HR CDD-4] (Optional)

This page of Form I-HR reports the results of the toxicity equivalence calculations for each the biological TEFs for each sample analyzed. The concentration of each of the 2,3,7,8-substituted CDD and CDF isomers is multiplied by a Toxicity Equivalence Factor (TEF) to arrive at an equivalent toxicity concentration of 2,3,7,8-TCDD for each biological classification.

3.4.4.1 Complete the header information as specified in Section 3.3. The header of Form I-HR CDD-4 must match the header of Form I-HR CDD-1 for the same sample.

3.4.4.2 For each 2,3,7,8-substituted isomer positively identified in the sample, enter the concentration found in the column labeled "Concentration". If an isomer was not detected (e.g., flagged "U" on Form I CDD-1) for the purposes of this calculation, enter the EDL or EMPC, if eh EMPC is available. EDLs and EMPCs are used as surrogate concentrations in the calculation. Multiply each concentration times the TEF listed on the form for that isomer. Use the 2005 World Health Organization (WHO) TEFs for mammal and the 1998 WHO TEFs for fish and bird as listed on the Form. Enter the product of the two in the column labeled "TEF-Adjusted Concentration". Add all 17 TEF-adjusted concentrations together and enter the total on the line at the bottom of the form. This calculation is performed for each of the three sets of TEFs: mammal, fish, and bird using the applicable TEFs for each.

3.4.5 CDD/CDF Total Homologue Concentration Summary High Resolution [Form II-HR CDD]

This form reports the total concentration of all CDD/CDF isomers in a given homologue that are detected in the sample, including those isomers that do not represent the 2,3,7,8-substituted isomers of greatest toxicological concern. Because there are many isomers in each homologue, it is necessary to indicate the number of peaks that represent isomers within the homologue. Enter the number of peaks detected in each homologue under "Peaks". For instance, if three PeCDD peaks are detected and summed together, enter "3" under "Peaks".

3.4.5.1 Enter the total concentration of the homologue, as calculated in Exhibit D, under "Concentration". Enter qualifiers under the "Q" column, as described in Section 3.4.1.6. If no isomers in a homologue were detected, enter "U" as the qualifier, and enter the lowest EDL of any of the 2,3,7,8-substituted isomers under the "EMPC/EDL" column.

3.4.5.2 If any of the peaks in a congener meet all the identification criteria except the ion abundance ratio, report the total concentration as an EMPC under the "EMPC/EDL" column.

3.4.6 CDD/CDF Lab Control Sample Summary High Resolution [Form III-HR CDD]

This page of Form III reports the results of the LCS analysis.

3.4.6.1 Complete the header information as in Section 3.3. Enter the designated Sample Number in the box at the top of the form. Similarly, the Lab Sample ID and Lab File ID must refer to the LCS.

3.4.6.2 Under the "Spike Added" column, enter the calculated concentration of each of the 17 analytes in the LCS in pg/L or ng/kg (according to the matrix) that results from dividing each spike compound amount added by the aliquot weight or volume. In the column labeled "Amount Recovered", enter the concentration (or EMPC) of each analyte detected in the LCS. The concentration units must be those indicated at the top of the form and be appropriate to the sample matrix listed in the header. Calculate the recovery of each spiked analyte as described in Exhibit D, and enter this value to the nearest whole percentage point in the column labeled "Percent Recovery". Flag any recoveries outside the QC limits listed on the form by placing an asterisk (*) in the column under the number (#) symbol.

3.4.6.3 In addition to Form III CDD, a copy of Form I-HR CDD-1 must also be completed for the LCS analysis, following the procedures described above.

3.4.7 CDD/CDF Method Blank Summary High Resolution [Form IV-HR CDD]

This form summarizes the samples associated with each method blank analysis. A copy of Form IV-HR is required for each blank.

3.4.7.1 Complete the header information as described in Section 3.3. The designated Sample Number entered in the box at the top of the form shall be the number assigned to the method blank. The matrix entered on this form refers to the matrix of the associated samples, as one blank is required each time that samples of a similar matrix are extracted together. Therefore, samples of differing matrices cannot be mixed together on a single Form IV-HR.

3.4.7.2 Summarize the samples associated with a given method blank in the box in the lower portion of the form, entering the designated Sample Number, Lab Sample ID, Lab File ID, and date of analysis of each sample. Include LCSs as well.

3.4.8 CDD/CDF WDM Summary High Resolution [Form V-HR CDD-1]

This page of Form V reports the results of the analysis of the WDM that precedes each calibration verification on each GC column and instrument used for analysis. The analysis of this mixture is used to document the retention time window for the CDD/CDF homologues. Complete the header information as described in Section 3.3, entering the designated Sample Number of the WDM injection in the box at the top of the form. The header information must correspond to the analysis of the WDM.

3.4.8.1 In the box in the lower portion of the form, enter the Absolute RTs of the first and last eluting isomers in each homologue. Enter the retention times in minutes and decimal minutes.

NOTE: As there is only one possible octachlorinated dioxin and furan, the retention times of these analytes are not contained in the WDM, and are not reported here.

3.4.9 CDD/CDF Chromatographic Resolution Summary High Resolution [Form V-HR CDD-2]

This page of Form V reports the chromatographic resolution of selected analytes in one of two solutions, depending on the GC column. The chromatographic resolution of these analytes is crucial to evaluating the results for the CDDs/CDFs reported in the samples. This evaluation is made every 12 hours during which samples or standards are analyzed. The Form V-HR CDD-2 shall be submitted for each column used.

3.4.9.1 For the DB-5 (or equivalent) column and for the DB-225 (or equivalent) column, the chromatographic resolution is judged from the analysis of the isomer specificity check that precedes the analysis of the calibration verification (see Exhibit D).

3.4.9.2 Complete one copy of Form V-HR CDD-2 for each analysis of the isomer specificity check on each GC column. Complete the header information, as described in Section 3.3, entering the designated Sample Number of the isomer specificity check in the box at the top of the form. Enter the date and time of analysis of the standard in the header.

3.4.9.3 Calculate the chromatographic resolution for the GC column identified in the header according to the procedures in Exhibit D. For the DB-5 (or equivalent) column, enter only the results from the isomer specificity check analysis. For the DB-225 (or equivalent) column, enter only the results from the isomer specificity check analysis.

3.4.10 CDD/CDF Analytical Sequence Summary High Resolution [Form V-HR CDD-3]

This page of Form V reports the sequence of analyses, including the analysis of the WDM, Isomer Specificity Check, the calibration standards, blanks, samples, and LCSs.

3.4.10.1 Complete the header information as described in Section 3.3. Enter the inclusive dates and times of the analyses of the first and last initial calibration standards in the fields for "Init. Calib. Date(s)" and "Init. Calib. Times". Dates must be in the format MM/DD/YYYY, and all times are expressed as HHMM, in military time (i.e., a 24-hour clock).

3.4.10.2 In the box in the lower portion of the form, enter the designated Sample Number, Lab Sample ID, Lab File ID, and date and time of analysis of all standards, samples, blanks, LCSs, dilutions, re-analyses, etc. All analyses must be listed on Form V in chronological order by date and time of analyses. If analysis is not associated

with the SDG being reported, enter the designated Sample Number as "ZZZZZ", as described in Section 3.3.

3.4.10.3 If the analytical sequence includes the analysis of the initial calibration standards, these standards and the WDM must be included on that copy of Form V, identified by the designated Sample Numbers described in Section 3.3. A copy of the analytical sequence that includes these initial calibration standards and the WDM must be submitted with each data package to which the initial calibration applies, but the Case number and Task Order number must match those of each data package in which these initial calibration data are reported.

3.4.11 CDD/CDF Initial Calibration Response Factor Summary High Resolution [Form VI-HR CDD-1]

This form summarizes the Relative Response (RR) or Relative Response Factors (RRF) for each target analyte, labeled compound, and cleanup standard calculated from the initial calibration. Complete the header information as described in Section 3.3. Enter the inclusive initial calibration date(s) and times, as described for Form V-HR CDD-3. One copy of Form VI-HR CDD-1 must be completed for each initial calibration and for each instrument and GC column used for analysis of samples, and must be accompanied by a corresponding Form VI-HR CDD-2.

3.4.11.1 Enter the RR and RRF determined from the analysis of each of the calibration standards (CS1 through CS5). Enter RR/RRF values to three decimal places. Calculate the mean RR/RRF, as described in Exhibit D, and enter the value in the "Mean RR/RRF" column. Calculate the Percent Relative Standard Deviation (%RSD), and enter under "%RSD". Note that as the internal standards are used to determine the RRFs of the labeled compounds, no RRF values can be calculated for the internal standards, and therefore, they do not appear on Form VI CDD-1.

3.4.12 CDD/CDF Initial Calibration Ion Abundance Ratio Summary High Resolution [Form VI-HR CDD-2]

This page of Form VI reports the ion abundance ratios for each of the initial calibration standards. Because the ratio of the abundances of the two ions monitored for each analyte is crucial to the identification of these analytes, the ion abundance ratios must meet the QC limits.

3.4.12.1 For each native analyte, labeled compound, and internal standard, the two ions monitored for each analyte are listed in the column labeled "Selected Ions". Calculate the ratio of the abundances of these two ions and enter the ion abundance ratio of each analyte in each of the initial calibration standards to two decimal places.

3.4.12.2 Compare the ion abundance ratios to the QC limits shown on the form, and flag any analyte which did not meet these limits in one or more of the standards.

NOTE: The cleanup standard does <u>not</u> appear on Form VI-HR CDD-2, as only one ion is monitored for this analyte. Therefore, no ion abundance ratio can be calculated.

3.4.12.3 One copy of Form VI-HR CDD-2 must be completed for each initial calibration, for each instrument and GC column used for analysis of samples, and must accompany a corresponding copy of Form VI CDD-1.

3.4.13 CDD/CDF Continuing Calibration Summary High Resolution [Form VII-HR CDD-1]

This page of Form VII summarizes the results of the continuing calibration that must occur in each 12-hour analytical sequence. The form is used to report the RR/RRF values and ion abundance ratios of each analyte in the CS3 standard, and to compare these values to the initial calibration data reported on Form VI-HR CDD-1.

3.4.13.1 One copy of Form VII-HR CDD-1 must be completed for each continuing calibration performed, and must be accompanied by a corresponding copy of Form VII-HR CDD-2.

3.4.13.2 Complete the header information as described in Section 3.3. The date and time of analysis and Lab File ID in the header must correspond to the analysis of the CS3 standard. Enter the dates and times of the associated initial calibration in the fields for "Init. Calib. Date(s)" and "Init. Calib. Times", respectively. If the calendar date changed during the initial calibration, enter the inclusive dates of the first and last standards in the associated initial calibration in the fields for "Init. Calib. Date(s)".

For each of the native analytes, labeled compounds, and the cleanup standard in the CS3 Standard, enter the RR or RRF determined from the analysis of the continuing calibration standard in the column labeled "RR/RRF". Enter the mean RR/RRF for each analyte from the associated initial calibration, in the column labeled "Mean RR/RRF". The values reported in this column must match those reported on the Form VI for the associated initial calibration. Calculate the Percent Difference (%D) between the RR/RRF and the mean RR/RRF for each analyte, and report under "%D". If the Percent Difference exceeds the quality control limits specified in Exhibit D, flag that analyte by placing an asterisk (*) in the "%D Flag" column. Report the ion abundance ratio of each analyte under the "Ion Ratio" column. Flag any ion ratio that falls outside the QC limits shown on the form by placing an asterisk (*) in the "Ion Ratio Flag" column.

NOTE: Because only one ion is monitored for the cleanup standard, no ion ratio is determined for this analyte. For the internal standards, RRFs are not calculated or reported on Form VII-HR CDD-1, but the ion abundance ratios for these standards must be reported on Form VII-HR CDD-1.

3.4.14 CDD/CDF Continuing Calibration Retention Time Summary High Resolution [Form VII-HR CDD-2]

This page of Form VII summarizes the RT and Relative Response Times (RRTs) of the analytes in the continuing calibration standards that must be analyzed in each 12-hour analytical sequence. RTs and RRTs are critical to the identification of CDDs/CDFs by this method. One copy of Form VII-HR CDD-2 must be completed for each continuing calibration performed and must be accompanied by a corresponding copy of Form VII-HR CDD-1.

3.4.14.1 Complete the header information as described in Section 3.3. The date and time of analysis and Lab File ID in the header must correspond to the analysis of the CS3 standard. Enter the date of the associated initial calibration in the field for "Init. Calib. Date(s)". If the calendar date changed during the initial calibration, enter the inclusive dates of the analyses of the first and last standards in the associated initial calibration in the fields for "Init. Calib. Date(s)".

3.4.14.2 For each of the native and labeled analytes, enter the RRT and RT of the analyte in the calibration standard. RRT is calculated as the RT of the native analyte divided by the RT of the appropriate labeled compound, and the RT of the labeled compound divided by the RT of the appropriate internal standard. For the internal standards, report only the RTs. Enter all RTs in minutes and decimal minutes. RRTs are reported to two decimal places.

3.5 CDD/CDF Sample Log-In Sheet [Form DC-1]

This form documents the receipt and inspection of sample containers and samples. One original of Form DC-1 is required for each sample shipping container. If the samples in a single sample shipping container must be assigned to more than one SDG, the original Form DC-1 shall be placed with the deliverables for the lowest alpha numeric SDG number, and a copy of Form DC-1 must be placed with the deliverables for the other SDG(s). The copies should be identified as "copy(ies)", and the location of the original should be noted on the copies.

3.5.1 Sign and date the airbill (if present). Examine the shipping container and record the presence/absence of custody seals and their condition (e.g., intact, broken) in Item 1 of Form DC-1. Record the custody seal numbers in Item 2.

3.5.2 Open the container, remove the enclosed sample documentation, and record the presence/absence of Traffic Reports/Chain of Custody Records, packing lists, and airbills or airbill stickers in Items 3-5. Specify if there is an airbill present or an airbill sticker in Item 5. Record the airbill or sticker number in Item 6.

3.5.3 Remove the samples from the shipping container(s), examine the samples and the sample tags (if present), and record the condition of the sample bottles (e.g., intact, broken, leaking) and presence or absence of sample tags in Items 7 and 8.

3.5.4 Review the sample shipping documents and complete the header information as described in Section 3.3. Report the temperature of the cooler under Item 9. Compare the information recorded on all the documents and samples and circle the appropriate answer in Item 10.

3.5.5 If there are no problems observed during sample receipt, sign and date (include time) Form DC-1, and the Traffic Report/Chain of Custody Record, and write the Sample Numbers on Form DC-1. Record the appropriate sample tags and assigned laboratory numbers, if applicable. The log-in date should be recorded at the top of Form DC-1 and the date and time of cooler receipt at the laboratory should be recorded in Items 11 and 12. Record the specific area designation (e.g., refrigerator number) in the Sample Transfer block located in the bottom left corner of Form DC-1. Sign and date the Sample Transfer block. Cross out unused columns and spaces.

3.5.6 If there are problems observed during sample receipt or an answer marked with an asterisk (e.g., "absent*") was circled, contact SMO. SMO will contact USEPA for a resolution. The resolution provided by USPEA will then be provided to the Contractor. Document the contact and the resolution of the problem on a Communication Log. If the communication is by phone, the Contractor will send an email to the SMO confirming the resolution of the issue. Following resolution, sign and date the forms as specified in the preceding paragraph and note, where appropriate, the resolution of the problem.

3.6 CDD/CDF Complete SDG File (CSF) Inventory Sheet [Form DC-2]

This form is used to record the inventory of the CSF documents and the count of documents in the original Sample Data that is sent to the TOPO.

3.6.1 Organize all CSF documents, as described in Section 2. Assemble the documents in the order specified on Form DC-2 and Section 2, and stamp each page with a consecutive number. (Do not number the DC-2 form.) Inventory the CSF by reviewing the document numbers and recording page number ranges in the columns provided in the Form DC-2. If there are no documents for a specific document type, enter "NA" in the empty space.

3.6.2 Certain laboratory-specific documents related to the CSF may not fit into a clearly-defined category. The laboratory should review Form DC-2 to determine if it is most appropriate to place them under Item 5, 6, 7, or 8. Item 8 should be used if there is no appropriate previous item. These types of documents should be described or listed in the blanks under each appropriate item.

4.0 DATA REPORTING FORMS

The data reporting forms are shown on the following pages.

EPA Sample No.

1DFA – FORM I-HR CDD-1
CDD/CDF SAMPLE DATA SUMMARY
HIGH RESOLUTION

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ TO No.: _____ SDG No.: _____

Matrix: (Soil/Water/Ash/Tissue/Oil) _____ Lab Sample ID: _____

Sample wt/vol: _____ (g/mL) _____ Lab File ID: _____

Water Sample Prep: _____(SEPF/SPE) Date Received: _____

Concentrated Extract Volume: _____(uL) Date Extracted: _____

Injection Volume: _____(uL) % Solids/Lipids: _____ Date Analyzed: _____

GC Column: _____ ID: _____(mm) Dilution Factor: _____

Concentration Units: (pg/L or ng/kg) _____

Target Analyte	Selected Ions	Peak RT	Ion Ratio #	Concentration	Q	EMPC/EDL
2378-TCDD	320/322					
2378-TCDF	304/306					
12378-PeCDF	340/342					
12378-PeCDD	356/358					
23478-PeCDF	340/342					
123478-HxCDF	374/376					
123678-HxCDF	374/376					
123478-HxCDD	390/392					
123678-HxCDD	390/392					
123789-HxCDD	390/392					
234678-HxCDF	374/376					
123789-HxCDF	374/376					
1234678-HpCDF	408/410					
1234678-HpCDD	424/426					
1234789-HpCDF	408/410					
OCDD	458/460					
OCDF	442/444					

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

Labeled Compounds	Selected Ions	Peak RT	Ion Ratio #	Ion Ratio Limits	% Rec #	Recovery Limits
13C-2378-TCDD	332/334			0.65-0.89		25-164
13C-12378-PeCDD	368/370			1.32-1.78		25-181
13C-123478-HxCDD	402/404			1.05-1.43		32-141
13C-123678-HxCDD	402/404			1.05-1.43		28-130
13C-1234678-HpCDD	436/438			0.88-1.20		23-140
13C-OCDD	470/472			0.76-1.02		17-157
13C-2378-TCDF	316/318			0.65-0.89		24-169
13C-12378-PeCDF	352/354			1.32-1.78		24-185
13C-23478-PeCDF	352/354			1.32-1.78		21-178
13C-123478-HxCDF	384/386			0.43-0.59		26-152
13C-123678-HxCDF	384/386			0.43-0.59		26-123
13C-123789-HxCDF	384/386			0.43-0.59		29-147
13C-234678-HxCDF	384/386			0.43-0.59		28-136
13C-1234678-HpCDF	418/420			0.37-0.51		28-143
13C-1234789-HpCDF	418/420			0.37-0.51		26-138
37C1-2378-TCDD	328/NA		NA	NA		35-197

Column to be used to flag values outside QC limits.

EPA Sample No.

1DFB – FORM I-HR CDD-2
CDD/CDF TOXICITY EQUIVALENCE SUMMARY
HIGH RESOLUTION

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ TO No.: _____ SDG No.: _____

Matrix: (Soil/Water/Ash/Tissue/Oil) _____ Lab Sample ID: _____

Sample wt/vol: _____ (g/mL) _____ Lab File ID: _____

Water Sample Prep: _____(SEPF/SPE) Date Received: _____

Concentrated Extract Volume: _____(uL) Date Extracted: _____

Injection Volume: _____(uL) % Solids/Lipids: _____ Date Analyzed: _____

GC Column: _____ ID: _____(mm) Dilution Factor: _____

Concentration Units: (pg/L or ng/kg) _____

Target Analyte	Concentration	TEF*	TEF-Adjusted Concentration
2378-TCDD		x 1.0 =	
2378-TCDF		x 0.1 =	
12378-PeCDF		x 0.03 =	
12378-PeCDD		x 1.0 =	
23478-PeCDF		x 0.3 =	
123478-HxCDF		x 0.1 =	
123678-HxCDF		x 0.1 =	
123478-HxCDD		x 0.1 =	
123678-HxCDD		x 0.1 =	
123789-HxCDD		x 0.1 =	
234678-HxCDF		x 0.1 =	
123789-HxCDF		x 0.1 =	
1234678-HpCDF		x 0.01 =	
1234678-HpCDD		x 0.01 =	
1234789-HpCDF		x 0.01 =	
OCDD		x 0.0003 =	
OCDF		x 0.0003 =	
		Total =	

* TEF - Toxicity Equivalent Factors from the World Health Organization (WHO), 2005.

EPA Sample No.

1DFC – FORM I-HR CDD-3
CDF SECOND COLUMN CONFIRMATION
HIGH RESOLUTION

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ TO No.: _____ SDG No.: _____

Matrix: (Soil/Water/Ash/Tissue/Oil) _____ Lab Sample ID: _____

Sample wt/vol: _____ (g/mL) _____ Lab File ID: _____

Water Sample Prep: _____(SEPF/SPE) Date Received: _____

Concentrated Extract Volume: _____(uL) Date Extracted: _____

Injection Volume: _____(uL) % Solids/Lipids: _____ Date Analyzed: _____

GC Column: _____ ID: _____(mm) Dilution Factor: _____

Concentration Units: (pg/L or ng/kg) _____

Analyte	Selected Ions	Peak RT	Ion Ratio #	Concentration	Q	EMPC/EDL
2378-TCDF	304/306					

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Limits (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

Labeled Compounds	Selected Ions	Peak RT	Ion Ratio #	Ion Ratio Limits	% Rec #	Recovery Limits
13C-2378-TCDF	316/318			0.65-0.89		24-169
37Cl-2378-TCDD	328/NA		NA	NA		35-197

Column to be used to flag values outside Quality Control (QC) limits.

EPA Sample No.

1DFD – FORM I-HR CDD-4
TEF ADJUSTED CONCENTRATION MAMMAL/FISH/BIRD

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ TO No.: _____ SDG No.: _____

Matrix: (Soil/Water/Ash/Tissue/Oil) _____ Lab Sample ID: _____

Sample wt/vol: _____ (g/mL) _____ Lab File ID: _____

Water Sample Prep: _____(SEPF/SPE) Date Received: _____

Concentrated Extract Volume: _____(uL) Date Extracted: _____

Injection Volume: _____(uL) % Solids/Lipids: _____ Date Analyzed: _____

GC Column: _____ ID: _____(mm) Dilution Factor: _____

Concentration Units: (pg/L or ng/kg) _____

Target Analyte	Conc.	TEF Mammal	TEF-Adj. Conc.	TEF Fish	TEF-Adj. Conc.	TEF Bird	TEF Adj. Conc.
2378-TCDD		1.0		1.0		1.0	
2378-TCDF		0.1		0.05		1.0	
12378-PeCDF		0.03		0.05		0.1	
12378-PeCDD		1.0		1.0		1.0	
23478-PeCDF		0.3		0.5		1.0	
123478-HxCDF		0.1		0.1		0.1	
123678-HxCDF		0.1		0.1		0.1	
123478-HxCDD		0.1		0.5		0.05	
123678-HxCDD		0.1		0.01		0.01	
123789-HxCDD		0.1		0.01		0.1	
234678-HxCDF		0.1		0.1		0.1	
123789-HxCDF		0.1		0.1		0.1	
1234678-HpCDF		0.01		0.01		0.01	
1234678-HpCDD		0.01		0.001		0.001	
1234789-HpCDF		0.01		0.01		0.01	
OCDD		0.0003		0.0001		0.0001	
OCDF		0.0003		0.0001		0.0001	
TEQ		Total		Total =		Total =	

TEF – Toxicity Equivalent Factor from World Health Organization (WHO) (Mammal 2005, Fish and Bird 1998)

EPA Sample No.

2DF – FORM II-HR CDD
CDD/CDF TOTAL HOMOLOGUE CONCENTRATION SUMMARY
HIGH RESOLUTION

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ TO No.: _____ SDG No.: _____

Matrix: (Soil/Water/Ash/Tissue/Oil) _____ Lab Sample ID: _____

Sample wt/vol: _____ (g/mL) _____ Lab File ID: _____

Water Sample Prep: _____(SEPF/SPE) Date Received: _____

Concentrated Extract Volume: _____(uL) Date Extracted: _____

Injection Volume: _____(uL) % Solids/Lipids: _____ Date Analyzed: _____

GC Column: _____ ID: _____(mm) Dilution Factor: _____

Concentration Units: (pg/L or ng/kg) _____

Homologue	Peaks	Concentration	Q	EMPC/EDL
Dioxins				
Total TCDD				
Total PeCDD				
Total HxCDD				
Total HpCDD				
Furans				
Total TCDF				
Total PeCDF				
Total HxCDF				
Total HpCDF				

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Limits (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with %Lipids). The total homologue concentrations do not affect the TEF (Toxicity Equivalent Factor) calculations.

EPA Sample No.

3DFA – FORM III-HR CDD
CDD/CDF LAB CONTROL SAMPLE SUMMARY
HIGH RESOLUTION

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ TO No.: _____ SDG No.: _____

Matrix: (Soil/Water/Ash/Tissue/Oil) _____ Lab Sample ID: _____

Sample wt/vol: _____ (g/mL) _____ Lab File ID: _____

Water Sample Prep: _____(SEPF/SPE) Date Received: _____

Concentrated Extract Volume: _____(uL) Date Extracted: _____

Injection Volume: _____(uL) Date Analyzed: _____

GC Column: _____ ID: _____(mm) Dilution Factor: _____

Concentration Units: (pg/L or ng/kg) _____

Spike Analyte	Spike Added	Amount Recovered	Percent Recovery	#	QC Limits
2378-TCDD					67-158
2378-TCDF					75-158
12378-PeCDF					80-134
12378-PeCDD					70-142
23478-PeCDF					68-160
123478-HxCDF					72-134
123678-HxCDF					84-130
123478-HxCDD					70-164
123678-HxCDD					76-134
123789-HxCDD					64-162
234678-HxCDF					70-156
123789-HxCDF					78-130
1234678-HpCDF					82-132
1234678-HpCDD					70-140
1234789-HpCDF					78-138
OCDD					78-144
OCDF					63-170

Column to be used to flag values outside Quality Control (QC) limits.

Laboratory Control Sample Recovery: _____ Outside limits out of _____ total.

EPA Sample No.

4DF – FORM IV-HR CDD
CDD/CDF METHOD BLANK SUMMARY
HIGH RESOLUTION

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ TO No.: _____ SDG No.: _____

Matrix: (Soil/Water/Ash/Tissue/Oil) _____ Lab Sample ID: _____

Sample wt/vol: _____ (g/mL) _____ Lab File ID: _____

Water Sample Prep: _____(SEPF/SPE) Date Received: _____

GC Column: _____ ID: _____(mm) Date Extracted: _____

Instrument ID: _____ Date Analyzed: _____

EPA Sample No.	Lab Sample ID	Lab File ID	Date Analyzed

EPA Sample No.

5DFA – FORM V-HR CDD-1
CDD/CDF WINDOW DEFINING MIX (WDM) SUMMARY
HIGH RESOLUTION

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ TO No.: _____ SDG No.: _____

GC Column: _____ ID: _____(mm) Lab File ID: _____

Instrument ID: _____ Date Analyzed: _____

Time Analyzed: _____

CDD/CDF	RT First Eluting	RT Last Eluting
TCDD		
TCDF		
PeCDD		
PeCDF		
HxCDD		
HxCDF		
HpCDD		
HpCDF		

EPA Sample No.

5DFB – FORM V-HR CDD-2
CDD/CDF CHROMATOGRAPHIC RESOLUTION SUMMARY
HIGH RESOLUTION

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ TO No.: _____ SDG No.: _____

GC Column: _____ ID: _____(mm) Lab File ID: _____

Instrument ID: _____ Date Analyzed: _____

Time Analyzed: _____

Percent Valley determination for DB-5 (or equivalent) column -
For the column performance solution beginning the 12-hour period:

1238-TCDD/2378-TCDD: _____

Quality Control (QC) Limits:

Percent Valley between the TCDD isomers must be less than or equal to 25%.

Percent Valley Determination for DB-225 (or equivalent) column -
For the column Performance Solution beginning the 12-hour period:

2347-TCDF/2378-TCDF: _____

QC Limits:

Percent Valley between the TCDD/TCDF isomers must be less than or equal to 25%.

5DFC - FORM V-HR CDD-3
CDD/CDF ANALYTICAL SEQUENCE SUMMARY
HIGH RESOLUTION

Lab Name:______________________________ Contract: ______________________________

Lab Code: __________ Case No.: __________ TO No.: ________ SDG No.: ______________

GC Column: ____________ ID: ______________(mm) Instrument ID: ______________

Init. Calib. Date(s): __________ __________

Init. Calib. Times: __________ __________

The Analytical Sequence of standards, samples, blanks, and Laboratory Control Samples (LCSs) is as follows:

EPA Sample No.	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed

6DFA – FORM VI-HR CDD-1
CDD/CDF INITIAL CALIBRATION RESPONSE FACTOR SUMMARY
HIGH RESOLUTION

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ TO No.: _____ SDG No.: _____

GC Column: _____ ID: _____(mm) Instrument ID: _____

Init. Calib. Date(s): _____ _____

Init. Calib. Times: _____ _____

Target Analytes	RR/RRF					Mean RR/RRF	%RSD	QC Limits
	CS1	CS2	CS3	CS4	CS5			
2378-TCDD								± 20%
2378-TCDF								± 20%
12378-PeCDF								± 20%
12378-PeCDD								± 20%
23478-PeCDF								± 20%
123478-HxCDF								± 20%
123678-HxCDF								± 20%
123478-HxCDD								± 20%
123678-HxCDD								± 20%
123789-HxCDD[1]								± 20%
234678-HxCDF								± 20%
123789-HxCDF								± 20%
1234678-HpCDF								± 20%
1234678-HpCDD								± 20%
1234789-HpCDF								± 20%
OCDD								± 20%
OCDF[2]								± 20%
Labeled Compounds								
13C-2378-TCDD								± 35%
13C-12378-PeCDD								± 35%
13C-123478-HxCDD								± 35%
13C-123678-HxCDD								± 35%
13C-1234678-HpCDD								± 35%
13C-OCDD								± 35%
13C-2378-TCDF								± 35%
13C-12378-PeCDF								± 35%
13C-23478-PeCDF								± 35%
13C-123478-HxCDF								± 35%
13C-123678-HxCDF								± 35%
13C-123789-HxCDF								± 35%
13C-234678-HxCDF								± 35%
13C-1234678-HpCDF								± 35%
13C-1234789-HpCDF								± 35%
37C1-2378-TCDD								± 35%

[1]The Relative Response (RR) is calculated based on the labeled analogs of the other two HxCDDs.

[2] The RR is calculated based on the labeled analog of OCDD.

6DFB - FORM VI-HR CDD-2
CDD/CDF INITIAL CALIBRATION ION ABUNDANCE RATIO SUMMARY
HIGH RESOLUTION

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ TO No.: _____ SDG No.: _____

GC Column: _____ ID: _____(mm) Instrument ID: _____

Init. Calib. Date(s): _____ _____

Init. Calib. Times: _____ _____

Target Analytes	Selected Ions	Ion Abundance Ratio					Flag	Ion Ratio QC Limits
		CS1	CS2	CS3	CS4	CS5		
2378-TCDD	320/322							0.65-0.89
2378-TCDF	304/306							0.65-0.89
12378-PeCDF	340/342							1.32-1.78
12378-PeCDD	356/358							1.32-1.78
23478-PeCDF	340/342							1.32-1.78
123478-HxCDF	374/376							1.05-1.43
123678-HxCDF	374/376							1.05-1.43
123478-HxCDD	390/392							1.05-1.43
123678-HxCDD	390/392							1.05-1.43
123789-HxCDD	390/392							1.05-1.43
234678-HxCDF	374/376							1.05-1.43
123789-HxCDF	374/376							1.05-1.43
1234678-HpCDF	408/410							0.88-1.20
1234678-HpCDD	424/426							0.88-1.20
1234789-HpCDF	408/410							0.88-1.20
OCDD	458/460							0.76-1.02
OCDF	442/444							0.76-1.02
Labeled Compounds								
13C-2378-TCDD	332/334							0.65-0.89
13C-12378-PeCDD	368/370							1.32-1.78
13C-123478-HxCDD	402/404							1.05-1.43
13C-123678-HxCDD	402/404							1.05-1.43
13C-1234678-HpCDD	436/438							0.88-1.20
13C-OCDD	470/472							0.76-1.02
13C-2378-TCDF	316/318							0.65-0.89
13C-12378-PeCDF	352/354							1.32-1.78
13C-23478-PeCDF	352/354							1.32-1.78
13C-123478-HxCDF	384/386							0.43-0.59
13C-123678-HxCDF	384/386							0.43-0.59
13C-123789-HxCDF	384/386							0.43-0.59
13C-234678-HxCDF	384/386							0.43-0.59
13C-1234678-HpCDF	418/420							0.37-0.51
13C-1234789-HpCDF	418/420							0.37-0.51
Internal Standards								
13C-1234-TCDD	332/334							0.65-0.89
13C-123789-HxCDD	402/404							1.05-1.43

Quality Control (QC) limits represent ± 15% window around the theoretical ion abundance ratio. The laboratory must flag any analyte in any calibration solution which does not meet the ion abundance ratio QC limit by placing an asterisk in the flag column.

7DFA – FORM VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ TO No.: _____ SDG No.: _____

GC Column: _____ ID: _____(mm) Instrument ID: _____

Lab File ID: _____ Date Analyzed: _____ Time Analyzed: _____

Init. Calib. Times: _____ _____ Init. Calib. Date(s): _____ _____

Target Analytes	Selected Ions	RR/ RRF	Mean RR/ RRF	%D	%D Flag	Ion Ratio	Ion Ratio Flag	Ion Ratio QC Limits
2378-TCDD	320/322							0.65-0.89
2378-TCDF	304/306							0.65-0.89
12378-PeCDF	340/342							1.32-1.78
12378-PeCDD	356/358							1.32-1.78
23478-PeCDF	340/342							1.32-1.78
123478-HxCDF	374/376							1.05-1.43
123678-HxCDF	374/376							1.05-1.43
123478-HxCDD	390/392							1.05-1.43
123678-HxCDD	390/392							1.05-1.43
123789-HxCDD	390/392							1.05-1.43
234678-HxCDF	374/376							1.05-1.43
123789-HxCDF	374/376							1.05-1.43
1234678-HpCDF	408/410							0.88-1.20
1234678-HpCDD	424/426							0.88-1.20
1234789-HpCDF	408/410							0.88-1.20
OCDD	458/460							0.76-1.02
OCDF	442/444							0.76-1.02
Labeled Compounds								
13C-2378-TCDD	332/334							0.65-0.89
13C-12378-PeCDD	368/370							1.32-1.78
13C-123478-HxCDD	402/404							1.05-1.43
13C-123678-HxCDD	402/404							1.05-1.43
13C-1234678-HpCDD	436/438							0.88-1.20
13C-OCDD	470/472							0.76-1.02
13C-2378-TCDF	316/318							0.65-0.89
13C-12378-PeCDF	352/354							1.32-1.78
13C-23478-PeCDF	352/354							1.32-1.78
13C-123478-HxCDF	384/386							0.43-0.59
13C-123678-HxCDF	384/386							0.43-0.59
13C-123789-HxCDF	384/386							0.43-0.59
13C-234678-HxCDF	384/386							0.43-0.59
13C-1234678-HpCDF	418/420							0.37-0.51
13C-1234789-HpCDF	418/420							0.37-0.51
Clean-up								
37C1-2378-TCDD	328/NA					NA	NA	NA
Internal Standards								
13C-1234-TCDD	332/334	NA	NA	NA	NA			0.65-0.89
13C-123789-HxCDD	402/404	NA	NA	NA	NA			1.05-1.43

The laboratory must flag any analyte which does not meet criteria for Percent Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate flag column.

7DFB - FORM VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ TO No.: _____ SDG No.: _____

GC Column: _____ ID: _____(mm) Instrument ID: _____

Date Analyzed: _____ Time Analyzed: _____

Lab File ID: _____

Init. Calib. Times: _____ _____ Init. Calib. Date(s): _____ _____

Target Analytes	RRT	RT
2378-TCDD		
2378-TCDF		
12378-PeCDF		
12378-PeCDD		
23478-PeCDF		
123478-HxCDF		
123678-HxCDF		
123478-HxCDD		
123678-HxCDD		
123789-HxCDD		
234678-HxCDF		
123789-HxCDF		
1234678-HpCDF		
1234678-HpCDD		
1234789-HpCDF		
OCDD		
OCDF		
Labeled Compounds		
13C-2378-TCDD		
13C-12378-PeCDD		
13C-123478-HxCDD		
13C-123678-HxCDD		
13C-1234678-HpCDD		
13C-OCDD		
13C-2378-TCDF		
13C-12378-PeCDF		
13C-23478-PeCDF		
13C-123478-HxCDF		
13C-123678-HxCDF		
13C-123789-HxCDF		
13C-234678-HxCDF		
13C-1234678-HpCDF		
13C-1234789-HpCDF		
Clean-up Standard		
37Cl-2378-TCDD	NA	
Internal Standard		
13C-1234-TCDD	NA	
13C-123789-HxCDD	NA	

RRT = (RT of analyte)/(RT of appropriate labeled compound).

CDD/CDF
SAMPLE LOG-IN SHEET (DC-1)

Lab Name					Page ____ of ____
Received By (Print Name)					Log-in Date
Received By (Signature)					
Contract No.					TO No.
Case No.		Sample Delivery Group No.			
Remarks:			Corresponding		Remarks: Condition of Sample Shipment, etc.
		EPA Sample #	Sample Tag #	Assigned Lab #	
1. Custody Seal(s)	Present/Absent* Intact/Broken				
2. Custody Seal Nos.	_____ _____				
3. Traffic Reports/Chain of Custody Records or Packing Lists	Present/Absent*				
4. Airbill	Airbill/Sticker Present/Absent*				
5. Airbill No.	_____ _____				
6. Sample Tags	Present/Absent*				
Sample Tag Numbers	Listed/Not Listed on Chain of Custody Record				
7. Sample Condition	Intact/Broken*/Leaking				
8. Cooler Temperature Bottle Indicator	Present/Absent				
9. Cooler Temperature	_____				
10. Does information on custody records and sample tags agree?	Yes/No*				
11. Date Received at Laboratory	_____				
12. Time Received	_____				
Sample Transfer					
Fraction	Fraction				
Area #	Area #				
By	By				
On	On				

* Contact SMO and attach record of resolution.

Reviewed By	Logbook No.
Date	Logbook Page No.

CDD/CDF COMPLETE SDG FILE (CSF) INVENTORY SHEET

LABORATORY NAME _____

CITY/STATE _____

CASE NO. _____ SDG NO. _____ SDG NOS. TO FOLLOW _____ _____ _____

TASK ORDER NO. _____

CONTRACT NO. _____

SOW NO. _____

All documents delivered in the Complete SDG File must be original documents where possible. (Reference - Exhibit B Section 2.6)

	PAGE NOs.		CHECK	
	FROM	TO	LAB	EPA
1. **Inventory Sheet** (DC-2) (Do not number)				
2. **SDG Narrative**				
3. **Traffic Report**				
4. **CDD/CDF Data**				
a. Sample Data				
Sample Data Summary (FORM I-HR CDD-1)				
Toxicity Equivalence Summary (FORM I-HR CDD-2)				
Second Column confirmation Summary (FORM I-HR CDD-3)				
TEF Adjusted Concentration Mammal/Fish/Bird (FORM I-HR CDD-4)				
Selected Ion Current Profile (SICP) for each sample				
Quantitation Reports and Area Summaries				
Total Homologue Concentration Summary (FORM II-HR CDD)				
b. Quality Control Data				
Lab Control Sample Summary (FORM III-HR CDD-1)				
Method Blank Summary (FORM IV-HR CDD)				
Window Defining Mix Summary (FORM V-HR CDD-1)				
Chromatographic Resolution Summary (FORM V-HR CDD-2)				
Analytical Sequence Summary (FORM V-HR CDD-3)				
c. Calibration Data				
Initial Calibration Data (FORM VI-HR CDD-1 and FORM VI-HR CDD-2), PFK mass resolution, CDD/CDF standard(s) SICPs, Quantitation Reports, and Area Summaries for the initial (five-point) calibration				
Continuing Calibration Data (FORM VII-HR CDD-1 and FORM VII-HR CDD-2), PFK mass resolution, SICPs, Quantitation Reports, and Area Summaries				

	PAGE NOs. FROM	PAGE NOs. TO	CHECK LAB	CHECK EPA
d. Raw Quality Control Data				
Blank Data FORM I-HR CDD-1, CDD-2, CDD-3 (if applicable)				
Blank Data including SICPs, Quantitation Reports, and Area Summaries for each blank analyzed				
LCS FORM I-HR CDD-1 and CDD-2				
LCS Data including SICPs, Quantitation Reports, and Area Summaries				
5. **Miscellaneous Data**				
Original preparation and analysis forms or copies of preparation and analysis logbook pages				
Internal sample and sample extract transfer Chain of Custody Records				
Screening records				
All instrument output, including strip charts from screening activities (describe or list)				
_____				
_____				
_____				
6. **EPA Shipping/Receiving Documents**				
Airbills (No. of shipments _____)				
Chain of Custody Records				
Sample Tags				
Sample Log-In Sheet (Lab & DC-1)				
Traffic Report Cover Sheet				
Miscellaneous Shipping/Receiving Records (describe or list)				
_____				
_____				
_____				
7. **Internal Lab Sample Transfer Records and Tracking Sheets**				
(Describe or list)				
_____				
_____				
_____				
8. **Other Records** (describe or list)				
Telephone Communication Log				
_____				
_____				
_____				

9. **Comments:** _____

_____

_____

Completed by:

(CLP Lab) _____ _____ _____

(Signature) (Print Name & Title) (Date)

Audited by:

(USEPA) _____ _____ _____

(Signature) (Print Name & Title) (Date)

EXHIBIT C

TARGET COMPOUND LIST (TCL)
AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQLs)
FOR CHLORINATED DIBENZO-P-DIOXINS (CDDs) and CHLORINATED DIBENZOFURANS (CDFs)

Exhibit C - Target Compound List and Contract Required Quantitation Limits for Chlorinated Dibenzo-p-Dioxin/Chlorinated Dibenzofuran (CDD/CDF)

Table of Contents

1.0 CHLORINATED DIBENZO-P-DIOXIN/CHLORINATED DIBENZOFURAN (CDD/CDF) TARGET COMPOUND LIST (TCL) AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQLS)

CDD/CDF	CAS No.	WATER (pg/L)	SOLIDS* (ng/kg)
2,3,7,8-TCDD	1746-01-6	10	1.0
1,2,3,7,8-PeCDD	40321-76-4	50	5.0
1,2,3,6,7,8-HxCDD	57653-85-7	50	5.0
1,2,3,4,7,8-HxCDD	39227-28-6	50	5.0
1,2,3,7,8,9-HxCDD	19408-74-3	50	5.0
1,2,3,4,6,7,8-HpCDD	35822-46-9	50	5.0
OCDD	3268-87-9	100	10
2,3,7,8-TCDF	51207-31-9	10	1.0
1,2,3,7,8-PeCDF	57117-41-6	50	5.0
2,3,4,7,8-PeCDF	57117-31-4	50	5.0
1,2,3,6,7,8-HxCDF	57117-44-9	50	5.0
1,2,3,7,8,9-HxCDF	72918-21-9	50	5.0
1,2,3,4,7,8-HxCDF	70648-26-9	50	5.0
2,3,4,6,7,8-HxCDF	60851-34-5	50	5.0
1,2,3,4,6,7,8-HpCDF	67562-39-4	50	5.0
1,2,3,4,7,8,9-HpCDF	55673-89-7	50	5.0
OCDF	39001-02-0	100	10

* Solids include soil, sediment, sludge, tissue (no human tissue), ash, oil, and oil matrices.

NOTE: The values in these tables are quantitation limits, not absolute detection limits. The amount of material necessary to produce a detector response that can be identified and reliably quantified is greater than that needed to be simply detected above the background noise. The quantitation limits in these tables are set at the concentrations in the sample equivalent to the concentration of the lowest calibration standard analyzed for each analyte.

Specific quantitation limits are highly matrix-dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

These CRQL values are based on the analysis of samples according to the specifications given in Exhibit D. Sample data are reported on a dry weight basis for all non-aqueous samples [except tissues which are reported on a wet weight basis, along with their Percent Lipid (% Lipid) content].

2.0 TOTAL HOMOLOGUES

Data are reported for the total concentration of all detected chlorinated dibenzo-p-dioxins (CDDs) or chlorinated dibenzofurans (CDFs) in the following homologues. However, because the number of non-2,3,7,8-substituted isomers that might be detected in a sample is unpredictable, it is not possible to assign Contract Required Quantitation Limits (CRQLs) values to the total homologue concentrations.

Homologue	CAS No.	No. of Possible Isomers	No. of 2,3,7,8-Substituted Isomers
Total TCDD	41903-57-5	22	1
Total PeCDD	36088-22-9	14	1
Total HxCDD	34465-46-8	10	3
Total HpCDD	37871-00-4	2	1
Total TCDF	55722-27-5	38	1
Total PeCDF	30402-15-4	28	2
Total HxCDF	55684-94-1	16	4
Total HpCDF	38998-75-3	4	2

There is only one isomer in both the OCDD and OCDF homologues, hence the total concentration is the same as the 2,3,7,8-substituted concentration.

Homologue		Definition
TCDD	=	Tetrachlorinated dibenzo-p-dioxin
TCDF	=	Tetrachlorinated dibenzofuran
PeCDD	=	Pentachlorinated dibenzo-p-dioxin
PeCDF	=	Pentachlorinated dibenzofuran
HxCDD	=	Hexachlorinated dibenzo-p-dioxin
HxCDF	=	Hexachlorinated dibenzofuran
HpCDD	=	Heptachlorinated dibenzo-p-dioxin
HpCDF	=	Heptachlorinated dibenzofuran
OCDD	=	Octachlorinated dibenzo-p-dioxin
OCDF	=	Octachlorinated dibenzofuran