

# Puget Sound Sediment Reference Material: Requesting, Analyzing, Validating and Reporting Data

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## Introduction

The Puget Sound Sediment Reference Material (SRM) has been developed to help assess/evaluate measurement accuracy and monitor laboratory performance when analyzing for chlorinated dioxin, furans, and biphenyl compounds in sediment samples collected in the Pacific Northwest. The SRM is currently available free of charge, though recipients must pay shipping costs. This document provides instructions for obtaining, analyzing, and reporting on the SRM. The guidance and procedures are intended to ensure that SRM users:

- Report methods used for analysis
- Report QA/QC procedures used to verify and validate results, and
- Report results that can be included in periodic recalculations of acceptance limits

The Puget Sound SRM has been established for chlorinated dibenzo-p-dioxins / chlorinated dibenzofurans (CDD/CDF) and/or chlorinated biphenyl (CB) congener analysis using high resolution gas chromatography / high resolution mass spectrometry (HRGC/HRMS) methods. This SRM is also suitable for Aroclor analysis using gas chromatography/electron capture detection (GC/ECD) methods.

## Request Procedure

The Seattle District Corps of Engineers, Washington Department of Ecology, and US EPA Region 10 have assigned staff to distribute the Puget Sound SRM in support of agency missions, including regulatory programs. The request procedure is as follows:

- Obtain the electronic Puget Sound SRM Request Form from the appropriate agency involved with the project (see agency contact list below), or from the Seattle District Corps of Engineers Dredged Material Management Office (DMMO) website.
- Return completed Request Form to agency contact.
- Agency contact reviews and certifies/signs the bottom of the form as an “authorized agency requester”, and then forwards the signed form to the EPA Region 10 SRM Manager (Raymond Wu) for processing.
- Request is processed, typically within a week.

Examples of how the request process works:

1. CWA 404 permit applicants would request from and submit the completed form to the Seattle District Corps of Engineers DMMO contact.
2. A CERCLA PRP would submit the request form via an EPA contact.
3. The State of Washington's ambient monitoring program would submit the form via the Ecology contact.

The authorized agency contacts are available to help with any questions about the Request Form. Submission of incomplete forms may delay the request processing.

### **Authorized Agency Contacts:**

Seattle District Corps of Engineers – Dredged Material Management Office (DMMO):

Joy Dunay (206) 764-6083, [joy.m.dunay@usace.army.mil](mailto:joy.m.dunay@usace.army.mil)

Lauran Warner (206) 764-6550, [lauran.c.warner@usace.army.mil](mailto:lauran.c.warner@usace.army.mil)

Kelsey van der Elst (206) 764-6945, [kelsey.vanderelst@usace.army.mil](mailto:kelsey.vanderelst@usace.army.mil)

Heather Fourie (206) 764-6713, [heather.w.fourie@usace.army.mil](mailto:heather.w.fourie@usace.army.mil)

Washington Department of Ecology:

Laura Inouye (306) 407-6165, [lino461@ecy.wa.gov](mailto:lino461@ecy.wa.gov)

US Environmental Protection Agency Region 10:

Justine Barton (206) 553-6051, [barton.justine@epa.gov](mailto:barton.justine@epa.gov)

Erika Hoffman (360) 753-9540, [hoffman.erika@epa.gov](mailto:hoffman.erika@epa.gov)

Donald Brown (206) 553-0717, [brown.donaldm@epa.gov](mailto:brown.donaldm@epa.gov)

SRM Manager, Raymond Wu (206) 553-1413, [wu.raymond@epa.gov](mailto:wu.raymond@epa.gov)

### **Shipping**

The Puget Sound SRM is stored at EPA's national Quality Assurance Technical Services (QATS) contractor located in Las Vegas, Nevada. Lab contacts listed on the Request Form should be prepared to confirm shipping details (including UPS or FedEx account number) if contacted by the EPA QATS contractor. The QATS contractor will generally ship the SRM

within 24 hours of receiving the completed Request Form from the EPA Region 10 SRM Manager. The SRM will arrive with specific instructions on handling and storage requirements, data reporting requirements, as well as chain of custody paperwork.

When the SRM has been shipped, the EPA QATS contractor will provide notification emails to the EPA Region 10 SRM Manager, the authorized agency contact (as indicated on the Request Form), and the destination laboratory. The emails will include the project name as indicated on the Request Form.

## **SRM Storage Requirements including Use of SRM from Partial Bottles**

Each amber glass bottle contains approximately 30 grams of the Puget Sound SRM.

The SRM contains compounds that are light sensitive and should be protected from light during storage. Store the SRM at  $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$  until SRM preparation and analysis.

Previously, the DMMP did not recommend use of leftover SRM materials from partially used bottles. However, the DMMP now allows use of these materials for DMMP projects if the bottle has been securely stored by a testing lab per the guidance immediately above. Users must make careful note of the bottle number, and ensure it is reported, along with all other required deliverables as outlined below.

## **SRM Analysis Requirements**

The SRM is to be analyzed as described in the appropriate methods employed for the analysis of CDD/CDF and/or CB congener analytes using HRGC/HRMS instrumentation and/or Aroclors using GC/ECD instrumentation.

The following analytical methods may be used in the analysis of the SRM:

- SW-846 Method 8082A (or current revision), “Polychlorinated Biphenyls (PCBs) by Gas Chromatography”
- SW-846 Method 8290A (or current revision), “ Polychlorinated Dibenzo-*p*-Dioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry (HRGC/HRMS)”
- Method 1613B (or current revision), “Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution HRGC/HRMS”
- Method 1668C (or current revision), “Chlorinated Biphenyl Congeners in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS”

## **Data Verification/Validation**

SRM users may be held to different data validation requirements, depending on their program and project circumstances. Data must be validated to a minimum of EPA Stage 2B. Any validation narrative must indicate the validation stage used. Data validation stages are described in EPA-540-R-08-005 (see References).

## Data Reporting

Individual laboratories typically provide all project data and validation reports to their clients. The client/project proponent is responsible for ensuring that all information relative to the SRM, including associated QA data, is sent to the original agency requester. For DMMP projects, submittal of the complete validated data package to the DMMO contact fulfills this requirement.

For SRM data meeting established QA requirements, the agency contact will submit the validated electronic data deliverable/data summary sheets (or the equivalent) and validation reports relevant to the SRM to the EPA Region 10 SRM Manager. Changes made by the data validator (e.g. modification of data qualifiers) must be clearly indicated on the data sheets. SRM data not meeting established QA requirements will not be forwarded to EPA's QATS contractor; however, the QATS contractor will be notified of the QA failure for their records.

The following are the minimum required deliverables for Puget Sound SRM data submissions. Also included below are optional deliverables that may or may not be needed depending on the available deliverables.

### Required Deliverables

The required deliverables listed below should be sent via email to the SRM Manager, Raymond Wu (wu.raymond@epa.gov). Include the project name and SRM bottle number in the email subject line.

1. **Data Validation Report** – report that documents the analytical quality of the data. Relative to the Puget Sound SRM, this report serves two functions. First, it confirms that data validation was completed, as the guidance requires data validation to at least EPA Stage 2B. Second, the report documents the reasons for any failure to meet method, procedural, or contractual requirements, as well as provides an evaluation of the impact of such failure on the overall data set.
2. **Electronic Data Deliverable (EDD)** – an electronic, tabular format for sharing, manipulating, and using the data. EDDs should be submitted in a comma- or tab-delimited file or as a Microsoft Excel spreadsheet. If in doubt about what to request from the lab, ask for an EDD in EIM format.

3. **SRM Sample Data Summary Report** – similar to a Form 1 from the Contract Laboratory Program, this report should provide a summary of the analytical parameters, analytical results, reporting limits, and laboratory/validation qualifiers. At a minimum, the sample data summary report should include the following:

- Identification and quantitation of target analytes including dilution and reanalysis
- CAS numbers
- Laboratory name
- Project number
- Project name
- Sample ID number (SRM bottle bar code)
- Agency sample number (if applicable)
- Laboratory sample number
- Date SRM received by the lab
- Date and time of analysis
- For Aroclor data, laboratory reporting limits and method detection limits
- For Chlorinated Biphenyl Congener and Dioxin/Furan data, reporting limits and estimated detection limits
- Laboratory qualifiers and definitions
- Validation qualifiers

### Optional Deliverables

1. **Laboratory Case Narrative** – laboratory report that describes the analytical process used by the lab to analyze the samples and any problems encountered in processing the samples, along with corrective action taken and problem resolution. The case narrative should only be submitted with the SRM data if there were significant problems during sample analysis that affected the SRM or if there are other observations relevant to the SRM.
2. **Raw Data** – laboratory worksheets, records, notes, or instrument printouts that are the result of original observations and activities. The chromatograms and integration reports associated with the SRM should be submitted with the SRM Sample Data Summary Report, if possible.
3. **Data Package** – the entire laboratory package including all narratives, sample summary reports, QC reports, calibrations, and raw data. The full data package should only be submitted if there were significant QC failures that affect the SRM result or if the data did not go through the data validation process.

### Performance / Acceptance Limits

The acceptance limits presented below are guidance values based on the original laboratory round-robin associated with the development of the SRM. The implications associated with not meeting these acceptance limits will be determined by data reviewers on a case-by-case basis, based on the goals of their program/project. For now, the DMMP will review results on a case-by-case basis and will consider the values advisory.

PCB Aroclors: A twelve-lab round-robin testing of the SRM (including commercial and CLP labs) was used to calculate an acceptance limit for Aroclor 1260. The average Aroclor 1260 concentration found during the round robin was 108 ug/kg. The acceptance limit is set at the 95% confidence interval.

- **Aroclor 1260:**  
**Warning low: 41 ug/kg**  
**Warning high: 180 ug/kg**

CDD/CDF: A ten-lab round-robin testing of the SRM (including commercial and CLP labs) was used to calculate an acceptance limit of  $\pm 50\%$  action low and action high for each congener as follows:

Acceptance Limits Source	Analyte	CAS No.	Avg. Conc. (ng/kg)	Action Low -50%	Action High +50%
<b><math>\pm 50</math> Percent</b>	2,3,7,8-TCDD	1746-01-6	1.05	0.525	1.57
	1,2,3,7,8-PeCDD	40321-76-4	1.08	0.542	1.63
	1,2,3,4,7,8-HxCDD	39227-28-6	1.59	0.797	2.39
	1,2,3,6,7,8-HxCDD	67653-85-7	3.88	1.94	5.82
	1,2,3,7,8,9-HxCDD	19408-74-3	3.04	1.52	4.55
	1,2,3,4,6,7,8-HpCDD	35822-46-9	90.6	45.3	136
	OCDD	3268-87-9	811	406	1217
	2,3,7,8-TCDF	51207-31-9	1.11	0.557	1.67
	1,2,3,7,8-PeCDF	57117-41-6	1.23	0.613	1.84
	2,3,4,7,8-PeCDF	57117-31-4	1.07	0.533	1.60
	1,2,3,4,7,8-HxCDF	70648-26-9	3.02	1.51	4.53
	1,2,3,6,7,8-HxCDF	57117-44-9	1.09	0.545	1.64
	2,3,4,6,7,8-HxCDF	60851-34-5	1.83	0.917	2.75
	1,2,3,7,8,9-HxCDF	72918-21-9	0.511	0.255	0.77
	1,2,3,4,6,7,8-HpCDF	67562-39-4	18.7	9.36	28.1
	1,2,3,4,7,8,9-HpCDF	55673-89-7	1.63	0.815	2.44
OCDF	39001-02-0	58.4	29.2	87.6	

CB Congeners: A ten-lab round-robin testing of the SRM (including commercial and CLP labs) was used to calculate an acceptance limit of  $\pm 50\%$  action low and action high for each congener as follows:

**Individually eluting congeners table**

Congener #	Target Analyte	CI Level*	Avg	SD	Acceptance Low (-50%)	Acceptance High (+150%)
			ng/kg dry weight			
1	2-Chlorobiphenyl	1	23	2.6	12	35
3	4-Chlorobiphenyl	1	25	8.4	13	38
4	2,2'-Dichlorobiphenyl	2	114	16.5	57	171
6	2,3'-Dichlorobiphenyl	2	169	30.4	85	254
7	2,4-Dichlorobiphenyl	2	17	3.3	8	25
8	2,4'-Dichlorobiphenyl	2	366	65.5	183	548
9	2,5-Dichlorobiphenyl	2	20	4.0	10	29
11	3,3'-Dichlorobiphenyl	2	74	10.5	37	110
15	4,4'-Dichlorobiphenyl	2	308	36.5	154	462
16	2,2',3-Trichlorobiphenyl	3	212	21.3	106	318
17	2,2',4-Trichlorobiphenyl	3	363	31.7	182	545
19	2,2',6-Trichlorobiphenyl	3	68	9.7	34	102
22	2,3,4'-Trichlorobiphenyl	3	385	47.8	192	577
25	2,3',4-Trichlorobiphenyl	3	245	34.8	122	367
27	2,3',6-Trichlorobiphenyl	3	81	6.5	40	121
31	2,4',5-Trichlorobiphenyl	3	1132	113.8	566	1697
32	2,4',6-Trichlorobiphenyl	3	237	30.9	118	355
35	3,3',4-Trichlorobiphenyl	3	26	4.3	13	39
37	3,4,4'-Trichlorobiphenyl	3	355	44.7	178	533
42	2,2',3,4'-Tetrachlorobiphenyl	4	413	55.9	206	619
46	2,2',3,6'-Tetrachlorobiphenyl	4	75	11.8	37	112
48	2,2',4,5-Tetrachlorobiphenyl	4	246	44.4	123	369
52	2,2',5,5'-Tetrachlorobiphenyl	4	3743	447.6	1871	5614
56	2,3,3',4'-Tetrachlorobiphenyl	4	651	139.8	326	977
60	2,3,4,4'-Tetrachlorobiphenyl	4	253	124.4	126	379
63	2,3,4',5-Tetrachlorobiphenyl	4	59	11.4	30	89
64	2,3,4',6-Tetrachlorobiphenyl	4	659	81.3	329	988
66	2,3',4,4'-Tetrachlorobiphenyl	4	1654	301.0	827	2481
67	2,3',4,5-Tetrachlorobiphenyl	4	56	10.2	28	84
68	2,3',4,5'-Tetrachlorobiphenyl	4	22	4.9	11	34
72	2,3',5,5'-Tetrachlorobiphenyl	4	37	7.5	19	56
77	3,3',4,4'-Tetrachlorobiphenyl	4	135	19.3	68	203
82	2,2',3,3',4-Pentachlorobiphenyl	5	486	33.3	243	729
84	2,2',3,3',6-Pentachlorobiphenyl	5	1327	31.5	664	1991
92	2,2',3,5,5'-Pentachlorobiphenyl	5	1180	72.1	590	1770
94	2,2',3,5,6'-Pentachlorobiphenyl	5	20	1.6	10	30
96	2,2',3,6,6'-Pentachlorobiphenyl	5	29	2.0	14	43
103	2,2',4,5',6-Pentachlorobiphenyl	5	57	3.5	28	85

**Individually eluting congeners table, continued**

Congener #	Target Analyte	Cl Level*	Avg	SD	Congener #	Target Analyte
			ng/kg dry weight			
114	2,3,4,4',5-Pentachlorobiphenyl	5	68	8.2	34	102
118	2,3',4,4',5-Pentachlorobiphenyl	5	4021	764.9	2011	6032
120	2,3',4,5,5'-Pentachlorobiphenyl	5	19	2.3	9	28
122	2,3,3',4',5'-Pentachlorobiphenyl	5	44	10.0	22	66
123	2,3',4,4',5'-Pentachlorobiphenyl	5	54	6.1	27	81
130	2,2',3,3',4,5'-Hexachlorobiphenyl	6	591	50.9	296	887
131	2,2',3,3',4,6-Hexachlorobiphenyl	6	116	14.0	58	174
132	2,2',3,3',4,6'-Hexachlorobiphenyl	6	4569	582.7	2284	6853
133	2,2',3,3',5,5'-Hexachlorobiphenyl	6	179	15.8	90	269
136	2,2',3,3',6,6'-Hexachlorobiphenyl	6	2141	280.2	1071	3212
137	2,2',3,4,4',5-Hexachlorobiphenyl	6	223	29.6	112	335
141	2,2',3,4,5,5'-Hexachlorobiphenyl	6	3657	395.7	1829	5486
144	2,2',3,4,5',6-Hexachlorobiphenyl	6	862	57.7	431	1293
146	2,2',3,4',5,5'-Hexachlorobiphenyl	6	2029	303.2	1014	3043
158	2,3,3',4,4',6-Hexachlorobiphenyl	6	1257	132.4	628	1885
159	2,3,3',4,5,5'-Hexachlorobiphenyl	6	239	81.5	119	358
164	2,3,3',4',5',6-Hexachlorobiphenyl	6	1068	118.1	534	1602
167	2,3',4,4',5,5'-Hexachlorobiphenyl	6	367	14.4	184	551
170	2,2',3,3',4,4',5-Heptachlorobiphenyl	7	5251	715.7	2626	7877
172	2,2',3,3',4,5,5'-Heptachlorobiphenyl	7	903	206.0	452	1355
174	2,2',3,3',4,5,6'-Heptachlorobiphenyl	7	6604	1100.6	3302	9906
175	2,2',3,3',4,5',6-Heptachlorobiphenyl	7	249	29.0	125	374
176	2,2',3,3',4,6,6'-Heptachlorobiphenyl	7	806	95.6	403	1209
177	2,2',3,3',4,5',6'-Heptachlorobiphenyl	7	3630	471.6	1815	5445
178	2,2',3,3',5,5',6-Heptachlorobiphenyl	7	1237	194.2	619	1856
179	2,2',3,3',5,6,6'-Heptachlorobiphenyl	7	2719	293.5	1359	4078
187	2,2',3,4',5,5',6-Heptachlorobiphenyl	7	7316	1289.5	3658	10974
189	2,3,3',4,4',5,5'-Heptachlorobiphenyl	7	185	11.1	93	278
190	2,3,3',4,4',5,6-Heptachlorobiphenyl	7	1077	200.7	539	1616
191	2,3,3',4,4',5',6-Heptachlorobiphenyl	7	217	40.6	108	325
194	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	8	2624	391.8	1312	3936
195	2,2',3,3',4,4',5,6-Octachlorobiphenyl	8	1169	163.2	585	1754
196	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	8	1579	183.8	789	2368
201	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	8	373	65.6	187	560
202	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	8	487	51.9	243	730
203	2,2',3,4,4',5,5',6-Octachlorobiphenyl	8	1829	354.3	914	2743
205	2,3,3',4,4',5,5',6-Octachlorobiphenyl	8	143	9.2	71	214
206	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	9	575	39.2	288	863
207	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	9	91	18.6	46	137
208	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	9	124	7.5	62	186
209	Decachlorobiphenyl	10	97	4.4	48	145

\* number of chlorine substituents



**Co-eluting congeners table**

Congener #	Co-eluting Pairs	Cl Level*	Avg	SD	Acceptance Low (-50%)	Acceptance High (+150%)	Co-eluting Sets
			ng/kg dry weight				
12	3,4-Dichlorobiphenyl	2					
13	3,4'-Dichlorobiphenyl	2	70	9.3	35	105	12/13
18	2,2',5-Trichlorobiphenyl	3					
30	2,4,6-Trichlorobiphenyl	3	615	78.3	307	922	18/30
20	2,3,3'-Trichlorobiphenyl	3					
28	2,4,4'-Trichlorobiphenyl	3	1436	149.8	718	2154	20/28
21	2,3,4-Trichlorobiphenyl	3					
23	2,3,5-Trichlorobiphenyl	3	545	49.8	273	818	21/23
26	2,3',5-Trichlorobiphenyl	3					
29	2,4,5-Trichlorobiphenyl	3	506	47.9	253	759	26/29
40	2,2',3,3'-Tetrachlorobiphenyl	4					
41	2,2',3,4-Tetrachlorobiphenyl	4					
71	2,3',4',6-Tetrachlorobiphenyl	4	717	125.8	359	1076	40/41/71
44	2,2',3,5'-Tetrachlorobiphenyl	4					
47	2,2',4,4'-Tetrachlorobiphenyl	4					
65	2,3,5,6-Tetrachlorobiphenyl	4	2026	194.2	1013	3039	44/47/65
45	2,2',3,6-Tetrachlorobiphenyl	4					
51	2,2',4,6'-Tetrachlorobiphenyl	4	224	37.0	112	336	45/51
49	2,2',4,5'-Tetrachlorobiphenyl	4					
69	2,3',4,6-Tetrachlorobiphenyl	4	1550	185.4	775	2325	49/69
50	2,2',4,6-Tetrachlorobiphenyl	4					
53	2,2',5,6'-Tetrachlorobiphenyl	4	242	35.5	121	363	50/53
59	2,3,3',6-Tetrachlorobiphenyl	4					
62	2,3,4,6-Tetrachlorobiphenyl	4					
75	2,4,4',6-Tetrachlorobiphenyl	4	142	22.5	71	213	59/62/75
61	2,3,4,5-Tetrachlorobiphenyl	4					
70	2,3',4',5-Tetrachlorobiphenyl	4					
74	2,4,4',5-Tetrachlorobiphenyl	4					
76	2,3',4',5'-Tetrachlorobiphenyl	4	3251	513.3	1626	4877	61/70/74/76
83	2,2',3,3',5-Pentachlorobiphenyl	5					
99	2,2',4,4',5-Pentachlorobiphenyl	5	2548	373.6	1274	3821	83/99
85	2,2',3,4,4'-Pentachlorobiphenyl	5					
116	2,3,4,5,6-Pentachlorobiphenyl	5					
117	2,3,4',5,6-Pentachlorobiphenyl	5	737	29.5	368	1105	85/116/117
86	2,2',3,4,5-Pentachlorobiphenyl	5					
87	2,2',3,4,5'-Pentachlorobiphenyl	5					
97	2,2',3,4',5-Pentachlorobiphenyl	5					
108	2,3,3',4,5'-Pentachlorobiphenyl	5					
119	2,3',4,4',6-Pentachlorobiphenyl	5					
125	2,3',4',5',6-Pentachlorobiphenyl	5	3337	142.6	1668	5005	86/87/97/108/119/125
88	2,2',3,4,6-Pentachlorobiphenyl	5					
91	2,2',3,4',6-Pentachlorobiphenyl	5	674	49.9	337	1011	88/91

**Co-eluting congeners table, continued**

Congener #	Co-eluting Pairs	Cl Level*	Avg	SD	Acceptance Low (-50%)	Acceptance High (+150%)	Co-eluting Sets
			ng/kg dry weight				
90	2,2',3,4',5-Pentachlorobiphenyl	5					
101	2,2',4,5,5'-Pentachlorobiphenyl	5					
113	2,3,3',5',6-Pentachlorobiphenyl	5	6957	787.6	3478	10435	90/101/113
93	2,2',3,5,6-Pentachlorobiphenyl	5					
95	2,2',3,5',6-Pentachlorobiphenyl	5					
98	2,2',3,4',6'-Pentachlorobiphenyl	5					
100	2,2',4,4',6-Pentachlorobiphenyl	5					
102	2,2',4,5,6'-Pentachlorobiphenyl	5	5608	516.7	2804	8412	93/95/98/100/102
107	2,3,3',4',5-Pentachlorobiphenyl	5					
124	2,3',4',5,5'-Pentachlorobiphenyl	5	249	105.2	124	373	107/124
110	2,3,3',4',6-Pentachlorobiphenyl	5					
115	2,3,4,4',6-Pentachlorobiphenyl	5	6488	384.7	3244	9733	110/115
128	2,2',3,3',4,4'-Hexachlorobiphenyl	6					
166	2,3,4,4',5,6-Hexachlorobiphenyl	6	1354	167.1	677	2031	128/166
129	2,2',3,3',4,5-Hexachlorobiphenyl	6					
138	2,2',3,4,4',5'-Hexachlorobiphenyl	6					
160	2,3,3',4,5,6-Hexachlorobiphenyl	6					
163	2,3,3',4',5,6-Hexachlorobiphenyl	6	14189	1183.2	7094	21283	129/138/160/163
134	2,2',3,3',5,6-Hexachlorobiphenyl	6					
143	2,2',3,4,5,6'-Hexachlorobiphenyl	6	657	45.0	329	986	134/143
135	2,2',3,3',5,6'-Hexachlorobiphenyl	6					
151	2,2',3,5,5',6-Hexachlorobiphenyl	6					
154	2,2',4,4',5,6'-Hexachlorobiphenyl	6	6326	374.1	3163	9488	135/151/154
139	2,2',3,4,4',6-Hexachlorobiphenyl	6					
140	2,2',3,4,4',6'-Hexachlorobiphenyl	6	115	18.7	58	173	139/140
147	2,2',3,4',5,6-Hexachlorobiphenyl	6					
149	2,2',3,4',5',6-Hexachlorobiphenyl	6	14314	1582.6	7157	21471	147/149
153	2,2',4,4',5,5'-Hexachlorobiphenyl	6					
168	2,3',4,4',5',6-Hexachlorobiphenyl	6	13913	1343.2	6956	20869	153/168
156	2,3,3',4,4',5-Hexachlorobiphenyl	6					
157	2,3,3',4,4',5'-Hexachlorobiphenyl	6	891	52.1	446	1337	156/157
171	2,2',3,3',4,4',6-Heptachlorobiphenyl	7					
173	2,2',3,3',4,5,6-Heptachlorobiphenyl	7	1794	202.8	897	2691	171/173
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl	7					
193	2,3,3',4',5,5',6-Heptachlorobiphenyl	7	12396	1530.7	6198	18594	180/193
183	2,2',3,4,4',5',6-Heptachlorobiphenyl	7					
185	2,2',3,4,5,5',6-Heptachlorobiphenyl	7	4184	665.7	2092	6277	183/185
197	2,2',3,3',4,4',6,6'-Octachlorobiphenyl	8					
200	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	8	496	106.0	248	744	197/200
198	2,2',3,3',4,5,5',6-Octachlorobiphenyl	8					
199	2,2',3,3',4,5,5',6'-Octachlorobiphenyl	8	3260	626.4	1630	4890	198/199

\* number of chlorine substituents

## Recalculation of Acceptance Limits

The national EPA QATS contractor, coordinating with the Region 10 SRM Manager, will store the SRM, conduct stability testing, and maintain the SRM database used to recalculate acceptance limits. Timing for any acceptance limit recalculations will depend on the quantity of high quality data received. It is anticipated that the next recalculation will occur after 30 new data points have been received.

## References

Revised Supplemental Information on Polychlorinated Dioxins and Furans (PCDD/F) for Use in Preparing a Quality Assurance Project Plan (QAPP), dated November 8, 2010.

Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, dated January 13, 2009 (EPA-540-R-08-005).