WASHINGTON STATE DEPARTMENT OF ECOLOGY
AQUEOUS SAMPLES

PERFLUORINATED ORGANIC ANALYSIS
AXYS METHOD: MLA-060

Project Name: URBAN WATER – ELLIOTT BAY

4499: L19747-1 and -3

28 June 2013

NARRATIVE

This narrative describes the analysis of two aqueous samples for the determination of perfluorinated organic compounds using high performance liquid chromatography/tandem mass spectrometry (HPLC/MS-MS).

SAMPLE RECEIPT AND STORAGE

The samples were received on the 11th of June 2013. Details of sample conditions upon receipt are provided on the Sample Receiving forms included in the Sample Documentation section of this data package. The samples were stored at 4°C prior to sample preparation, extraction and analysis.

Some documentation discrepancies were noticed between the Chain of Custody record and the sample labels by the analyst during the login of the samples. The client was notified of discrepancies and the details of the action taken have been included in the Sample Documentation section of the data package.

SAMPLE EXTRACTION AND ANALYSIS

Sample extraction, instrumental analysis and analyte quantification procedures were in accordance with AXYS Method MLA-060: ***Analytical Procedure for the Analysis of Perfluorinated Organic Compounds in Aqueous Samples by LC-MS/MS.*** A method summary (MSU-060) of AXYS Method MLA-060 is included in the data package.

The samples and QC samples (a procedural blank and an Ongoing Precision and Recovery (OPR)) were analyzed in a batch named WG43899, the composition of which is shown on the Correlation Table and on the Batch List accompanying the extraction workup sheets. The procedural blank and the OPR were prepared using Canadian Springs water.

An accurately weighed sample (approximately 1L) was spiked with ^{13}C-labelled quantification standards, and extracted and cleaned up using SPE cartridges. The cartridges were eluted with methanolic 0.3% NH_4OH. The resulted extract was instrumentally analyzed using HPLC/MS-MS.

CALCULATION

Target analyte concentrations were determined by isotope dilution/internal standard quantification procedures using MassLynx 4.1 software. Quantification was conducted by comparing the area of the quantification ion to that of the ^{13}C-labelled quantification standards (surrogate) and correcting for response factors. Quadratic quantification equations with 1/X weighting fit were determined from a multi-point calibration series prepared alongside the samples. Formula used to calculate analyte concentrations are provided in the method summary. Quantification equations for each target analyte are provided in Quantify Compound Summary Report in Analysis Chromatography section of the data package.

Alternate transitions are acquired for several analytes including PFOA, PFBS, PFHxS and PFOS. These transitions are listed in the method summary and may be used if necessary to avoid interference. Both

transitions are acquired and are present in the raw data (ie PFOA-1, PFOA-2) but only one transition is reported in the final reports.

Sample specific detection limit (SDL) was calculated for each target analyte and used as the detection qualifier. If the software selected an unrepresentative area for the detection limit calculation, the data validation chemists made corrections. These corrections are hand noted on the quantification report pages attached to the chromatograms.

The reporting limit (RL) was defined as the concentration equivalent to the lowest calibration standard (CS0) or the sample specific detection limit, whichever was greater.

It is AXYS protocol to deem the regression to be valid only within the measured calibration range. As the uncertainty outside this range is unknown, data is not reported beyond the measured calibration range.

REPORTING CONVENTIONS

For internal tracking, Axys assigned the Washington State Dept of Ecology a contract number 4499. Samples were logged under unique laboratory identifiers L19747-X, where X is a numeral. All data reports reference both the Axys ID and the client sample identifier. To assist in locating data, a table correlating AXYS ID with the client sample number is also included in this Data Package. The report forms were generated using Laboratory Information Management Software (LIMS).

Suffixes are added to the Axys IDs such that each GC-MS acquisition is uniquely identified. The suffixes appearing in this data package are:

i = instrumental re-analysis performed on the sample extract

The following laboratory qualifier flags were used for this data package:

U = identifies a compound that was not detected.
V = surrogate recovery not within method control limits

The results were reported with concentration units of nanograms per liter (ng/L) with concentrations and detection limits provided to three significant figures. The analysis results for each sample are provided on Analysis Report forms 1A and 2.

QA/QC NOTES

Samples and QC samples were analyzed in one analysis batch and were carried intact through the entire analytical process. The sample data were reviewed and evaluated in relation to the batch QC samples.

- Sample analyte concentrations are not blank corrected. The data should be evaluated with consideration of the procedural blank results.
- By virtue of the isotope dilution/internal standard quantification procedures, data are recovery corrected for possible losses during extraction and cleanup.
- The Signal/Noise (S/N) ratios were measured as '0' for some compounds in the QC samples and sample data. This has been determined to be a limitation of the software and would not affect the data.
- All linearity, CAL/VER, OPR, sample duplicate and labeled compound recovery specifications were met with the following exceptions:

The recovery of $^{13}C_2$-PFDoA in 1306020-05 (AXYS ID: L19747-1) did not meet the method criteria; this compound is flagged with a 'V'. As the isotope dilution method of quantification produces data that are recovery corrected, the slight variances from the method acceptance criteria are deemed not to affect the quantification of these analytes. Percent surrogate recoveries are used as general method performance indicator only.

ANALYTICAL DISCUSSION

The CS6 and CS7 calibration solutions were accidently injected prior to the procedural blank (AXYS ID: WG43889-101); therefore, the procedural blank and samples 1306020-05 and 1306020-32 (AXYS IDs: L19747-1 and -3, respectively were instrumentally re-analyzed to confirm possible instrumental carry-over. The re-analysis data showed that the original analysis data was affected by carry over and the re-analysis data are reported (indicated by the test suffix 'i' added to the AXYS ID).

DATA PACKAGE

This data package is assigned a unique identifier, DPWG44058, shown on the title page of this data package. Includes the following documentation after this narrative:

- Method Summary
- Method Detection Limit Study
- Sample Correlation Table
- Sample Receiving Documentation
- RFQQ Request for Qualifications and Quote
- Standard Solution Preparation Records
- Extraction work sheets
- Sample Data Reports (in order of AXYS Sample ID)
- Laboratory QC Data Reports
- Instrumental QC Data Reports (organized by analysis date)
- Sample Raw Data (in order of AXYS ID)
- Laboratory QC Sample Raw Data
- Instrument Run (injection) Log
- Instrument QC Raw Data
- Supplemental Unvalidated data
- Accreditation Scope

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, except for the conditions detailed above. In addition, I certify, that to the best of my knowledge and belief, the data as reported are true and accurate. The following signature, on behalf of AXYS Analytical Services Ltd, authorizes the release of the data contained in this data package.

Signed: Jason MacKenzie, B.Sc.,
Product Development Chemist

28-June-2013
Date Signed

AXYS Analytical Services Ltd.

Method Summary

Analytical Procedure for the Analysis of Perfluorinated Organic Compounds in Aqueous Samples by LC-MS/MS by AXYS Method MLA-060 Rev. 10 Ver. 04

Method MLA-060 describes the analysis of perfluorinated organic compounds (PFC) in aqueous samples. Typical quantification limits are in the range of 1 - 2 ng/L for a 0.5 L sample size.

ANALYTES OF INTEREST

Perfluorobutanoate (PFBA)	Perfluorobutanesulfonate (PFBS)
Perfluoropentanoate (PFPeA)	Perfluorohexanesulfonate (PFHxS)
Perfluorohexanoate (PFHxA)	Perfluorooctanesulfonate (PFOS)
Perfluoroheptanoate (PFHpA)	Perfluorooctane sulfonamide (PFOSA) [1]
Perfluorooctanoate (PFOA)	
Perfluorononanoate (PFNA)	
Perfluorodecanoate (PFDA)	
Perfluoroundecanoate (PFUnA)	
Perfluorododecanoate (PFDoA)	

EXTRACTION AND CLEANUP

Sample size may be up to 1000 mL. Samples are stored in HDPE (high density polyethylene) containers. Samples are filtered, adjusted to pH 6.5, spiked with surrogate standards and extracted by solid phase extraction (SPE) using weak anion exchange cartridges. Wash and elution procedures are chosen to meet various analysis requirements. The eluates are spiked with recovery standards and analyzed by LC-MS/MS. Calibration solutions are processed through SPE in the same way as the samples.

QUALITY ASSURANCE / QUALITY CONTROL

All samples are analyzed in batches. The composition of a batch is detailed on a batch sheet. Each batch has the following composition:

- Batch Size - Each batch consists of test samples and additional QC samples.
- Blanks – Blanks are analyzed with a minimum frequency of 5% of client samples.
- Duplicates – With each analysis batch containing greater than six (6) test samples, or as required by contract, a duplicate sample is analyzed, provided there is sufficient sample.
- Matrix Spike/Matrix Spike Duplicate analyzed upon client request.
- OPR (Spiked Reference Sample) – OPRs are analyzed with a minimum frequency of 5% of client samples.

QC Specification: Procedural Blank Levels and OPR Recoveries

Analyte		Procedural Blank Level ng/sample [2]	OPR Recovery Range (%)[1]
Perfluorobutanoate	(PFBA)	<0.25	80 – 120 [1]
Perfluoropentanoate	(PFPeA)	<0.25	80 – 120 [1]
Perfluorohexanoate	(PFHxA)	<0.25	80 – 120 [1]
Perfluoroheptanoate	(PFHpA)	<0.25	80 – 120 [1]
Perfluorooctanoate	(PFOA)	<0.25	80 – 120 [1]
Perfluorononanoate	(PFNA)	<0.25	80 – 120 [1]
Perfluorodecanoate	(PFDA)	<0.25	80 – 120 [1]
Perfluoroundecanoate	(PFUnA)	<0.25	80 – 120 [1]
Perfluorododecanoate	(PFDoA)	<0.25	80 – 120 [1]
Perfluorobutanesulfonate	(PFBS)	<0.25	70 - 130
Perfluorohexanesulfonate	(PFHxS)	<0.25	70 – 130
Perfluorooctanesulfonate	(PFOS)	<0.25	70 – 130
Perfluorooctane sulfonamide	(PFOSA)	<0.25	70 – 130

[1] Marginal exceedance allowance – recovery for 2 compounds may be 75-125% and for one compound 70-130%.

[2] Reporting limits (based on the lowest calibration standard and routine final extract volume of 4 mL) may exceed the stated blank criteria.

QC Specification: Surrogate Standard Recoveries (Calibration Solutions and Samples)

Surrogate Standard	Recovery Range [1]
$^{13}C_4$-Heptafluorobutyric acid ($^{13}C_4$-PFBA)	20 - 150%
$^{13}C_2$-Perfluorocaproic acid ($^{13}C_2$-PFHxA)	40 - 150%
$^{13}C_2$- Perfluorooctanoic acid ($^{13}C_2$-PFOA)	40 - 150%
$^{13}C_5$-Heptadecafluorononanoic acid ($^{13}C_5$-PFNA)	40 - 150%
$^{13}C_2$- Perfluorodecanoic acid ($^{13}C_2$-PFDA)	40 - 150%
$^{13}C_2$-Perfluoro-n-(1,2)dodecanoic acid ($^{13}C_2$-PFDoA)	40 - 150%
$^{18}O_2$-Perfluorohexanesulfonate ($^{18}O_2$-PFHxS)	40 - 150%
$^{13}C_4$-Perfluorooctanesulfonate ($^{13}C_4$-PFOS)	40 - 150%
$^{13}C_8$-Perfluoro-1-octanesulfonamide ($^{13}C_8$-PFOSA)	40 - 150%

[1] Lower recoveries may be accepted based on application and professional judgment

QC Specification Table: Other Parameters

QC Parameter	Specification
Instrument Sensitivity	Daily, S:N ≥ 3:1 for all analytes for lowest calibration standard.
Initial Calibration (native compounds)	Run initially, and as required to maintain calibration verification and instrument sensitivity. (1/x) weighted quadratic, exclude origin. Calculated conc. 75-125 % of actual (lowest cal may be 70-130%), R^2 > 0.990. Surrogate recoveries must fall within the same limits as for the samples in the table above.
Continuing Calibration Verification (native compounds)	Run every 20 samples or more frequently, quantify against I-CAL. Calculated conc. 70-130% actual for a maximum of three compounds with the remainder 80–120 % of actual. Surrogate recoveries must fall within the same limits as for the samples in the table above.
Instrumental Carryover and Instrument Background	Every Initial Calibration, Cal/Ver, or SPM: ≤ 0.3 % carryover and area response of analytes in instrument blank ≤ 800.
Duplicate Samples or MS/MSD	If conc. > 5 times R.L., RPD < 40% If conc. < 5 times R.L., difference between pairs < R.L.

ANALYSIS BY LC-MS/MS

Analysis of sample extracts for perfluorinated organics by HPLC-MS/MS is performed on a high performance liquid chromatograph coupled to a triple quadrupole mass spectrometer. The mass spectrometer is run at unit mass resolution in the Multiple Reaction Monitoring (MRM) mode.

Instrument specifications:

Instrument	Waters 2690 or Waters 2795 HPLC, Micromass Quattro Ultima MS/MS
LC Column	Waters Xterra MS C_{18} Reverse Phase C18, 10.0 cm, 2.1 mm i.d., 3.5 µm particle size (or equivalent)
Ionization	Negative Ion Electrospray
Acquisition	MRM mode, unit resolution
Injection Volume	15 µL

LC-MS/MS Operating Conditions:

LC Gradient Program				General LC Conditions	
Time (min)	**Flow mixture[1]**	**LC Flow Rate Program**	**Gradient Curve**	Column Temp (°C)	40
0.0	15% eluent A 85% eluent B	0.15 mL/min	1	Max Pressure (bar)	300
1.0	15% eluent A 85% eluent B	0.15 mL/min	1	**MS Conditions**	
5.0	70% eluent A 30% eluent B	0.20 mL/min	4	Source Temp (°C)	120
8.5	100% eluent A	0.20 mL/min	4	Desolvation Temp (°C)	300
11	100% eluent A	0.20 mL/min	4	Capillary Voltage	2.75
11.3 - 14.5	15% eluent A 85% eluent B	0.20 mL/min	2	Gases	~70L/hr cone ~300L/hr desolvation

[1] Eluent A = 90% CH_3CN (aqueous)
Eluent B = 13 mM ammonium acetate in 0.1% acetic acid (aqueous)

Initial calibration of the LC-MS/MS instrument is performed by the analysis of six or more calibration solutions. A mid-level calibration standard is analyzed to verify the initial calibration after every 20th sample (including QC samples) injected at a minimum. All calibration solutions go through the same SPE extraction/cleanup procedures as the samples.

ANALYTE IDENTIFICATION

Positive identification of target PFC, surrogate standard and recovery standards require:

- ≥ 3:1 S:N for parent ion to daughter ion transition.
- Compound retention time must fall within 0.4 minutes of the predicted retention times from the daily Calibration Verification. Natives with labelled surrogate standards must elute within 0.1 minutes of the associated labelled surrogates.

QUANTIFICATION AND DATA REPORTING PROCEDURES

Target compounds are quantified using the internal standard method, comparing the area of the quantification ion to that of the ^{13}C-labelled standard and correcting for response factors.

Quadratic calibration equations are determined from a multi-point calibration series with 1/X weighing fit as described by the following general equation:

$Y = a + bX + cX^2$ (general quadratic equation)

where Y = (area target/area surr) x weight surr
X = weight target
a,b,c are empirical constants

Concentrations in samples are determined as:

$$Sample\ Conc = \frac{-b \pm \sqrt{b^2 - 4c\left(a - \left(\frac{area\ of\ target}{area\ of\ sur}\ x\ weight\ sur\right)\right)}}{2c\ x\ sample\ size}$$

The recovery of the surrogate standard is calculated **(by internal standard quantification against the recovery standard using an average RRF)** and monitored as an indication of overall data quality. Final target concentrations are recovery corrected by this method of quantification.

Sample Specific Detection Limits (SDL) are determined .by converting the area equivalent of 3.0 times the estimated chromatographic noise height to a concentration in the same manner that target peak responses are converted to final concentrations. The SDL accounts for any effect of matrix on the detection system and for recovery achieved through the analytical work-up.

Results are reported to the greater of the SDL or the concentration equivalent to the lowest calibration standard analyzed.

Analytes, Ions and Quantification References

Target Analyte	Typical Retention Time (minutes)	Parent Ion Mass	Daughter Ion Mass	Quantified Against
Target Analytes				
Perfluorobutanoate (PFBA)	5.0	213	169	$^{13}C_4$-PFBA
Perfluoropentanoate (PFPeA)	5.8	263	219	$^{13}C_2$-PFHxA
Perfluorohexanoate (PFHxA)	6.2	313	269	$^{13}C_2$-PFHxA
Perfluoroheptanoate (PFHpA)	6.6	363	319	$^{13}C_2$-PFHxA
Perfluorooctanoate (PFOA)	7.0	413	369 (169)[1]	$^{13}C_2$-PFOA
Perfluorononanoate (PFNA)	7.4	463	419	$^{13}C_5$-PFNA
Perfluorodecanoate (PFDA)	7.9	513	469	$^{13}C_2$-PFDA
Perfluoroundecanoate (PFUnA)	8.5	563	519	$^{13}C_2$-PFDA
Perfluorododecanoate (PFDoA)	9.0	613	569	$^{13}C_2$-PFDoA
Perfluorobutanesulfonate (PFBS)	6.3	299	80 (99)[1]	$^{18}O_2$-PFHxS
Perfluorohexanesulfonate (PFHxS)	7.2	399	80 (99/119)[1]	$^{18}O_2$-PFHxS
Perfluorooctane sulfonate (PFOS)	8.2	499	80 (99)[1]	$^{13}C_4$-PFOS
Perfluorooctane sulfonamide (PFOSA)	9.9	498	78	$^{13}C_8$-PFOSA
Surrogate Standard				
$^{13}C_4$-Heptafluorobutyric acid ($^{13}C_4$-PFBA)	5.0	217	172	$^{13}C_2$-PFOUEA
$^{13}C_2$-Perfluorocaproic acid ($^{13}C_2$-PFHxA)	6.2	315	270	$^{13}C_2$-PFOUEA
$^{13}C_2$-Perfluorooctanoic acid ($^{13}C_2$-PFOA)	7.0	415	370	$^{13}C_4$-PFOA
$^{13}C_5$-Heptadecafluorononanoic acid ($^{13}C_5$-PFNA)	7.4	468	423	$^{13}C_2$-PFOUEA
$^{13}C_2$-Perfluorodecanoic acid ($^{13}C_2$-PFDA)	7.9	515	470	$^{13}C_2$-PFOUEA
$^{13}C_2$-Perfluorododecanoic acid ($^{13}C_2$-PFDoA)	9.0	615	570	$^{13}C_2$-PFOUEA
$^{18}O_2$–Perfluorohexanesulfonate ($^{18}O_2$-PFHxS)	7.2	403	84 (103)[1]	$^{13}C_2$-PFOUEA
$^{13}C_4$–Perfluorooctanesulfonate ($^{13}C_4$-PFOS)	8.2	503	80 (99)[1]	$^{13}C_2$-PFOUEA
$^{13}C_8$-Perfluorooctane sulfonamide ($^{13}C_8$-PFOSA)	9.9	506	78	$^{13}C_2$-PFOUEA
Recovery Standard				
$^{13}C_2$-2H-Perfluoro-2-decenoic acid ($^{13}C_2$-PFOUEA)	7.3	459	394	-
$^{13}C_4$-Perfluorooctanoic acid ($^{13}C_4$-PFOA)	6.9	417	372	-

[1] Alternate transition within brackets, may be used if necessary to avoid interference.

AXYS Analytical Services Ltd

PFCs by LC-MS/MS

Method Detection Limit for PFCs in Aqueous samples

MDL Results

Axys Method: MLA-060 Rev 09, modified with new surrogate $^{18}O_2$-PFHxS (equivalent to MLA-060 Rev 10)
Analysis Type: Perfluorinated Organic Compounds (PFC)
Instrument Type: LC-MS/MS
Matrix Spiked: AQUEOUS
Axys Workgroup: WG34009
Column Type: C18MS
MDL Protocol: Federal Register 40 CFR Part 136, Appendix B, rev. 1.11, April 29, 2002, no iteration

MDL 1 Data Filename:	FC0G_474 S: 23	**Sample ID:**	WG34009-102	**Instr. Analysis Date:**	24-Sep-2010
MDL 2 Data Filename:	FC0G_474 S: 24	**Sample ID:**	WG34009-103	**Instr. Analysis Date:**	24-Sep-2010
MDL 3 Data Filename:	FC0G_474 S: 25	**Sample ID:**	WG34009-104	**Instr. Analysis Date:**	24-Sep-2010
MDL 4 Data Filename:	FC0G_474 S: 26	**Sample ID:**	WG34009-105	**Instr. Analysis Date:**	24-Sep-2010
MDL 5 Data Filename:	FC0G_474 S: 27	**Sample ID:**	WG34009-106	**Instr. Analysis Date:**	24-Sep-2010
MDL 6 Data Filename:	FC0G_474 S: 28	**Sample ID:**	WG34009-107	**Instr. Analysis Date:**	24-Sep-2010
MDL 7 Data Filename:	FC0G_474 S: 29	**Sample ID:**	WG34009-108	**Instr. Analysis Date:**	25-Sep-2010
MDL 8 Data Filename:	FC0G_474 S: 30	**Sample ID:**	WG34009-109	**Instr. Analysis Date:**	25-Sep-2010
MDL 9 Data Filename:	FC0G_474 S: 31	**Sample ID:**	WG34009-110	**Instr. Analysis Date:**	25-Sep-2010

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN SAMPLES
Based on 500 mL of water

Native Analyte	Method Detection Limit, ng/L	Spiking Level ng/L	Number of Observations	Mean ng/L	Standard Devation	Student's t-Value	Mean % rec.	Est MU (2rsd)
PFBA	**0.47**	1.00	9	1.130	0.162	2.896	113	32
PFPEA	**0.29**	1.00	9	1.057	0.099	2.896	106	20
PFHXA	**0.20**	1.00	9	0.620	0.069	2.896	62	14
PFHPA	**0.28**	1.00	9	1.019	0.098	2.896	102	20
PFOA-1	**0.44**	1.00	9	0.863	0.153	2.896	86	31
PFNA	**0.40**	1.00	9	1.059	0.138	2.896	106	28
PFDA	**0.39**	1.00	9	0.980	0.135	2.896	98	27
PFUNA	**0.44**	1.00	9	1.140	0.152	2.896	114	30
PFDOA	**0.31**	1.00	9	0.871	0.107	2.896	87	21
PFBS-1	**0.58**	2.00	9	2.054	0.202	2.896	103	20
PFHXS-1	**0.72**	2.00	9	2.568	0.248	2.896	128	25
PFOS-1	**0.90**	2.00	9	1.946	0.311	2.896	97	31
PFOSA	**0.20**	1.00	9	0.886	0.068	2.896	89	14

Washington State Department of Ecology

CORRELATION TABLE

PERFLUORINATED ORGANIC ANALYSIS

Lab Name: AXYS Analytical Services Ltd.	**Project Manager: Georgina Brooks**
Project: N/A	**Contract No: 4499**
Project Name:Urban Waters - Elliott Bay	**AXYS Method: MLA-060**
Data Package Identification: DPWG44058	**Program: Aqueous Samples**
Client Sample No.	**Lab Sample ID**
LAB BLANK	WG43899-101
OPR	WG43899-102
1306020-05	L19747-1
1306020-32	L19747-3

AXYS | Axys Analytical Services Ltd

2045 Mills Road West TEL: (250) 655-5800
Sidney, British Columbia, Canada V8L 5X2 FAX: (250) 655-5811

CHAIN OF CUSTODY

AXYS CLIENT #: 4499

REPORT TO:

Company: WA Dept of Ecology
Address: 300 Desmond Drive
PO Box 47600
Olympia WA 98504-7600
Contact: Maggie Dutch
Phone: 360-407-6021
FAX: 360-407-6884
E-mail: margaret.dutch@ecy.wa.gov

INVOICE TO:

Company: same
Address:
Contact:
Phone:
FAX:
E-mail:

Project Name/Number: Urban Waters Initiative - Elliott Bay PFC/PFAS (PFC)

Sampler's Name: Margaret Dutch
Signature: Margaret Dutch

ANALYSIS REQUESTED: PFC Rinsate Blank (Cardinal Springs H_2O)

Client Sample Identification	Matrix	Sampling Date	Sampling Time	Container Type/No.	Preservative Y / N	AXYS Lab ID Lab use only	PFC Rinsate Blank (Cardinal Springs H_2O)	
sta 174 (1306020-05)	water	6/7/13	0950 AM	1L plastic	N	L9747-1	1	
sta 173 (1306020-04)	↓	↓	1050 AM	↓	↓	-2	1	(soap bubbles seen in rinse)
sta 201 (1306020-32)			1142 AM			-3	1	
sta 202 (1306020-33)			1325 pm			-4	1	(soap bubbles seen in rinse)

Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time
Maggie Dutch	6/10/13	6:30 pm	[signature]	6/10/13	6:39
[signature]	6/11/13	10:30	M. Wilman	11 JUN 13	10:20

Remarks / Type Of Preservative:

Courier	Waybill No.

Sample Receipt

	Cooler
Temp °C	
Custody Seal #	
Seal Intact Y / N	
Sample Tags Y / N	

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2045 Mills Road West TEL: (250) 655-5800
Sidney, British Columbia, Canada V8L 5X2 FAX: (250) 655-5811

CHAIN OF CUSTODY

AXYS CLIENT #: 4499

REPORT TO:

Company: WA Dept of Ecology
Address: 300 Desmond Dr. SE
PO Box 47600
Olympia, WA 98504-7600
Contact: Maggie Dutch
Phone: 360-407-6021
FAX: 360-407-6884
E-mail: Margaret.dutch@ecy.wa.gov

INVOICE TO:

Company: same
Address:
Contact:
Phone:
FAX:
E-mail:

Project Name/Number: Urban Waters Initiative - Elliott Bay - PPCP/PFAS(PFC)

Sampler's Name: Margaret Dutch
Signature: Margaret Dutch

ANALYSIS REQUESTED: PPCP Rinsate Blank (Seastar Water)

Client Sample Identification	Matrix	Sampling Date	Sampling Time	Container Type/No.	Preservative Y / N	AXYS Lab ID Lab use only	PPCP Rinsate Blank (Seastar Water)	
sta194 (1306020-25)	water	6/7/13	1L plastic	1406pm	N	L9748-1	1	(soap bubbles seen in rinsate after 1 min. agitation)
sta187 (1306020-18)	↓	6/10/13	↓	0904	↓	-2	1	
sta192 (1306020-23)	↓	↓	↓	1092	↓	-3	1	
sta195 (1306020-26)	↓	↓	↓	1127	↓	-4	1	
sta193 (1306020-24)	↓	↓	↓	1311	↓	-5	1	
sta196 (1306020-27)	↓	↓	↓	1406	↓	-6	1	

Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time
Maggie Dutch	6/10/13	6:30pm	[signature]	6-10-13	6:30
[signature]	6/11/13	10:30	M. Wilman	11 JUN 13	10:20

Remarks / Type Of Preservative:

Courier:
Waybill No.:

Sample Receipt

	Cooler
Temp °C	
Custody Seal #	
Seal Intact Y / N	
Sample Tags Y / N	

AXYS Analytical Services Ltd
SAMPLE RECEIVING RECORD

Waybill : Yes/No
Waybill #: HAND DELIVERED 11 JUN 13 #1
Date Shipped: 10-JUN-13
Date /Time Received: 11-JUN-13 10:20

AXYS Client & Contract # **4499-Washington State Dept of Ecology**

Project Number:
Receipt No: WB14891

Login Number:

Received By: MGIERDEN
Log in by: mgerde
Signature:

Axys Sample ID's: L9747-1to4 & L19748-1to6

Matrix Type: 10 Water

Condition of Shipping Container: Intact

Temperature upon Receipt: .5 Celcius shipped on wet ice, temp blank present

Thermometer ID: 3270
Corrected Temperature: .5 Celcius

Custody Seals: Shipping Containers Yes/No Intact Yes /No Seal Numbers Yes /No
Samples Yes/No Intact Yes /No Seal Numbers Yes /No

Chain of Custody or Documents:	Yes /No	Tracking Report /Packing List:	Yes /No
Sample ID's	Yes /No	Sample Tag Numbers	Yes /No
Collection Location	Yes /No	Sample Type	Yes /No
Date & Time Collection	Yes /No	Preservative Added	Yes /No
Collector's Name	Yes /No	Preservation Requested	Yes /No

Sample Tags	Yes /No		
Sample Labels	Yes /No		
Sample Labels Cross Referenced to COC	Yes /No	Information Agrees	Yes /No
Sample Tags Cross Referenced to Sample Labels	Yes /No	Information Agrees	Yes /No
Sample Tags Cross Referenced to COC	Yes /No	Information Agrees	Yes /No

Comments: The COC had each bottle listed separately, with unique identifiers for each. The bottle labels only had part of the information shown for the client ID's that is written out on the COC. Example:
Sta 194 (1306020-25) on COC
Sta 194 on label

Action Taken: Contacted project manager, the sample ID's logged in are the numbers shown in brackets, this is consistant with previous submissions. analysis product information for each bottle logged in as instructed.

AXYS

AXYS Analytical Services Ltd.

Login Chain of Custody Report (ln01)

Jun. 14, 2013

11:48 AM

for scanning
GBrooks
14-June-2013

Login Number: L19748
Account: 4499 Washington State Dept of Ecology
Project: URBAN WATERS - EBAY

Axys ID versus Client Sample Identification		Received	Due	PR
L19748-1		11-JUN-13		
	Storage: WIF-4, Floor			
1306020-25 07-JUN-13 14:06	Project #: URBAN WATERS - EBAY Description: Sta 194			
EDataDeliv	PPCP EDD		:	USD
D.Package	PPC DATA PKG LIST 1		:	USD
D.Package	PPC DATA PKG LIST 2		:	USD
D.Package	PPC DATA PKG LIST 3		:	USD
D.Package	PPC DATA PKG LIST 5		:	USD
Aqueous	PP075.1AP		:	USD
Aqueous	PP075.2AC		:	USD
Aqueous	PP075.3AN		:	USD
Aqueous	PP075.5AP		:	USD
ANY	SAMPLE RECEIPT	1	: 1 L plastic	USD
L19748-2		11-JUN-13		
	Storage: WIF-4, Floor			
1306020-18 10-JUN-13 09:04	Project #: URBAN WATERS - EBAY Description: Sta 187			
Comments: Backup for either L19748-1 or -3				
ANY	SAMPLE RECEIPT	1	: 1 L plastic	USD
L19748-3		11-JUN-13		
	Storage: WIF-4, Floor			
1306020-23 10-JUN-13 10:02	Project #: URBAN WATERS - EBAY Description: Sta 192			
EDataDeliv	PPCP EDD		:	USD
D.Package	PPC DATA PKG LIST 4		:	USD
Aqueous	PP075.4BP		:	USD
ANY	SAMPLE RECEIPT	1	: 1 L plastic	USD

AXYS

AXYS Analytical Services Ltd.

Login Chain of Custody Report (ln01)

Jun. 14, 2013
11:48 AM

Login Number: L19748
Account: 4499 Washington State Dept of Ecology
Project: URBAN WATERS - EBAY

Axys ID versus Client Sample Identification		Received	Due	PR
L19748-4		11-JUN-13		
	Storage: WIF-4, Floor			
1306020-26 10-JUN-13 11:27	Project #: URBAN WATERS - EBAY Description: Sta 195			
EDataDeliv	PPCP EDD		:	USD
D.Package	PPC DATA PKG LIST 1		:	USD
D.Package	PPC DATA PKG LIST 2		:	USD
D.Package	PPC DATA PKG LIST 3		:	USD
D.Package	PPC DATA PKG LIST 5		:	USD
Aqueous	PP075.1AP		:	USD
Aqueous	PP075.2AC		:	USD
Aqueous	PP075.3AN		:	USD
Aqueous	PP075.5AP		:	USD
ANY	SAMPLE RECEIPT	1	: 1 L plastic	USD
L19748-5		11-JUN-13		
	Storage: WIF-4, Floor			
1306020-24 10-JUN-13 13:11	Project #: URBAN WATERS - EBAY Description: Sta 193			
EDataDeliv	PPCP EDD		:	USD
D.Package	PPC DATA PKG LIST 4		:	USD
Aqueous	PP075.4BP		:	USD
ANY	SAMPLE RECEIPT	1	: 1 L plastic	USD
L19748-6		11-JUN-13		
	Storage: WIF-4, Floor			
1306020-27 10-JUN-13 14:06	Project #: URBAN WATERS - EBAY Description: Sta 196			
Comments: Backup for either L19748-4 or -5				
ANY	SAMPLE RECEIPT	1	: 1 L plastic	USD

AXYS

AXYS Analytical Services Ltd.

Login Chain of Custody Report (ln01)

Jun. 14, 2013

11:45 AM

for scanning
JBrooks
14-June-2013

Login Number: L19747
Account: 4499 Washington State Dept of Ecology
Project: URBAN WATERS - EBAY

Axys ID versus Client Sample Identification			Received	Due	PR
L19747-1			11-JUN-13		
		Storage: WIC-2, Shelf C			
1306020-05 07-JUN-13 09:50		Project #: URBAN WATERS - EBAY Description: Sta 174			
EDataDeliv	PFC EDD			:	USD
D.Package	PFOS DATA PKG			:	USD
Aqueous	FC060			:	USD
ANY	SAMPLE RECEIPT		1	: 1 L plastic	USD
L19747-2			11-JUN-13		
		Storage: WIC-2, Shelf C			
1306020-04 07-JUN-13 10:50		Project #: URBAN WATERS - EBAY Description: Sta 173			
Comments: Backup for L19747-1					
ANY	SAMPLE RECEIPT		1	: 1 L plastic	USD
L19747-3			11-JUN-13		
		Storage: WIC-2, Shelf C			
1306020-32 07-JUN-13 11:42		Project #: URBAN WATERS - EBAY Description: Sta 201			
EDataDeliv	PFC EDD			:	USD
D.Package	PFOS DATA PKG			:	USD
Aqueous	FC060			:	USD
ANY	SAMPLE RECEIPT		1	: 1 L plastic	USD
L19747-4			11-JUN-13		
		Storage: WIC-2, Shelf C			
1306020-33 07-JUN-13 13:25		Project #: URBAN WATERS - EBAY Description: Sta 202			
Comments: Backup for L19747-3					
ANY	SAMPLE RECEIPT		1	: 1 L plastic	USD

Washington State Department of Ecology
Request for Qualifications and Quote (RFQQ)

2013 MEL Cx 17 PSEMP Elliot Bay PPCP & PFC 2013

Laboratory Services

This Request for Quote and Qualifications will support an agreement with the Department of Ecology for the Contract laboratory to provide analytical services to the Department of Ecology.

		Date Issued:	**5/14/2013**
Responses due by 4:00 PM Port Orchard WA time:		**May 20, 2013** ***Late submissions will not be considered.***	
Please respond via email to:		**Karin.Feddersen@ecy.wa.gov**	

Expected Work Commitment

Title: PSEMP Elliot Bay PPCP & PFC 2013

Scope of Qualifications:

A. Provide analytical services to the Washington State Department of Ecology (Ecology). Details and specifications are provided in the attached Scope of Work (SOW). The apparent successful vendor must:

1. Be currently accredited by the Ecology's Laboratory Accreditation Unit for all analyses described in this SOW for which accreditation is available.
2. Have a minimum of 5 years experience in the method.
3. Submit proof that they can provide the analysis as requested, including but not limited to a Method Detection Limit (MDL) supporting the requested reporting limits. Provide documentation of a standard analyzed at the reporting limit requested for this SOW.
4. Submit blank data proving that they can meet the required blank contamination limits described in the SOW.
5. Provide documentation of the quantitation limits (based on the lowest calibration standard) that the instrument can achieve.
6. Provide quality control limits for laboratory control samples, matrix spikes, etc., for all analyses in this SOW.
7. Provide results from the most recent International Intercalibration Study.
8. Provide contact name, company name, address, and phone number for 3 client references who have had the requested analyses performed on the matrices specified in the SOW, and who have reviewed the raw data for these analyses.
9. Provide the analysis as requested in the attached SOW.

B. Ecology will pay vendor when all of the following have been satisfied:

1. Sample analyses and documentation performed according to this SOW.
2. Deliverables sent to Ecology within **30 calendar days** of vendor receiving samples.
3. Sufficient documentation for assessing the bias, usability and quality of the data.
4. Receipt of properly completed invoices.

Deliverables:

C. Deliverables will include:

1. Paper hardcopies or CD (**fully bookmarked** and **searchable** PDF) of all raw data and reports;
2. Results in Ecology-specified EDD format described in the SOW;

Other Factors for this Work Request:

D. Laboratories who want to perform this work must:

1. Provide a 3-page maximum length description of their qualifications specific to the SOW and their intended approach to performing the analysis, electronically or in hardcopy. **Include details of preparation method to be used on these samples.**

2. Submit an example work product in the form of one fully bookmarked and searchable PDF file or one bound hardcopy with a table of contents. This product must include all raw data that would be needed to perform an independent review of the results: calibration reports, chromatograms, spectra, benchsheets, etc..

   EXCEPTION: If the vendor has performed these same requested analyses for Ecology within the last 3 years, and a raw data package was submitted that uses the same instrument software that is proposed to be used for this SOW, no example work product is required.

3. Include in the quote, electronically or in hardcopy:
   - RFQQ customer reference number or title.
   - The names of two Laboratory representatives who will be responsible for the execution of these services and communications with the Ecology project manager.
   - The name and address of the bidder's firm.
   - Minority or Women's Business Enterprise status including Certification Number, if applicable.
   - The 20 most recent method blanks for the matrix/matrices of interest in this RFQQ.
   - The 20 most recent OPRs (LCS) for the matrix/matrices of interest in this RFQQ.

   Ecology does not assume responsibility for any problems with e-mail or the method of delivery chosen.

Bid Selection Process:

E. Ecology will review each bid to determine if the bid:

1. Was received by the date and time requested.
2. Is complete.
3. Shows a good understanding of project goals and needs.
4. Relevant experience with similar environmental samples.
5. Meets all technical specifications. QC limits will be evaluated from each bidder.
6. Meets the specified schedule for sample analysis and reporting.
7. Provides complete and clear cost information.

Ecology may request written clarifications pertaining to technical or cost elements of the bid.

The selection process will be based on cost, relevant experience, and ability to provide the specified deliverables according to schedule.

The Department of Ecology reserves the right to reject any or all bids if they do not meet the above award criteria. Furthermore, the release of this RFQQ does not compel the state to purchase anything and Ecology reserves the right to refrain from contracting with all bidders. Any costs or liabilities associated with the preparation of your response to this RFQQ are not the responsibility of Ecology, or any of its representatives.

In the event it becomes necessary to revise any part of this RFQQ, addenda will be provided to all persons/firms who receive the RFQQ.

It is important that all potential costs are included in your bid; **Ecology cannot reimburse for costs not included in the successful bid**.

Ecology's Right to Cancel:

F. Ecology reserves the right to cancel this Work Request at any time, reject any and all responses received, award more than one Work Order, and/or not execute a Work Order from this Work Request without penalty to the agency. The release of this solicitation document does not obligate Ecology to contract for the services specified in this Work Request. The agency shall not be liable for any costs incurred by a Vendor in preparation of a proposal submitted in response to this Work Request, conducting interviews, acquiring accreditation, or any other activity related to responding to this Work Request.

Waive Minor Administrative Irregularities:

G. Ecology reserves the right to waive minor administrative irregularities contained in any Response. Additionally, Ecology reserves the right, at its sole option, to make corrections to Vendors' Responses when an obvious arithmetical error has been made in the price quotation. Vendors will not be allowed to make changes to their quoted price after the Response submission deadline.

Errors in Response:

H. Vendors are liable for all errors or omissions contained in their Responses. Vendors will not be allowed to alter Response documents after the deadline for Response submission. Ecology is not liable for any errors in Responses. Ecology reserves the right to contact Vendor for clarification of Response contents.

In those cases where it is unclear to what extent a requirement or price has been addressed, the evaluation team(s) may, at their discretion and acting through the Agency Project Manager, contact a Vendor to clarify specific points in the submitted Response. However, under no circumstances will the responding Vendor be allowed to make changes to the proposed items after the deadline stated for receipt of Responses.

Vendor Questions:

I. Specific questions concerning this Work Request must be submitted, in writing to the Work Request Coordinator by the date and time set forth in the Estimated Schedule of Events. Questions must be transmitted by electronic mail. Only written questions will receive official written responses. Copies of all written questions and Ecology responses will be posted on the WEBS. It will be the Vendor's responsibility to monitor this website during preparation of their response. Only posted answers to questions will be considered official.

Proprietary or Confidential Information:

J. Any information contained in the Response that is proprietary or confidential must be clearly designated. Marking of the entire Response or entire sections of the Response as proprietary or confidential will not be accepted nor honored. Ecology will not accept Responses where pricing is marked proprietary or confidential, and the Response will be rejected.

To the extent consistent with Chapter 42.56 RCW, the Public Records Act, Ecology shall maintain the confidentiality of Vendors' information marked confidential or proprietary. If a request is made to view Vendor's proprietary information, Ecology will notify Vendor of the request and of the date that the records will be released to the requester unless Vendor obtains a court order enjoining that disclosure. If a Vendor fails to obtain the court order enjoining disclosure, Ecology will release the requested information on the date specified.

The state's sole responsibility shall be limited to maintaining the above data in a secure area and to notify a Vendor of any request(s) for disclosure for so long as Ecology retains the Vendor's information in Ecology's records. Failure to so label such materials or failure to timely respond after notice of request for public disclosure has been given shall be deemed a waiver by a Vendor of any claim that such materials are exempt from disclosure.

Agency (Project Manager):	**Department of Ecology (Karin Feddersen)**				
Phone:	**360-871-8829**	**Email:**	**Karin.Feddersen@ecy.wa.gov**	**Fax:**	**360-871-8850**

Submit completed bid packages to Karin.Feddersen@ecy.wa.gov or fax to (360) 871-8850.

SCOPE OF WORK

This Scope of Work (SOW) does not include the collection of any samples.

The Department of Ecology (Ecology) will send up to 33 samples of sediment, and request up to two sets of matrix spike/matrix spike duplicates and up to three duplicates; for Pharmaceuticals and Personal Care Products (PPCP) and Perfluorinated Compounds (PFCs). In addition, up to two water rinseate blanks will be collected for possible analysis.

See Appendix for lists of analytes. Samples must be maintained as per the methods from the time of receipt at the laboratory until preparation.

Laboratories must bid on all of the analyses, with the exception of the list in Table A3. Please provide a separate quote for these analytes.

Laboratories must provide a copy of the extraction methods as performed.

Laboratories must analyze and provide data for an independent source standard (different vendor than the calibration standards).

Bidding Laboratories must provide a list of the QC limits they adhere to for each method in this SOW.

The successful vendor will be responsible for:

A) Providing sufficient sample containers, ice chests, and blue ice for each sampling event;

OR

B) Returning any Ecology-owned ice chests and blue ice to Ecology. The estimated cost of ground shipping these items should be included in the price quote responding to this RFQQ.

The final data package is to include raw data (aka EPA Tier IV or Level 4 deliverables) and results in an electronic data deliverable (EDD) format that meets the requirements in Table 4. The EDD format is needed for loading results to Ecology's Information Management (EIM) database. Other items may be included as needed to help understand the data package.

This Agreement does not make either the Contractor or any of its employees or agents an employee or agent of Ecology.

Items for analytical services:

1. Perform all result calculations using the initial calibration as per the method. In other words, do not use a single point calibration standard.

Reporting of Results

1. Report all results in ng/g, dry weight.

2. Include a copy of the "Request for Laboratory Services" with signed and dated Chain of Custody section: this form will be provided by Ecology.

3. Include Case Narratives and corrective action reports.

4. Provide description of: analytical method used; any modifications to the method, Quality Assurance/Quality Control (QA/QC) performed and results; definitions of all data qualifiers used; and any other information that helps client understand the data package.

5. Provide fully validatable deliverables package: Deliverables shall include copies of all raw data necessary to perform an independent evaluation of the results, including, but not limited to initial calibration and verification standards, sample and QC chromatograms and spectra, analytical sequence (run) logs, benchsheets, standard logs and Certificates of Analysis for standards, etc.

   A. Include a fully paginated and bookmarked Adobe Acrobat (PDF) file on compact disk (CD) and/or paginated hardcopies of all raw data with a table of contents.

   B. Bookmark *each sample and each standard chromatogram* for ease of review.

   C. Rotate landscape pages as needed so that all information is viewable left to right in the electronic file.

   D. Clearly identify all field and QC samples with the sample number or QC name in the raw data and report.

   E. All initial calibration (ICAL) standards and CCVs, shall be clearly identified in the raw data.

   F. An Independent Calibration Verification (ICV) standard must be analyzed from a separate source in order to verify the initial calibration standards. The ICV must be analyzed each time a new standard curve is prepared. Provide the results of the most recent ICV with the data.

   G. Provide before and after printouts of any and all manual integrations.

   H. Provide analytical sequence logs that include the date, time, and filename for the initial and continuing calibrations, all field and QC samples, check standards, etc., associated with the project.

6. Reporting Limits (RL), Estimated Quantitation Limit (EQL - equivalent to “ML” in 1668), Method Detection Limit (MDL), Estimated Detection Limit (EDL).

   A. Maximum RLs are defined in the table below.

Table 1. Analytical Methods and Reporting Limits for PPCPs and PFCs

Analysis	Method Reference	Reporting Limit; sediment (dry weight basis)
PPCPs	EPA 1694 or equivalent	0.2 to 500 ppb (depending on analyte)
PFCs	HPLC/MS/MS http://water.epa.gov/scitech/methods/cwa/upload/Draft-Procedure-for-Analysis-of-Perfluorinated-Carboxylic-	0.10 to 0.20 ppb (depending on analyte)

	Acids-and-Sulfonic-Acids-in-Sewage-Sludge-and-Biosolids-by-HPLC-MS-MS.pdf or equivalent	

B. If any of these limits cannot be met for individual samples due to interference or other issues, contact the client to discuss action to take.

C. Provide the Estimated Quantitation Limit for each result (EQL: based on the lowest validated standard in calibration curve). Report the EQL in the electronic results file.

D. Provide the most recent Method Detection Limit (MDL) study results for each analyte. Include the date of the most recent MDL study in the Case Narrative.

E. Report down to the Estimated Detection Limits (EDL) - aka Instrument Detection Limits (IDL) or Sample Detection Limits (SDL) - based on 2.5 times the signal-to-noise ratio for HRMS analyses. Provide this value for each analyte by HRMS and LCMS in the electronic results file.

F. Dilutions

   a. Any results above the range of the calibration curve must be diluted to be within the range of the calibration curve.

   b. All results reported from dilution analyses must be within the range of the calibration curve.

G. For non-detect values, record the EDL in the "Result Reported Value" column and a "UJ" the "Result Data Qualifier" column.

H. Qualify detected values that are below the EQL as estimates ("J").

I. Do not report below the EDL. Where the EDL is above the EQL due to interference, raise any values below the EDL to the value of the EDL and qualify "UJ".

J. Calculate and report the Estimated Maximum Possible Concentration (EMPC) value for results that do not meet ion abundance ratio criteria. Qualify these results with "NJ".

7. The qualifiers used above are defined as:

   A. "J" – The analyte was positively identified. The associated numerical result is an estimate.

   B. "U" – The analyte was not detected at or above the reporting limit. (This qualifier will likely not be used if reporting all analytes down to the level of the EDL.)

   C. "UJ" – The analyte was not detected at or above the estimated reporting limit.

   D. "NJ" – The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration. (See 6. J., above.)

8. Perform all QC samples as specified in the method.

   A. Report results of Laboratory Control Samples (On-going Precision and Recovery standards), Matrix Spikes (if applicable), labeled compounds, internal standards, and surrogates as % recoveries in the EDD.

B. Report results of Standard or Certified Reference Materials, (e.g.: SRM 1944; CRM CARP-2), in the same units as the samples.

9. Method Blanks.

A. Clearly identify samples associated with each laboratory method blank.

B. The value of individual analytes found in the associated method blank must not exceed $1/10^{th}$ of the sample level. If these limits are exceeded, contact the client to discuss actions to take. Most likely, the blank should be re-extracted along with any associated samples.

C. If sample results are less than 10 times the concentration in the associated method blank, flag sample results with “B” – even if the sample result has already been qualified “NJ”; but not when the blank result is qualified “NJ”.

10. Sample identification.

A. Provide the client sample ID (MEL lab ID) associated with all sample results.

B. Provide the lab’s internal sample ID associated with all results OR a table that cross-references MEL lab ID with the lab’s internal sample ID.

D. Clearly identify QA/QC samples and results: blanks, matrix spikes, Standard Reference Materials (SRM), lab duplicates. If samples are reanalyzed, these results need be clearly identified as such.

E. Label all analyte peaks on chromatograms with either the congener name or the retention time and scale chromatograms such that peaks are visible above the baseline.

11. Analyte identification.

A. Provide the Chemistry Abstract Service Registry Number (CAS RN) for individual congeners.

12. Electronic results must be in Excel-compatible format as in Table 2:

Required Fields for Electronic Data Deliverables submitted to WA State Department of Ecology.		
Preferred Order	**Field Name**	**Example**
1	MEL (Client) Sample ID	1311021-03
2	Field ID (sample name on tag)	COLRIV034
3	Result IUPAC Name	2,3'-DiCB
4	Result Parameter Name	PCB-006
5	Result Parameter CAS Number	25569-80-6
6	Sample Extraction Date	11/14/2013**(format as numerical date)**
7	Sample Analysis Date	11/15/2013 **(format as numerical date)**
8	Lab Duplicate Flag	"Y" if lab duplicate, leave blank or "N" if not
9	Re-analysis Flag	"Y" if a re-analysis, leave blank or "N" if not
10	Result Reported Value	7.9 (format as number)
11	Result Data Qualifier	J
12	Result Value Units of Measure	pg/L
13	Result Value EQL *	10 (format as number)
14	Result Value EDL**	3.42 (format as number)
15	Result Method Code	EPA 1668C
16	Result Lab Name	Laboratory Name
17	Contract Lab Sample ID	PR137954
18	Others as needed by contract lab or MEL.	If used, clearly identify field and content
	* = Estimated Quantitation Limit (Based on the lowest validated standard in the calibration curve and adjusted for weight, volume, % solids, etc., as applicable).	
	** = Estimated Sample Detection Limit; calculated from signal for each sample)	

Appendix A - Analyte Lists

Table A1 - Personal Care Products and Pharmaceuticals

1,7-Dimethylxanthine	Demeclocycline	Oxolinic acid
10-hydroxy-amitriptyline	Desmethyldiltiazem	Oxycodone
2-hydroxy-ibuprofen	Diazepam	Oxytetracycline
4-Epianhydrochlortetracycline	Digoxigenin	Paroxetine
4-Epianhydrotetracycline	Digoxin	Penicillin G
4-Epichlortetracycline	Diltiazem	Penicillin V
4-Epioxytetracycline	Diphenhydramine	Prednisolone
4-Epitetracycline	Doxycycline	Prednisone
Acetaminophen	Enalapril	Promethazine
Albuterol	Enrofloxacin	Propoxyphene
Alprazolam	Erythromycin-H20	Propranolol
Amitriptyline	Flumequine	Ranitidine
Amlodipine	Fluocinonide	Roxithromycin
Amphetamine	Fluoxetine	Sarafloxacin
Ampicillin	Fluticasone propionate	Sertraline
Anhydrochlortetracycline	Furosemide	Simvastatin
Anhydrotetracycline	Gemfibrozil	Sulfachloropyridazine
Atenolol	Glipizide	Sulfadiazine
Atorvastatin	Glyburide	Sulfadimethoxine
Azithromycin	Hydroclorothiazide	Sulfamerazine
Benzoylecgonine	Hydrocodone	Sulfamethazine
Benztropine	Hydrocortisone	Sulfamethizole
Betamethasone	Ibuprofen	Sulfamethoxazole
Bisphenol A	Isochlortetracycline	Sulfanilamide
Caffeine	Lincomycin	Sulfathiazole
Carbadox	Lomefloxacin	Tetracycline
Carbamazapine	Meprobamate	Theophylline
Cefotaxime	Metformin	Thiabendazole
Chlortetracycline	Methylprednisolone	Trenbolone
Cimetidine	Metoprolol	Trenbolone acetate
Ciprofloxacin	Miconazole	Triamterene
Clarithromycin	Minocycline	Triclocarban
Clinafloxacin	Naproxen	Triclosan
Clonidine	Norfloxacin	Trimethoprim
Cloxacillin	Norfluoxetine	Tylosin
Cocaine	Norgestimate	Valsartan
Codeine	Norverapamil	Verapamil
Cotinine	Ofloxacin	Virginiamycin
DEET	Ormetoprim	Warfarin
Dehydronifedipine	Oxacillin	

Table A2 - Perfluorinated Chemicals

Carboxylic Acids
Perfluorobutanoate (PFBA)
Perfluoropentanoate (PFPeA)
Perfluorohexanoate (PFHxA)
Perfluoroheptanoate (PFHpA)
Perfluorooctanoate (PFOA)
Perfluorononanoate (PFNA)
Perfluorodecanoate (PFDA)
Perfluoroundecanoate (PFUnA)
Perfluorododecanoate (PFDoA)
Sulphonic Acids
Perfluorobutanesulfonate (PFBS)
Perfluorohexanesulfonate (PFHxS)
Perfluorooctanesulfonate (PFOS)
Perfluorooctane sulfonamide (PFOSA)

Table A3 - Personal Care Products and Pharmaceuticals (Supplemental and optional)

Amsacrine	Lomustine
Azathioprine	Medroxyprogesterone acetate
Busulfan	Melphalan
Carmustine	Metronidazole
Chloramphenicol	Medroxyprogesterone acetate
Citalopram	Melphalan
Clotrimazole	Metronidazole
Colchicine	Moxifloxacin
Cyclophosphamide	Norethindrone
Daunorubicin	Oxazepam
Diatrizoic acid	Rosuvastatin
Doxorubicin	Tamoxifen
Drospirenone	Teniposide
Etoposide	Venlafaxine
Iopamidol	Zidovudine