

Appendix C
Laboratory QA Report



EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT

Washington Department of Ecology Toxics Cleanup Program
Fidalgo Bay Sediment Investigation – Anacortes, Washington

Prepared for:

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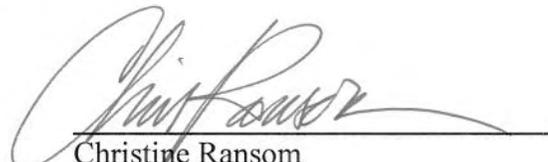
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Approved for Release


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INTRODUCTION

Basis for the Data Validation

This report summarizes the results of the validation performed on sediment, tissue, and quality control (QC) sample data for the Washington Department of Ecology – Sediment Investigation at Fidalgo Bay, Anacortes, Washington. A complete list of samples is provided in the **Sample Index**. Columbia Analytical Services, Kelso, Washington performed all analyses with the exception of dioxin & furan compounds, which were analyzed by Axy's Analytical Services, Sidney, British Columbia. The analytical methods and EcoChem project chemists are listed below.

Analysis	Method of Analysis	Primary Review	Secondary Review
Semivolatile Organic Compounds	SW8270C	Jennifer Newkirk	Mark Brindle
Phenols	SW8270 SIM		
Pesticides	SW8081		
PCB Aroclors	SW8082	Mark Brindle/ Melissa Swanson	Eric Strout/ Mark Brindle
Dioxin & Furan Compounds	EPA 1613B	Mark Brindle	Eric Strout
Metals	SW6020, SW7471A, SW7470A	Linda Holz	Chris Ransom
Conventionals: Total Solids, Total Organic Carbon, Total Volatile Solids, Ammonia as Nitrogen, Total Sulfides	EPA 160.3, 9060M, 160.4, 350.1, 9030M		

The data validation is based on QC criteria documented in the above listed methods, the *Fidalgo Bay Sediment Investigation, Anacortes, Washington Quality Assurance Project Plan (QAPP)*, (August 2007); and *USEPA National Functional Guidelines for Organic (1999) and Inorganic (2004) Data Review*. The QC criteria are summarized in **Appendix A**.

EcoChem's goal in assigning data validation qualifiers is to assist in proper data interpretation. If values are estimated (assigned a J), data may be used for site evaluation purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. Values with no data qualifier meet all data quality goals as outlined in the EPA Functional Guidelines.

Data qualifier definitions and Data Validation Criteria Tables are included as **Appendix A**. **Appendix B** contains the Qualified Data Summary Table. Data validation worksheets are kept on file at EcoChem.

Sample Index
SAIC - Fidalgo Bay
Axys Samples

SDG	Sample ID	Lab ID	Matrix	Dioxins
WG25699	A2R3-polychaeta	L11328-1	Tissue	✓
WG25699	A2R2-polychaeta	L11328-2	Tissue	✓
WG25699	A3R1-polychaeta	L11328-3	Tissue	✓
WG25699	A3R3-polychaeta	L11328-4	Tissue	✓
WG25699	A4R1-polychaeta	L11328-5	Tissue	✓
WG25699	A4R2-polychaeta	L11328-6	Tissue	✓
WG25699	A3R1-ES	L11328-7	Tissue	✓
WG25699	A3R2-SF	L11328-8	Tissue	✓
WG25699	A3R3-SF	L11328-9	Tissue	✓
WG25699	A2R1-SF	L11328-10	Tissue	✓
WG25699	A2R2-SF	L11328-11	Tissue	✓
WG25699	A2R3-SF	L11328-12	Tissue	✓
WG25699	A2R1-RR-hepato	L11328-13	Tissue	✓
WG25699	A2R1-RR-other	L11328-14	Tissue	✓
WG25699	A2R1-RR-tissue	L11328-15	Tissue	✓
WG25701	A2R2-DC-hepato	L11328-16	Tissue	✓
WG25701	A2R2-DC-tissue	L11328-17	Tissue	✓
WG25701	A2R2-DC-other	L11328-18	Tissue	✓
WG25701	A2R3-DC-hepato	L11328-19	Tissue	✓
WG25701	A2R3-DC-tissue	L11328-20	Tissue	✓
WG25701	A2R3-DC-other	L11328-21	Tissue	✓
WG25701	A3R1-DC-other	L11328-22	Tissue	✓
WG25701	A3R1-DC-hepato	L11328-23	Tissue	✓
WG25701	A3R1-DC-tissue	L11328-24	Tissue	✓
WG25701	A3R2-DC-other	L11328-25	Tissue	✓
WG25701	A4R2-RR-tissue	L11328-33	Tissue	✓
WG25701	A1R1-manila	L11328-35	Tissue	✓
WG25701	A2R3-bentnose	L11328-38	Tissue	✓
WG25701	A3R3-manila	L11328-42	Tissue	✓
WG25701	A4R2-bentnose	L11328-43	Tissue	✓
WG25730	A3R2-DC-hepato	L11328-26	Tissue	✓
WG25730	A3R2-DC-tissue	L11328-27	Tissue	✓
WG25730	A4R1-RR-tissue	L11328-28	Tissue	✓
WG25730	A4R1-RR-hepato	L11328-29	Tissue	✓
WG25730	A4R1-RR-other	L11328-30	Tissue	✓
WG25730	A4R2-RR-other	L11328-32	Tissue	✓
WG25730	A1R2-manila	L11328-34	Tissue	✓
WG25730	A1R3-manila	L11328-36	Tissue	✓
WG25730	A2R2-bentnose	L11328-37	Tissue	✓
WG25730	A2R1-manila	L11328-39	Tissue	✓
WG25730	A3R1-horse	L11328-40	Tissue	✓
WG25730	A3R2-macoma	L11328-41	Tissue	✓
WG25730	A4R3-bentnose	L11328-44	Tissue	✓
WG25730	A4R1-bentnose	L11328-45	Tissue	✓
WG25754	FBA4-07-S	L10342-44	Sediment	✓
WG25754	FBA4-04-S	L10342-46	Sediment	✓
WG25754	FBA4-03-S	L11365-1	Sediment	✓

Sample Index
SAIC - Fidalgo Bay
Axys Samples

SDG	Sample ID	Lab ID	Matrix	Dioxins
WG25754	FBA4-06-S	L11365-2	Sediment	✓
WG25754	FBA4-08-S	L11365-3	Sediment	✓
WG25754	FBA4-11-S	L11365-4	Sediment	✓
WG25754	FBA3-18-S	L11365-5	Sediment	✓
WG25754	FBA3-37-S	L11365-6	Sediment	✓
WG25754	FBA3-42-S	L11365-7	Sediment	✓
WG25754	FBA3-03-S	L11365-8	Sediment	✓
WG25754	FBA3-06-S	L11365-9	Sediment	✓

Sample Index
SAIC - Fidalgo Bay
CAS SDG: K0806166

Sample ID	Lab ID	Matrix	SVOC	Phenols	Pest	PCB	Metals	TOC	Ammonia	Sulfide	TVS	Total Solids
FB-A1-14	K0806166-001	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FB-A1-18	K0806166-002	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FB-A1-09	K0806166-003	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA2-30-S	K0806166-004	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA2-40-S	K0806166-005	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA2-56-S	K0806166-006	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA3-36-S	K0806166-007	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA3-37-S	K0806166-008	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA3-42-S	K0806166-009	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA4-03-S	K0806166-010	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA4-06-S	K0806166-011	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA4-08-S	K0806166-012	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA4-11-S	K0806166-013	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA4-14-S	K0806166-014	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA3-22b-S	K0806166-015	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA4-30-S	K0806166-016	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA4-29-S	K0806166-017	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA4-28-S	K0806166-018	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA3-03-S	K0806166-019	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA3-06-S	K0806166-020	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FBA3-18-S	K0806166-021	Sediment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Sample Index
SAIC - Fidalgo Bay
CAS SDG: K0805642

Sample ID	Lab ID	Matrix	PCB	Metals	Lipids	Total Solids
A1R2-manila	K0805642-001	Tissue	✓	✓	✓	✓
A1R1-manila	K0805642-002	Tissue	✓	✓	✓	✓
A1R3-manila	K0805642-003	Tissue	✓	✓	✓	✓
A2R2-bentnose	K0805642-004	Tissue	✓	✓	✓	✓
A2R3-bentnose	K0805642-005	Tissue	✓	✓	✓	✓
A2R1-manila	K0805642-006	Tissue	✓	✓	✓	✓
A3R1-horse	K0805642-007	Tissue	✓	✓	✓	✓
A3R3-manila	K0805642-008	Tissue	✓	✓	✓	✓
A4R2-bentnose	K0805642-009	Tissue	✓	✓	✓	✓
A4R3-bentnose	K0805642-010	Tissue	✓	✓	✓	✓
A3R1-ES	K0805642-011	Tissue	✓	✓	✓	✓
A3R2-SF	K0805642-012	Tissue	✓	✓	✓	✓
A3R3-SF	K0805642-013	Tissue	✓	✓	✓	✓
A2R1-SF	K0805642-014	Tissue	✓	✓	✓	✓
A2R2-SF	K0805642-015	Tissue	✓	✓	✓	✓
A2R3-SF	K0805642-016	Tissue	✓	✓	✓	✓
A2R1-RR-other	K0805642-017	Tissue	✓	✓	✓	✓
A2R1-RR-tissue	K0805642-018	Tissue	✓	✓	✓	✓
A2R2-RR-hepato	K0805642-019	Tissue	✓	✓	✓	✓
A2R2-DC-tissue	K0805642-020	Tissue	✓	✓	✓	✓
A2R2-DC-other	K0805642-021	Tissue	✓	✓	✓	✓
A2R3-DC-hepato	K0805642-022	Tissue	✓	✓	✓	✓
A2R3-DC-tissue	K0805642-023	Tissue	✓	✓	✓	✓
A2R3-DC-other	K0805642-024	Tissue	✓	✓	✓	✓
A3R1-DC-other	K0805642-025	Tissue	✓	✓	✓	✓
A3R1-DC-hepato	K0805642-026	Tissue	✓	✓	✓	✓
A3R1-DC-tissue	K0805642-027	Tissue	✓	✓	✓	✓
A3R2-DC-hepato	K0805642-028	Tissue	✓	✓	✓	✓
A3R2-DC-other	K0805642-029	Tissue	✓	✓	✓	✓
A3R2-DC-tissue	K0805642-030	Tissue	✓	✓	✓	✓
A4R1-RR-hepato	K0805642-031	Tissue	✓	✓	✓	✓
A4R1-RR-tissue	K0805642-032	Tissue	✓	✓	✓	✓
A4R1-RR-other	K0805642-033	Tissue	✓	✓	✓	✓
A4R2-RR-hepato	K0805642-034	Tissue	✓	✓	✓	✓
A4R2-RR-other	K0805642-035	Tissue	✓	✓	✓	✓
A4R2-RR-tissue	K0805642-036	Tissue	✓	✓	✓	✓
A4R1-bentnose	K0805642-037	Tissue	✓	✓	✓	✓

DATA VALIDATION REPORT

Fidalgo Bay Sediment Investigation

Semivolatile Organic Compounds – EPA Method 8270C

This report documents the review of analytical data from the analyses of sediment samples and the associated laboratory quality control (QC) samples. Columbia Analytical Services, Inc., Kelso, Washington, analyzed the samples. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
K0806166	21 Sediment	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. EDD TO HARDCOPY VERIFICATION

A verification of the electronic data deliverables (EDD) results was performed by comparison to the hardcopy laboratory data package. No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation	1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
GC/MS Instrument Performance Check	2	Laboratory Control Samples (LCS/LCSD)
Initial Calibration (ICAL)		Internal Standards
Continuing Calibration (CCAL)		Target Analyte List
Laboratory Blanks		Reporting Limits
Surrogate Compounds		

¹ *Quality control results are discussed below, but no data were qualified.*

² *Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.*

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Matrix spike/matrix spike duplicate (MS/MSD) analyses were not performed. Accuracy and precision were evaluated using the surrogates and laboratory control sample/laboratory control sample duplicates (LCS/LCSD).

Laboratory Control Samples (LCS/LCSD)

The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) percent recovery (%R) values for benzoic acid were less than 10% for batches KWG0806733 and KWG0806734. This analyte was not detected in the associated samples. Reporting limits were rejected (R-10).

The relative percent difference (RPD) value for benzo(g,h,i)perylene (62%) was greater than the upper control limit of 40% in batch KWG0806734. Positive results for this compound in the associated samples were estimated (J-9).

Reporting Limits

The reporting limit for butylbenzylphthalate was elevated in Sample FBA3-42-S due to chromatographic interference. No action was required.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD values, with the exceptions noted above. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values, with the exception previously noted.

Data were rejected based on LCS/LCSD recoveries that were less than 10%. Data were estimated based on an LCS/LCSD RPD outlier.

Rejected data should not be used for any purpose.

All other data, as qualified, are acceptable for use.

DATA VALIDATION REPORT

Fidalgo Bay Sediment Investigation

Phenols by EPA Method 8270C-SIM

This report documents the review of analytical data from the analyses of sediment samples and the associated laboratory quality control (QC) samples. Columbia Analytical Services, Inc., Kelso, Washington, analyzed the samples. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
K0806166	21 Sediment	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. EDD TO HARDCOPY VERIFICATION

A verification of the electronic data deliverables (EDD) results was performed by comparison to the hardcopy laboratory data package. No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times & Sample Preservation	1 Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
GC/MS Instrument Performance Check	Laboratory Control Sample (LCS)
Initial Calibration (ICAL)	Internal Standards
Continuing Calibration (CCAL)	Target Analyte List
Laboratory Blanks	Reporting Limits
Surrogate Compounds	1 Reported Results

¹ Quality control results are discussed below, but no data were qualified

² Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Matrix spike/matrix spike duplicate (MS/MSD) analyses were not performed. Accuracy and precision were evaluated using the surrogates and laboratory control sample/laboratory control sample duplicates (LCS/LCSD).

Reported Results

The laboratory noted that the values reported for 4-methylphenol likely represents a combination of 3-methylphenol and 4-methylphenol.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable as demonstrated by the surrogate and LCS/LCSD recoveries. Precision was also acceptable as demonstrated by the LCS/LCSD relative percent difference values.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT

Fidalgo Bay Sediment Investigation

Chlorinated Pesticides by Method SW846 8081A

This report documents the review of analytical data from the analyses of sediment samples and the associated laboratory quality control (QC) samples. Columbia Analytical Services, Inc., Kelso, Washington, analyzed the samples. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
K0806166	21 Sediments	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and anomalies were discussed in the case narrative.

II. EDD TO HARDCOPY VERIFICATION

A verification of the electronic data deliverables (EDD) results was performed by comparison to the hardcopy laboratory data package. No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation	Matrix Spike/Matrix Spike Duplicates (MS/MSD)
Initial Calibration (ICAL)	Laboratory Control Samples (LCS)
Continuing Calibration (CCAL)	2 Certified Reference Material (CRM)
Laboratory Blanks	1 Reporting Limits
Surrogate Compounds	2 Compound Identification

¹ *Quality control results are discussed below, but no data were qualified*

² *Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.*

Certified Reference Material (CRM)

The laboratory analyzed SRM 1944 – New York/New Jersey Waterway Sediment from NIST. This reference material has certified values for DDT isomers and hexachlorobenzene. The reported concentration for hexachlorobenzene exceeded the upper control limit for the acceptance window [$\pm 20\%$ of the 95% confidence interval]. All positive results for hexachlorobenzene were estimated (J-12) to indicate a potential high bias.

Reporting Limits (Method Detection Limit and Method Reporting Limit)

The method reporting limits for several compounds were greater than the limits specified in the Sampling and Analysis Plan. Chromatograms indicated non-target background interference. The reporting limits for these Aroclors were flagged "Ui" by the laboratory. No action was taken on this basis.

Compound Identification

The results from the two analytical columns were compared for agreement. In cases where the RPD value between the two columns was greater than 40% the reported result was "P" flagged by the laboratory. As the elevated RPD value may indicate the presence of an interferent resulting in a high bias, when the RPD value was greater than 40% but less than 60% the reported value was estimated (J-3). If the RPD value was greater than 60%, the result was qualified as a tentative identification (NJ-3). The following results were estimated based on %D outliers:

FBA1-14: 2,4'-DDT (J-3)
FBA4-30-S: alpha-BHC (J-3)
FBA3-03-S: alpha-BHC (J-3); 4,4'-DDT (NJ-3)
FBA4-29-S: 4,4'-DDD (J-3); 4,4'-DDT (NJ-3)
FBA4-28-S: hexachlorobenzene (J-3)
FBA4-06-S: 4,4'-DDE (NJ-3)
FBA3-22b-S: alpha-BHC (NJ-3)

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample/laboratory control sample duplicate (LCS/LCSD), and matrix spike (MS) percent recovery values. Precision was also acceptable as demonstrated by the relative percent difference values for the LCS/LCSD analyses.

Data were qualified as estimated due to a CRM outlier and confirmation criteria outliers. Data were qualified as tentatively identified based on confirmation outliers.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT

Fidalgo Bay Sediment Investigation

PCB Aroclors by Method SW846 8082

This report documents the review of analytical data from the analyses of sediment and tissue samples and the associated laboratory quality control (QC) samples. Columbia Analytical Services, Inc., Kelso, Washington, analyzed the samples. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
K0805642	37 Tissue	Summary
K0806166	21 Sediments	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and anomalies were discussed in the case narrative.

II. EDD TO HARDCOPY VERIFICATION

A verification of the electronic data deliverables (EDD) results was performed by comparison to the hardcopy laboratory data package. No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

- | | |
|---|---|
| 1 Holding Times and Sample Preservation | Matrix Spike/Matrix Spike Duplicates (MS/MSD) |
| Initial Calibration (ICAL) | Laboratory Control Samples (LCS) |
| Continuing Calibration (CCAL) | 1 Reporting Limits |
| Laboratory Blanks | Compound Identification |
| Surrogate Compounds | |

¹ *Quality control results are discussed below, but no data were qualified*

Holding Times and Sample Preservation

SDG K0805642: Some coolers were received at temperatures less than the recommended range of 4°C ±2°, at -1.8°C and 1.0°C. It was determined that these temperature outliers did not impact data quality and no qualifiers were required.

Reporting Limits

The method reporting limits for several Aroclors were greater than the limits specified in the Sampling and Analysis Plan. Chromatograms indicated non-target background interference. The reporting limits for these Aroclors were flagged "Ui" by the laboratory. No action was taken on this basis.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample/laboratory control sample duplicate (LCS/LCSD), and matrix spike (MS) percent recovery values. Precision was also acceptable as demonstrated by the relative percent difference values for the LCS/LCSD analyses.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Fidalgo Bay Sediment Investigation
Dioxin & Furan Compounds
Axys Method MLA-017 (EPA 1613B)

This report documents the review of analytical data from the analyses of tissue and sediment samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Axys Analytical Services, Ltd. of Sidney, British Columbia, Canada. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
WG25699	15 Tissues	Full
WG25701	15 Tissues	Summary
WG25730	14 Tissues	Summary
WG25754	11 Sediments	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG WG25730: No results were reported for Sample A4R2-RR-hepato. The laboratory case narrative stated that the sample could not be successfully analyzed. No further information was provided.

II. EDD TO HARDCOPY VERIFICATION

A verification of the electronic data deliverables (EDD) results was performed by comparison to the hardcopy laboratory data package. No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

- | | |
|---|--|
| <ul style="list-style-type: none"> 1 Holding Times and Sample Preservation Initial Calibration (ICAL) Continuing Calibration (CCAL) Laboratory Blanks 2 Labeled Compounds 2 Laboratory Duplicates | <ul style="list-style-type: none"> 1 Matrix Spike/Matrix Spike Duplicates (MS/MSD) Ongoing Precision and Recovery (OPR) Standard Reference Material (SRM) 2 Compound Identification Reporting Limits 1 Calculation Verification (full validation only) |
|---|--|

¹ *Quality control results are discussed below, but no data were qualified.*

² *Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.*

Holding Times and Sample Receipt

The validation guidance documents state that the cooler temperatures should be within an advisory temperature range of 2° to 6°C.

SDGs WG25699, WG25701, & WG25730: The sample cooler was received at the laboratory at a temperature of 0°C. This temperature outlier did not impact data quality and no action was taken.

SDG WG25754: The sample coolers were received at the laboratory at temperatures of 10°C and 18°C. Since dioxin/furan compounds are extremely stable and the laboratory refroze the samples immediately upon receipt, these temperature outliers should not impact data quality and no action was taken.

Labeled Compounds

SDG WG25730: The percent recovery (%R) value for $^{13}\text{C}_{12}$ -1,2,3,4,7,8-HxCDD in Sample A4R1-RR-tissue was less than the lower control limit. The result for the associated target analyte (1,2,3,4,7,8-HxCDD) was estimated (J-13) in this sample.

Laboratory Duplicates

Laboratory duplicate samples were analyzed at the required frequency. The relative percent difference (RPD) value is used to assess precision only if both sample results are greater than five times the reporting limit for a given analyte; otherwise the difference between the two results is used to evaluate precision. The RPD control limit is 35%. The difference control limit is twice the reporting limit of the compound.

SDG WG25754: A laboratory duplicate analysis was performed using Sample FBA4-04-S. The RPD values for 1,2,3,4,6,7,8-HpCDD (42.3%); OCDD (48.5%), and OCDF (44.4%) were greater than the 35% control limit. These results were estimated (J-9) in the parent sample.

Matrix Spike/Matrix Spike Duplicates (MS/MSD)

No matrix spike/matrix spike duplicate (MS/MSD) samples were analyzed. Accuracy and precision were assessed using labeled compound recovery, ongoing precision and recovery (OPR) samples and laboratory duplicate samples.

Compound Identification

The laboratory assigned a "K" flag to one or more analytes in all samples to indicate the ion ratio criterion were not met. Since the ion abundance ratio is the primary identification criterion for high resolution mass spectroscopy, an outlier indicates that the reported result may be a false positive. Due to this, these results were qualified as not detected (U-21) at the reported concentration.

Calculation Verification

SDG WG25699: Several results were verified by recalculation from the raw data. No calculation or transcription errors were found.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the labeled compound and OPR percent recovery values, with the exceptions noted above. Precision was acceptable as demonstrated by the laboratory duplicate RPD values, with the exceptions previously noted.

Data were qualified as not detected based on ion ratio criteria outliers. Data were estimated due to laboratory duplicate precision outliers and a labeled compound %R outlier.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT

Fidalgo Bay Sediment Investigation

Metals by Methods SW6010B, 6020, and 7471A

This report documents the review of analytical data from the analyses of sediment samples and the associated laboratory quality control (QC) samples. Columbia Analytical Services, Inc., Kelso, Washington, analyzed the samples. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
K0806166	21 Sediment	Summary
K0805642	37 Tissue	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. EDD TO HARDCOPY VERIFICATION

A verification of the electronic data deliverables (EDD) results was performed by comparison to the hardcopy laboratory data package. No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements for review are listed below.

- | | | | |
|---|--|---|----------------------------|
| 2 | Holding Times and Sample Preservation | 2 | Laboratory Duplicates |
| | Initial Calibration | | Field Duplicates |
| | Calibration Verification | | Interference Check Samples |
| | CRDL Standards | 2 | Serial Dilutions |
| 2 | Laboratory Blanks | | ICPMS Internal Standards |
| | Laboratory Control Samples (LCS) | | Reported Results |
| 2 | Matrix Spike/Matrix Spike Duplicates (MS/MSD)) | | |

¹ *Quality control results are discussed below, but no data were qualified.*

² *Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.*

Holding Times and Sample Preservation

The validation guidance documents state that the cooler temperature should be within an advisory temperature range of 2°C to 6°C.

SDG K0805642: Various coolers were received at the laboratory at temperatures less than 2°C (-1.8°C, 1.0°C). These temperature outliers did not impact data quality and no action was taken.

SDG K0806166: All sediments were stored in frozen archive (-20°C). The analysis for mercury took place after the extended archive holding time of 6 months. All mercury results were estimated (J-1).

Laboratory Blanks

Various analytes were detected in the method and instrument blanks at levels greater than the method detection limits (MDL). To evaluate the effect on the sample data, action levels of five times the blank concentrations were established. Positive results less than the action levels in the associated samples were qualified as not detected (U) at the reported concentration.

In addition, various analytes results were less than the negative MDL in some instrument blanks. For negative blanks, action levels of five times the absolute value of the blank concentrations were established. Results less than the action levels in the associated samples were estimated (J/UJ) to indicate a potential low bias.

The following analytes were qualified in one or more samples based on laboratory blanks:

SDG K0805642: silver, chromium – not detected (U-7)

Matrix Spike/Matrix Spike Duplicates (MS/MSD)

A matrix spike sample (MS) was analyzed at the proper frequency of one per 20 samples or one per batch; whichever was more frequent. The percent recovery (%R) values were within the laboratory control limits, with the exception noted below. For %R values less than the lower control limit, the associated positive results and non-detects were estimated (J/UJ-8) to indicate a possible low bias. The following outlier was noted:

SDG K0805642: QC Sample A3R1-DC-tissue: silver (37.1%) – low bias

Laboratory Duplicates

Laboratory duplicate relative percent difference (RPD) values were used to evaluate precision. The RPD values were within the control limit of 35% for sample results greater than five times the reporting limit (for results less than five times the reporting limit, the difference was less than twice the reporting limit) with the exception noted below. For RPD or difference values exceeding the control limits, associated positive results and non-detects were estimated (J/UJ-9).

SDG K0806166: QC Sample FB-A1-14: lead (150.4%)

ICP Serial Dilution

Serial dilutions were analyzed at the proper frequency of one per 20 samples or one per batch; whichever was more frequent. The percent difference (%D) values were less than the control limit of 10% for results greater than 50 times the MDL, with the following exceptions. For %D outliers,

all associated results were estimated (J/UJ-16). The sample used for the serial dilution analysis and the outliers were as follows:

SDG K0806166: FBA3-18-S - arsenic (11%), chromium (16%), copper (19%), and zinc (17%)

SDG K0805642: A3R2-SF - cadmium (20%), copper (12%), and zinc (19%)

SDG K0805642: A3R1-DC-tissue - zinc (13%)

IV. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical methods. The laboratory duplicate relative percent difference values indicated acceptable precision, except as previously noted. Accuracy was also acceptable, as demonstrated by the matrix spike and laboratory control sample recoveries, except as noted above.

Data were qualified as not detected base on blank contamination. Data were estimated based on exceeded holding times and matrix spike %R, laboratory duplicate RPD, and serial dilution %D outliers.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT

Fidalgo Bay Sediment Investigation

Conventional Parameter Analyses

This report documents the review of analytical data from the analyses of sediment samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Columbia Analytical Services, Inc., Kelso, Washington. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
K0806166	21 Sediment	Summary
K0805642	37 Tissue	Summary

The analytical tests that were performed are summarized below:

Parameter	Method
Total Solids	160.3M
Total Volatile Solids	160.4M
Ammonia	350.1M
Total Organic Carbon	9060M
Total Sulfide	9030M
Lipids	NOAA

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. EDD TO HARDCOPY VERIFICATION

A verification of the electronic data deliverables (EDD) results was performed by comparison to the hardcopy laboratory data package. No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements for review are listed below.

2 Holding Times and Sample Preservation	Laboratory Control Samples
Initial Calibration	Matrix Spike (MS)
Calibration Verification	Laboratory Replicates
Laboratory Blanks	Reporting Limits

¹ *Quality control results are discussed below, but no data were qualified.*

² *Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.*

Holding Times and Sample Preservation

The validation guidance documents state that the cooler temperature should be within an advisory temperature range of 2°C to 6°C.

SDG K0805642: Various coolers were received at the laboratory at temperatures less than 2°C (-1.8°C, 1.0°C). These temperature outliers did not impact data quality and no action was taken.

SDG K0806166: All sediments were stored in frozen archive (-20°C). The analyses for the conventional parameters took place after the extended archive holding time of 6 months. All results were estimated (J/UJ-1).

IV. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical methods. The laboratory duplicate relative percent difference values indicated acceptable precision. Accuracy was also acceptable, as demonstrated by the matrix spike and laboratory control sample recoveries.

Data were estimated due to exceeded holding times.

All data, as qualified, are acceptable for use.



EcoChem, INC.
Environmental Data Quality

APPENDIX A
DATA QUALIFIER DEFINITIONS
REASON CODES
AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a “tentative identification”.
NJ	The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is an EcoChem qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.
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DATA QUALIFIER REASON CODES

1	Holding Time/Sample Preservation
2	Chromatographic pattern in sample does not match pattern of calibration standard.
3	Compound Confirmation
4	Tentatively Identified Compound (TIC) (associated with NJ only)
5A	Calibration (initial)
5B	Calibration (continuing)
6	Field Blank Contamination
7	Lab Blank Contamination (e.g., method blank, instrument, etc.)
8	Matrix Spike(MS & MSD) Recoveries
9	Precision (all replicates)
10	Laboratory Control Sample Recoveries
11	A more appropriate result is reported (associated with "R" and "DNR" only)
12	Reference Material
13	Surrogate Spike Recoveries (a.k.a., labeled compounds & recovery standards)
14	Other (define in validation report)
15	GFAA Post Digestion Spike Recoveries
16	ICP Serial Dilution % Difference
17	ICP Interference Check Standard Recovery
18	Trip Blank Contamination
19	Internal Standard Performance (e.g., area, retention time, recovery)
20	Linear Range Exceeded
21	Potential False Positives
22	Elevated Detection Limit Due to Interference (i.e., laboratory, chemical and/or matrix)

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS
 (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C ±2°	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	<u>Water:</u> J(+)/UJ(-) if ext. > 7 and < 21 days J(+)/R(-) if ext > 21 days (EcoChem PJ) <u>Solids/Wastes:</u> J(+)/UJ(-) if ext. > 14 and < 42 days J(+)/R(-) if ext. > 42 days (EcoChem PJ) J(+)/UJ(-) if analysis >40 days	1
Tuning	DFTPP Beginning of each 12 hour period Method acceptance criteria	R(+/-) all analytes in all samples associated with the tune	5A
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5A
	%RSD < 30%	(EcoChem PJ, see TM-06) J(+) if %RSD > 30%	5A
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5B
	%D <25%	(EcoChem PJ, see TM-06) If > +/-90%: J+/R- If -90% to -26%: J+ (high bias) If 26% to 90%: J+/UJ- (low bias)	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample (+) result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)	7
		U(+) if sample (+) result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)	7
	No TICs present	R(+) TICs using 10X rule	7
Field Blanks (Not Required)	No results > CRQL	Apply 5X/10X rule; U(+) < action level	6

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS
 (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J(+) in parent sample if RPD > CL	9
LCS low conc. H2O SVOA	One per lab batch Within method control limits	J(+) assoc. cmpd if > UCL J(+)/R(-) assoc. cmpd if < LCL J(+)/R(-) all cmpds if half are < LCL	10
LCS regular SVOA (H2O & solid)	One per lab batch Lab or method control limits	J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) if %R < 10% (EcoChem PJ)	10
LCS/LCSD (if required)	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. cmpd. in all samples	9
Surrogates	Minimum of 3 acid and 3 base/neutral compounds Use method acceptance criteria	Do not qualify if only 1 acid and/or 1 B/N surrogate is out unless < 10% J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) if %R < 10%	13
Internal Standards	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J(+) if > 200% J(+)/UJ(-) if < 50% J(+)/R(-) if < 25% RT > 30 seconds, narrate and Notify PM	19
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD < 50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD < 35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R(+) common laboratory contaminants See Technical Director for ID issues	4
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers	14 21 (false +)

EcoChem Validation Guidelines for Pesticides/PCBs by GC/ECD
 (Based on Organic NFG 1999 & EPA SW-846 Method 8081/8082)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C ±2°	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	J(+)/UJ(-) if ext/analyzed > HT J(+)/R(-) if ext/analyzed > 3X HT (EcoChem PJ)	1
Resolution Check	Beginning of ICAL Sequence Within RTW Resolution >90%	Narrate (Use Professional Judgement to qualify)	14
Instrument Performance (Breakdown)	DDT Breakdown: < 20% Endrin Breakdown: <20% Combined Breakdown: <30% Compounds within RTW	J(+) DDT NJ(+) DDD and/or DDE R(-) DDT - If (+) for either DDE or DDD J(+) Endrin NJ(+) EK and/or EA R(-) Endrin - If (+) for either EK or EA	5A
Retention Times	Surrogates: TCX (+/- 0.05); DCB (+/- 0.10) Target compounds: elute before heptachlor epoxide (+/- 0.05) elute after heptachlor epoxide (+/- 0.07)	NJ(+)/R(-) results for analytes with RT shifts For full DV, use PJ based on examination of raw data	5B
Initial Calibration	Pesticides: Low=CRQL, Mid=4X, High=16X Multiresponse - one point Calibration %RSD<20% %RSD<30% for surr; two comp. may exceed if <30% Resolution in Mix A and Mix B >90%	J(+)/UJ(-)	5A
Continuing Calibration	Alternating PEM standard and INDA/INDB standards every 12 hours (each preceded by an inst. Blank) %D < 25% Resolution >90% in IND mixes; 100% for PEM	J(+)/UJ(-) J(+)/R(-) if %D > 90% PJ for resolution	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample result is < CRQL and < 5X rule (raise sample value to CRQL) ----- U(+) if sample result is > or equal to CRQL and < 5X rule (at reported sample value)	7
Instrument Blanks	Analyzed at the beginning of every 12 hour sequence No analyte > 1/2 CRQL	Same as Method Blank	7
Field Blanks	Not addressed by NFG No results > CRQL	Apply 5X rule; U(+) < action level	6

EcoChem Validation Guidelines for Pesticides/PCBs by GC/ECD
 (Based on Organic NFG 1999 & EPA SW-846 Method 8081/8082)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One set per matrix per batch Method Acceptance Criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One set per matrix per batch Method Acceptance Criteria	J(+) in parent sample if RPD > CL	9
LCS	One per SDG Method Acceptance Criteria	J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) using PJ if %R <<LCL (< 10%)	10
LCS/LCSD (if required)	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. cmpd. in all samples	9
Surrogates	TCX and DCB added to every sample %R = 30-150%	J(+)/UJ(-) if both %R = 10 - 60% J(+) if both >150% J(+)/R(-) if any %R <10%	13
Quantitation/ Identification	Quantitated using ICAL calibration factor (CF) RPD between columns <40%	J(+) if RPD = 40 - 60% NJ(+) if RPD >60% EcoChem PJ - See TM-08	3
Two analyses for one sample	Report only one result per analyte	"DNR" results that should not be used to avoid reporting two results for one sample	11
Sample Clean-up	GPC required for soil samples Florisil required for all samples Sulfur is optional Clean-up standard check %R within CLP limits	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL	14
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate (Qualify if required by project QAPP)	9

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
 (Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler/Storage Temperature	Waters/Solids < 4°C Tissues <-10°C	EcoChem PJ, see TM-05	1
Holding Time	Extraction - Water: 30 days from collection <i>Note:</i> Under CWA, SDWA, and RCRA the HT for H2O is 7 days* Extraction - Soil: 30 days from collection Analysis: 40 days from extraction	J(+)/UJ(-) if ext > 30 days J(+)/UJ(-) if analysis > 40 Days EcoChem PJ, see TM-05	1
Mass Resolution	>=10,000 resolving power at m/z 304.9824 Exact mass of m/z 380.9760 w/in 5 ppm of theoretical value (380.97410 to 380.97790) . Analyzed prior to ICAL and at the start and end of each 12 hr. shift	R(+/-) if not met	14
Window Defining Mix and Column Performance Mix	Window defining mixture/Isomer specificity std run before ICAL and CCAL Valley < 25% (valley = (x/y)*100%) x = ht. of TCDD y = baseline to bottom of valley For all isomers eluting near 2378-TCDD/TCDF isomers (TCDD only for 8290)	J(+) if valley > 25%	5A (ICAL) 5B (CCAL)
Initial Calibration	Minimum of five standards %RSD < 20% for native compounds %RSD <30% for labeled compounds (%RSD <35% for labeled compounds under 1613b)	J(+) natives if %RSD > 20%	5A
	Abs. RT of ¹³ C ₁₂ -1234-TCDD >25 min on DB5 >15 min on DB-225	EcoChem PJ, see TM-05	
	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	EcoChem PJ, see TM-05	
	S/N ratio > 10 for all native and labeled compounds in CS1 std.	If <10, elevate Det. Limit or R(-)	

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
 (Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Continuing Calibration	Analyzed at the start and end of each 12 hour shift. %D +/-20% for native compounds %D +/-30% for labeled compounds (Must meet limits in Table 6, Method 1613B) (If %Ds in the closing CCAL are w/in 25%/35% the avg RF from the two CCAL may be used to calculate samples per Method 8290, Section 8.3.2.4)	Do not qualify labeled compounds. Narrate in report for labeled compound %D outliers. For native compound %D outliers: 8290: J(+)/UJ(-) if %D = 20% - 75% J(+)/R(-) if %D > 75% 1613: J(+)/UJ(-) if %D is outside Table 6 limits J(+)/R(-) if %D is +/- 75% of Table 6 limit	5B
	Abs. RT of ¹³ C ₁₂ -1234-TCDD and ¹³ C ₁₂ -123789-HxCDD +/- 15 sec of ICAL.	EcoChem PJ, see ICAL section of TM-05	
	RRT of all other compounds must meet Table 2 of 1613B.	EcoChem PJ, see TM-05	
	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	EcoChem PJ, see TM-05	
	S/N ratio > 10	If <10, elevate Det. Limit or R(-)	
Method Blank	One per matrix per batch No positive results	If sample result <5X action level, qualify U at reported value.	7
Field Blanks (Not Required)	No positive results	If sample result <5X action level, qualify U at reported value.	6
LCS / OPR	Concentrations must meet limits in Table 6, Method 1613B or lab limits.	J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) using PJ if %R <<LCL (< 10%)	10
MS/MSD (recovery)	May not analyze MS/MSD %R should meet lab limits.	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	May not analyze MS/MSD RPD < 20%	J(+) in parent sample if RPD > CL	9

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
 (Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Lab Duplicate	RPD <25% if present.	J(+)/UJ(-) if outside limits	9
Labeled Compounds / Internal Standards	<i>Method 8290</i> : %R = 40% - 135% in all samples	J(+)/UJ(-) if %R = 10% to LCL J(+) if %R > UCL J(+)/R(-) if %R < 10%	13
	<i>Method 1613B</i> : %R must meet limits specified in Table 7, Method 1613		
Quantitation/ Identification	Ions for analyte, IS, and rec. std. must max w/in 2 sec. S/N >2.5 IA ratios meet limits in Table 9 of 1613B or Table 8 of 8290 RRTs w/in limits in Table 2 of 1613B	If RT criteria not met, use PJ (see TM-05) If S/N criteria not met, J(+). if unlabelled ion abundance not met, change to EMPC If labelled ion abundance not met, J(+).	21
EMPC (estimated maximum possible concentration)	If quantitation identification criteria are not met, laboratory should report an EMPC value.	If laboratory correctly reported an EMPC value, qualify with U to indicate that the value is a detection limit.	14
Interferences	PCDF interferences from PCDE	If both detected, change PCDF result to EMPC	14
Second Column Confirmation	All 2378-TCDF hits must be confirmed on a DB-225 (or equiv) column. All QC specs in this table must be met for the confirmation analysis.	Report lower of the two values. If not performed use PJ (see TM-05).	3
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
Two analyses for one sample	Report only one result per analyte	"DNR" results that should not be used	11

EcoChem Validation Guidelines for Metals Analysis by ICP
 (Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration Tissues: Frozen	EcoChem Professional Judgment - no qualification based on cooler temperature outliers J(+)/UJ(-) if pH preservation requirements are not met	1
Holding Time	180 days from date sampled Frozen tissues - HT extended to 2 years	J(+)/UJ(-) if holding time exceeded	1
Initial Calibration	Blank + minimum 1 standard If more than 1 standard, r > 0.995	J(+)/UJ(-) if r < 0.995 (multi point cal)	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±10% of true value	J(+)/UJ(-) if %R 75-89% J(+) if %R = 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run %R within ±10% of true value	J(+)/UJ(-) if %R = 75-89% J(+) if %R 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5B
Initial and Continuing Calibration Blank (ICB/CCB)	After each ICV and CCV every ten samples and end of run blank < IDL (MDL)	Action level is 5x absolute value of blank conc. For (+) blanks, U(+) results < action level For (-) blanks, J(+)/UJ(-) results < action level (Refer to TM-02 for additional information)	7
Reporting Limit Standard	2x RL analyzed beginning of run Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Sb, Pb, Tl)	R(-)/J(+) < 2x RL if %R < 50% (< 30% Sb, Pb, Tl) J(+) < 2x RL, UJ(-) if %R 50-69% (30-49% Sb, Pb, Tl) J(+) < 2x RL if %R 130-180% (150-200% Sb, Pb, Tl) R(+) < 2x RL if %R > 180% (200% Sb, Pb, Tl)	14
Interference Check Samples (ICSA/ICSAB)	ICSAB %R 80 - 120% for all spiked elements ICSA < MDL for all unspiked elements except: K, Na	For samples with Al, Ca, Fe, or Mg > ICS levels R(+/-) if %R < 50% J(+) if %R > 120% J(+)/UJ(-) if %R = 50 to 79% Use Professional Judgment for ICSA to determine if bias is present see TM-09 for additional details	17
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U(+) results < action level	7

EcoChem Validation Guidelines for Metals Analysis by ICP
 (Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Laboratory Control Sample (LCS)	One per matrix per batch		10
	Blank Spike: %R within 80-120%	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R > 120%	
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J(+)/UJ(-) if < LCL, J(+) if > UCL	
Matrix Spikes	One per matrix per batch 75-125% for samples less than 4x spike level	J(+) if %R > 125% J(+)/UJ(-) if %R < 75% J(+)/R(-) if %R < 30% or J(+)/UJ(-) if Post Spike %R 75-125% Qualify all samples in batch	8
Post-digestion Spike	If Matrix Spike is outside 75-125%, spike at twice the sample conc.	No qualifiers assigned based on this element	
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples > RL and < 5x RL (Diff < 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL (2x RL for solids) qualify all samples in batch	9
Serial Dilution	5x dilution one per matrix %D < 10% for original sample conc. > 50x MDL	J(+)/UJ(-) if %D > 10% qualify all samples in batch	16
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9
Linear Range	Sample concentrations must fall within range	J values over range	20

EcoChem Validation Guidelines for Metals Analysis by ICP-MS
 (Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45µm filter & preserve after filtration	EcoChem Professional Judgment - no qualification based on cooler temperature outliers J(+)/UJ(-) if pH preservation requirements are not met	1
Holding Time	180 days from date sampled Frozen tissues - HT extended to 2 years	J(+)/UJ(-) if holding time exceeded	1
Tune	Prior to ICAL monitoring compounds analyzed 5 times with Std Dev. ≤ 5% mass calibration <0.1 amu from True Value Resolution < 0.9 AMU @ 10% peak height or <0.75 amu @ 5% peak height	Use Professional Judgment to evaluate tune J(+)/UJ(-) if tune criteria not met	5A
Initial Calibration	Blank + minimum 1 standard If more than 1 standard, r>0.995	J(+)/UJ(-) if r<0.995 (for multi point cal)	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±10% of true value	J(+)/UJ(-) if %R 75-89% J(+) if %R = 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run ±10% of true value	J(+)/UJ(-) if %R = 75-89% J(+) if %R 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5B
Initial and Continuing Calibration Blanks (ICB/CCB)	After each ICV and CCV every ten samples and end of run blank < IDL (MDL)	Action level is 5x absolute value of blank conc. For (+) blanks, U(+) results < action level For (-) blanks, J(+)/UJ(-) results < action level refer to TM-02 for additional details	7
Reporting Limit Standard (CRI)	2x RL analyzed beginning of run Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Co,Mn, Zn)	R(-),(+) < 2x RL if %R < 50% (< 30% Co,Mn, Zn) J(+) < 2x RL, UJ(-) if %R 50-69% (30%-49% Co,Mn, Zn) J(+) < 2x RL if %R 130%-180% (150%-200% Co,Mn, Zn) R(+) < 2x RL if %R > 180% (200% Co, Mn, Zn)	14
Interference Check Samples (ICSA/ICSAB)	Required by SW 6020, but not 200.8 ICSAB %R 80% - 120% for all spiked elements ICSA < IDL (MDL) for all unspiked elements	For samples with Al, Ca, Fe, or Mg > ICS levels R(+/-) if %R < 50% J(+) if %R >120% J(+)/UJ(-) if %R = 50% to 79% Use Professional Judgment for ICSA to determine if bias is present see TM-09 for additional details	17
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U(+) results < action level	7
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 80%-120%	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J(+)/UJ(-) if < LCL, J(+) if > UCL	
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	One per matrix per batch 75-125% for samples where results do not exceed 4x spike level	J(+) if %R>125% J(+)/UJ(-) if %R <75% J(+)/R(-) if %R<30% or J(+)/UJ(-) if Post Spike %R 75%-125% Qualify all samples in batch	8
Post-digestion Spike	If Matrix Spike is outside 75-125%, Spike parent sample at 2x the sample conc.	No qualifiers assigned based on this element	

EcoChem Validation Guidelines for Metals Analysis by ICP-MS
 (Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples > RL and < 5 x RL (Diff < 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9
Serial Dilution	5x dilution one per matrix %D < 10% for original sample values > 50x MDL	J(+)/UJ(-) if %D >10% All samples in batch	16
Internal Standards	Every sample SW6020: 60%-125% of cal blank IS 200.8: 30%-120% of cal blank IS	J (+)/UJ (-) all analytes associated with IS outlier	19
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < AL in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9
Linear Range	Sample concentrations must fall within range	J values over range	20

EcoChem Validation Guidelines for Mercury Analysis by CVAA
 (Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	EcoChem Professional Judgment - no qualification based on cooler temperature outliers J(+)/UJ(-) if pH preservation requirements are not met	1
Holding Time	28 days from date sampled Frozen tissues: HT extended to 6 months	J(+)/UJ(-) if holding time exceeded	1
Initial Calibration	Blank + 4 standards, one at RL r > 0.995	J(+)/UJ(-) if r<0.995	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±20% of true value	J(+)/UJ(-) if %R = 65%-79% J(+) if %R = 121-135% R(+/-) if %R < 65% R(+) if %R > 135%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run %R within ±20% of true value	J(+)/UJ(-) if %R = 65%-79% J(+) if %R = 121-135% R(+/-) if %R < 65% R(+) if %R > 135%	5B
Initial and Continuing Calibration Blanks (ICB/CCB)	after each ICV and CCV every ten samples and end of run blank < IDL (MDL)	Action level is 5x absolute value of blank conc. For (+) blanks, U(+) results < action level For (-) blanks, J(+)/UJ(-) results < action level refer to TM-02 for additional details	7
Reporting Limit Standard (CRA)	conc at RL - analyzed beginning of run %R = 70-130%	R(-),(+) < 2xRL if %R < 50% J(+)<2x RL, UJ(-) if %R 50-69% J(+) < 2x RL if %R 130-180% R(+)<2x RL if %R>180%	14
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U(+) results < action level	7
Laboratory Control Sample (LCS)	One per matrix per batch		10
	Blank Spike: %R within 80-120%	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R > 120%	
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J(+)/UJ(-) if < LCL, J(+) if > UCL	
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One per matrix per batch 5% frequency 75-125% for samples less than 4x spike level	J(+) if %R>125% J(+)/UJ(-) if %R < 75% J(+)/R(-) if %R<30% all samples in batch	8
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples > RL and < 5x RL (Diff < 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9

DATA VALIDATION CRITERIA

Table No.: NFG-HG
 Revision No.: draft
 Last Rev. Date: draft
 Page: 2 of 2

EcoChem Validation Guidelines for Mercury Analysis by CVAA (Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5x RL: Water: Diff < RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9

DATA VALIDATION CRITERIA

Table No.: Eco-Conv
 Revision No.: 0
 Last Rev. Date: FINAL DRAFT
 Page: 1 of 2

EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler Temperature 4°C ±2°C Preservation: Method Specific	Use Professional Judgment to qualify based to qualify for cooler temp outliers J(+)/UJ(-) if preservation requirements not met	1
Holding Time	Method Specific	Professional Judgment J(+)/UJ(-) if holding time exceeded J(+)/R(-) if HT exceeded by > 3X	1
Initial Calibration	Method specific r>0.995	Use professional judgment J(+)/UJ(-) for r < 0.995	5A
Initial Calibration Verification (ICV)	Where applicable to method Independent source analyzed immediately after calibration %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5A
Continuing Cal Verification (CCV)	Where applicable to method Every ten samples, immed. following ICV/ICB and end of run %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5B
Initial and Continuing Cal Blanks (ICB/CCB)	Where applicable to method After each ICV and CCV every ten samples and end of run blank < MDL	Action level is 5x absolute value of blank conc. For (+) blanks, U(+) results < action level For (-) blanks, J(+)/UJ(-) results < action level refer to TM-02 for additional details	7
Method Blank	One per matrix per batch (not to exceed 20 samples) blank < MDL	Action level is 5x absolute value of blank conc. For (+) blk value, U(+) results < action level For (-) blk value, J(+)/UJ(-) results < action level	7
Laboratory Control Sample	Waters: One per matrix per batch %R (80-120%)	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	Soils: One per matrix per batch Result within manufacturer's certified acceptance range	J(+)/UJ(-) if < LCL, J(+) if > UCL	10
Matrix Spike	One per matrix per batch; 5% frequency 75-125% for samples less than 4 x spike level	J(+) if %R > 125% or < 75% UJ(-) if %R = 30-74% R(+/-) results < IDL if %R < 30%	8
Laboratory Duplicate	One per matrix per batch RPD <20% for samples > 5x RL Diff <RL for samples >RL and < 5 x RL (may use RPD < 35%, Diff < 2X RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9

DATA VALIDATION CRITERIA

Table No.: Eco-Conv
 Revision No.: 0
 Last Rev. Date: FINAL DRAFT
 Page: 2 of 2

EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Field Blank	blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5X RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2X RL	J(+)/UJ(-) in parent samples only	9



EcoChem, INC.
Environmental Data Quality

APPENDIX B

QUALIFIED DATA SUMMARY TABLE

**Qualified Data Summary Table
SAIC - Fidalgo Bay**

SDG	Sample_ID	Lab ID	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
K0805642	A1R1-manila	K0805642-002	Cadmium	1.74	mg/Kg		J	16
K0805642	A1R2-manila	K0805642-001	Cadmium	1.89	mg/Kg		J	16
K0805642	A1R3-manila	K0805642-003	Cadmium	2.37	mg/Kg		J	16
K0805642	A2R1-manila	K0805642-006	Cadmium	0.713	mg/Kg		J	16
K0805642	A2R1-RR-other	K0805642-017	Cadmium	9.5	mg/Kg		J	16
K0805642	A2R1-RR-tissue	K0805642-018	Cadmium	2.06	mg/Kg		J	16
K0805642	A2R1-SF	K0805642-014	Cadmium	0.386	mg/Kg		J	16
K0805642	A2R2-bentnose	K0805642-004	Cadmium	1.82	mg/Kg		J	16
K0805642	A2R2-DC-tissue	K0805642-020	Cadmium	0.48	mg/Kg		J	16
K0805642	A2R2-RR-hepato	K0805642-019	Cadmium	0.866	mg/Kg		J	16
K0805642	A2R2-SF	K0805642-015	Cadmium	0.413	mg/Kg		J	16
K0805642	A2R3-bentnose	K0805642-005	Cadmium	0.649	mg/Kg		J	16
K0805642	A2R3-SF	K0805642-016	Cadmium	0.418	mg/Kg		J	16
K0805642	A3R1-ES	K0805642-011	Cadmium	0.471	mg/Kg		J	16
K0805642	A3R1-horse	K0805642-007	Cadmium	0.785	mg/Kg		J	16
K0805642	A3R2-SF	K0805642-012	Cadmium	0.464	mg/Kg		J	16
K0805642	A3R3-manila	K0805642-008	Cadmium	1.45	mg/Kg		J	16
K0805642	A3R3-SF	K0805642-013	Cadmium	0.457	mg/Kg		J	16
K0805642	A4R2-bentnose	K0805642-009	Cadmium	0.732	mg/Kg		J	16
K0805642	A4R3-bentnose	K0805642-010	Cadmium	0.637	mg/Kg		J	16
K0805642	A3R2-DC-tissue	K0805642-030	Chromium	0.29	mg/Kg		U	7
K0805642	A4R1-RR-tissue	K0805642-036	Chromium	0.32	mg/Kg		U	7
K0805642	A4R2-RR-hepato	K0805642-034	Chromium	0.33	mg/Kg		U	7
K0805642	A1R1-manila	K0805642-002	Copper	12.3	mg/Kg		J	16
K0805642	A1R2-manila	K0805642-001	Copper	12	mg/Kg		J	16
K0805642	A1R3-manila	K0805642-003	Copper	8.34	mg/Kg		J	16
K0805642	A2R1-manila	K0805642-006	Copper	30.3	mg/Kg		J	16
K0805642	A2R1-RR-other	K0805642-017	Copper	83.3	mg/Kg		J	16
K0805642	A2R1-RR-tissue	K0805642-018	Copper	30.8	mg/Kg		J	16
K0805642	A2R1-SF	K0805642-014	Copper	4.72	mg/Kg		J	16
K0805642	A2R2-bentnose	K0805642-004	Copper	11.8	mg/Kg		J	16
K0805642	A2R2-DC-tissue	K0805642-020	Copper	55.8	mg/Kg		J	16
K0805642	A2R2-RR-hepato	K0805642-019	Copper	145	mg/Kg		J	16
K0805642	A2R2-SF	K0805642-015	Copper	4.45	mg/Kg		J	16
K0805642	A2R3-bentnose	K0805642-005	Copper	22.9	mg/Kg		J	16
K0805642	A2R3-SF	K0805642-016	Copper	13.1	mg/Kg		J	16
K0805642	A3R1-ES	K0805642-011	Copper	7.42	mg/Kg		J	16
K0805642	A3R1-horse	K0805642-007	Copper	27.1	mg/Kg		J	16
K0805642	A3R2-SF	K0805642-012	Copper	7.15	mg/Kg		J	16
K0805642	A3R3-manila	K0805642-008	Copper	9.87	mg/Kg		J	16
K0805642	A3R3-SF	K0805642-013	Copper	3.3	mg/Kg		J	16
K0805642	A4R2-bentnose	K0805642-009	Copper	75.9	mg/Kg		J	16
K0805642	A4R3-bentnose	K0805642-010	Copper	61.6	mg/Kg		J	16
K0805642	A2R2-DC-other	K0805642-021	Silver	1.7	mg/Kg	N	J	8
K0805642	A2R3-DC-hepato	K0805642-022	Silver	2.4	mg/Kg	N	J	8
K0805642	A2R3-DC-other	K0805642-024	Silver	1.4	mg/Kg	N	J	8
K0805642	A2R3-DC-tissue	K0805642-023	Silver	0.667	mg/Kg	N	J	8
K0805642	A3R1-DC-hepato	K0805642-026	Silver	2.2	mg/Kg	N	J	8
K0805642	A3R1-DC-other	K0805642-025	Silver	1.3	mg/Kg	N	J	8
K0805642	A3R1-DC-tissue	K0805642-027	Silver	0.714	mg/Kg	N	J	8
K0805642	A3R1-ES	K0805642-011	Silver	0.015	mg/Kg	B	U	7

**Qualified Data Summary Table
SAIC - Fidalgo Bay**

SDG	Sample_ID	Lab ID	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
K0805642	A3R2-DC-hepato	K0805642-028	Silver	2.1	mg/Kg	N	J	8
K0805642	A3R2-DC-other	K0805642-029	Silver	1.9	mg/Kg	N	J	8
K0805642	A3R2-DC-tissue	K0805642-030	Silver	0.708	mg/Kg	N	J	8
K0805642	A3R2-SF	K0805642-012	Silver	0.014	mg/Kg	B	U	7
K0805642	A4R1-bentnose	K0805642-037	Silver	0.862	mg/Kg	N	J	8
K0805642	A4R1-RR-hepato	K0805642-034	Silver	1.3	mg/Kg	N	J	8
K0805642	A4R1-RR-other	K0805642-035	Silver	1.2	mg/Kg	N	J	8
K0805642	A4R1-RR-tissue	K0805642-036	Silver	0.471	mg/Kg	N	J	8
K0805642	A4R2-RR-hepato	K0805642-034	Silver	2	mg/Kg	N	J	8
K0805642	A4R2-RR-other	K0805642-035	Silver	1.2	mg/Kg	N	J	8
K0805642	A4R2-RR-tissue	K0805642-036	Silver	0.827	mg/Kg	N	J	8
K0805642	A1R1-manila	K0805642-002	Zinc	71.1	mg/Kg		J	16
K0805642	A1R2-manila	K0805642-001	Zinc	83.1	mg/Kg		J	16
K0805642	A1R3-manila	K0805642-003	Zinc	70.5	mg/Kg		J	16
K0805642	A2R1-manila	K0805642-006	Zinc	62.7	mg/Kg		J	16
K0805642	A2R1-RR-other	K0805642-017	Zinc	167	mg/Kg		J	16
K0805642	A2R1-RR-tissue	K0805642-018	Zinc	223	mg/Kg		J	16
K0805642	A2R1-SF	K0805642-014	Zinc	48.3	mg/Kg		J	16
K0805642	A2R2-bentnose	K0805642-004	Zinc	79.1	mg/Kg		J	16
K0805642	A2R2-DC-other	K0805642-021	Zinc	134	mg/Kg		J	16
K0805642	A2R2-DC-tissue	K0805642-020	Zinc	216	mg/Kg		J	16
K0805642	A2R2-RR-hepato	K0805642-019	Zinc	77.7	mg/Kg		J	16
K0805642	A2R2-SF	K0805642-015	Zinc	47.2	mg/Kg		J	16
K0805642	A2R3-bentnose	K0805642-005	Zinc	72.4	mg/Kg		J	16
K0805642	A2R3-DC-hepato	K0805642-022	Zinc	85.8	mg/Kg		J	16
K0805642	A2R3-DC-other	K0805642-024	Zinc	120	mg/Kg		J	16
K0805642	A2R3-DC-tissue	K0805642-023	Zinc	201	mg/Kg		J	16
K0805642	A2R3-SF	K0805642-016	Zinc	48.9	mg/Kg		J	16
K0805642	A3R1-DC-hepato	K0805642-026	Zinc	108	mg/Kg		J	16
K0805642	A3R1-DC-other	K0805642-025	Zinc	140	mg/Kg		J	16
K0805642	A3R1-DC-tissue	K0805642-027	Zinc	217	mg/Kg		J	16
K0805642	A3R1-ES	K0805642-011	Zinc	39.7	mg/Kg		J	16
K0805642	A3R1-horse	K0805642-007	Zinc	102	mg/Kg		J	16
K0805642	A3R2-DC-hepato	K0805642-028	Zinc	86.3	mg/Kg		J	16
K0805642	A3R2-DC-other	K0805642-029	Zinc	127	mg/Kg		J	16
K0805642	A3R2-DC-tissue	K0805642-030	Zinc	203	mg/Kg		J	16
K0805642	A3R2-SF	K0805642-012	Zinc	47.2	mg/Kg		J	16
K0805642	A3R3-manila	K0805642-008	Zinc	65	mg/Kg		J	16
K0805642	A3R3-SF	K0805642-013	Zinc	44.4	mg/Kg		J	16
K0805642	A4R1-bentnose	K0805642-037	Zinc	235	mg/Kg		J	16
K0805642	A4R1-RR-hepato	K0805642-034	Zinc	210	mg/Kg		J	16
K0805642	A4R1-RR-other	K0805642-035	Zinc	183	mg/Kg		J	16
K0805642	A4R1-RR-tissue	K0805642-036	Zinc	247	mg/Kg		J	16
K0805642	A4R2-bentnose	K0805642-009	Zinc	88	mg/Kg		J	16
K0805642	A4R2-RR-hepato	K0805642-034	Zinc	321	mg/Kg		J	16
K0805642	A4R2-RR-other	K0805642-035	Zinc	189	mg/Kg		J	16
K0805642	A4R2-RR-tissue	K0805642-036	Zinc	309	mg/Kg		J	16
K0805642	A4R3-bentnose	K0805642-010	Zinc	140	mg/Kg		J	16
K0806166	FB-A1-14	K0806166-001	2,4'-DDT	0.15	ug/Kg	JP	J	3
K0806166	FBA4-29-S	K0806166-017	4,4'-DDD	0.81	ug/Kg	JP	J	3
K0806166	FBA4-06-S	K0806166-011	4,4'-DDE	0.43	ug/Kg	JP	NJ	3

**Qualified Data Summary Table
SAIC - Fidalgo Bay**

SDG	Sample_ID	Lab ID	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
K0806166	FBA3-03-S	K0806166-010	4,4'-DDT	0.65	ug/Kg	JP	NJ	3
K0806166	FBA4-29-S	K0806166-017	4,4'-DDT	0.7	ug/Kg	JP	NJ	3
K0806166	FBA3-03-S	K0806166-010	Alpha-BHC	0.56	ug/Kg	JP	J	3
K0806166	FBA3-22b-S	K0806166-015	Alpha-BHC	1.4	ug/Kg	P	NJ	3
K0806166	FBA4-30-S	K0806166-016	Alpha-BHC	0.66	ug/Kg	JP	J	3
K0806166	FB-A1-09	K0806166-003	Ammonia (NH3) as Nitrogen(N)	13.4	mg/Kg		J	1
K0806166	FB-A1-14	K0806166-001	Ammonia (NH3) as Nitrogen(N)	19.1	mg/Kg		J	1
K0806166	FB-A1-18	K0806166-002	Ammonia (NH3) as Nitrogen(N)	18.8	mg/Kg		J	1
K0806166	FBA2-30-S	K0806166-004	Ammonia (NH3) as Nitrogen(N)	26	mg/Kg		J	1
K0806166	FBA2-40-S	K0806166-005	Ammonia (NH3) as Nitrogen(N)	18.8	mg/Kg		J	1
K0806166	FBA2-56-S	K0806166-006	Ammonia (NH3) as Nitrogen(N)	18.1	mg/Kg		J	1
K0806166	FBA3-03-S	K0806166-019	Ammonia (NH3) as Nitrogen(N)	30.9	mg/Kg		J	1
K0806166	FBA3-06-S	K0806166-020	Ammonia (NH3) as Nitrogen(N)	22.9	mg/Kg		J	1
K0806166	FBA3-18-S	K0806166-021	Ammonia (NH3) as Nitrogen(N)	79.1	mg/Kg		J	1
K0806166	FBA3-22b-S	K0806166-015	Ammonia (NH3) as Nitrogen(N)	31.7	mg/Kg		J	1
K0806166	FBA3-36-S	K0806166-007	Ammonia (NH3) as Nitrogen(N)	20.8	mg/Kg		J	1
K0806166	FBA3-37-S	K0806166-008	Ammonia (NH3) as Nitrogen(N)	47.9	mg/Kg		J	1
K0806166	FBA3-42-S	K0806166-009	Ammonia (NH3) as Nitrogen(N)	35.8	mg/Kg		J	1
K0806166	FBA4-03-S	K0806166-010	Ammonia (NH3) as Nitrogen(N)	20.5	mg/Kg		J	1
K0806166	FBA4-06-S	K0806166-011	Ammonia (NH3) as Nitrogen(N)	17.9	mg/Kg		J	1
K0806166	FBA4-08-S	K0806166-012	Ammonia (NH3) as Nitrogen(N)	14.5	mg/Kg		J	1
K0806166	FBA4-11-S	K0806166-013	Ammonia (NH3) as Nitrogen(N)	25.7	mg/Kg		J	1
K0806166	FBA4-14-S	K0806166-014	Ammonia (NH3) as Nitrogen(N)	13.6	mg/Kg		J	1
K0806166	FBA4-28-S	K0806166-018	Ammonia (NH3) as Nitrogen(N)	13.7	mg/Kg		J	1
K0806166	FBA4-29-S	K0806166-017	Ammonia (NH3) as Nitrogen(N)	24.1	mg/Kg		J	1
K0806166	FBA4-30-S	K0806166-016	Ammonia (NH3) as Nitrogen(N)	18.5	mg/Kg		J	1
K0806166	FBA3-06-S	K0806166-020	Arsenic	3.43	mg/Kg		J	16
K0806166	FBA3-18-S	K0806166-021	Arsenic	6.06	mg/Kg		J	16
K0806166	FBA4-28-S	K0806166-018	Arsenic	3.98	mg/Kg		J	16
K0806166	FBA4-29-S	K0806166-017	Arsenic	3.86	mg/Kg		J	16
K0806166	FBA3-03-S	K0806166-019	Benzo(ghi)perylene	13	ug/Kg		J	9
K0806166	FBA3-06-S	K0806166-020	Benzo(ghi)perylene	8.4	ug/Kg	T	J	9
K0806166	FBA3-18-S	K0806166-021	Benzo(ghi)perylene	7.7	ug/Kg	T	J	9
K0806166	FBA4-28-S	K0806166-018	Benzo(ghi)perylene	2.1	ug/Kg	T	J	9
K0806166	FBA4-29-S	K0806166-017	Benzo(ghi)perylene	2.7	ug/Kg	T	J	9
K0806166	FBA4-30-S	K0806166-016	Benzo(ghi)perylene	33	ug/Kg		J	9
K0806166	FB-A1-09	K0806166-003	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FB-A1-14	K0806166-001	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FB-A1-18	K0806166-002	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FBA2-30-S	K0806166-004	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FBA2-40-S	K0806166-005	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FBA2-56-S	K0806166-006	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FBA3-03-S	K0806166-019	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FBA3-06-S	K0806166-020	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FBA3-18-S	K0806166-021	Benzoic Acid	210	ug/Kg	U	R	10
K0806166	FBA3-22b-S	K0806166-015	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FBA3-36-S	K0806166-007	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FBA3-37-S	K0806166-008	Benzoic Acid	210	ug/Kg	U	R	10
K0806166	FBA3-42-S	K0806166-009	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FBA4-03-S	K0806166-010	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FBA4-06-S	K0806166-011	Benzoic Acid	200	ug/Kg	U	R	10

**Qualified Data Summary Table
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SDG	Sample_ID	Lab ID	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
K0806166	FBA4-08-S	K0806166-012	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FBA4-11-S	K0806166-013	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FBA4-14-S	K0806166-014	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FBA4-28-S	K0806166-018	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FBA4-29-S	K0806166-017	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FBA4-30-S	K0806166-016	Benzoic Acid	200	ug/Kg	U	R	10
K0806166	FBA3-06-S	K0806166-020	Chromium	11	mg/Kg		J	16
K0806166	FBA3-18-S	K0806166-021	Chromium	28.2	mg/Kg		J	16
K0806166	FBA4-28-S	K0806166-018	Chromium	16	mg/Kg		J	16
K0806166	FBA4-29-S	K0806166-017	Chromium	17	mg/Kg		J	16
K0806166	FBA3-06-S	K0806166-020	Copper	26.9	mg/Kg		J	16
K0806166	FBA3-18-S	K0806166-021	Copper	22.5	mg/Kg		J	16
K0806166	FBA4-28-S	K0806166-018	Copper	12.1	mg/Kg		J	16
K0806166	FBA4-29-S	K0806166-017	Copper	8.06	mg/Kg		J	16
K0806166	FBA3-06-S	K0806166-020	Hexachlorobenzene	1.1	ug/Kg		J	12
K0806166	FBA4-28-S	K0806166-018	Hexachlorobenzene	0.27	ug/Kg	JP	J	3,12
K0806166	FBA4-29-S	K0806166-017	Hexachlorobenzene	0.87	ug/Kg	T	J	12
K0806166	FB-A1-09	K0806166-003	Lead	6.32	mg/Kg	*	J	9
K0806166	FB-A1-14	K0806166-001	Lead	7.66	mg/Kg	*	J	9
K0806166	FB-A1-18	K0806166-002	Lead	7.28	mg/Kg	*	J	9
K0806166	FBA2-30-S	K0806166-004	Lead	7.4	mg/Kg	*	J	9
K0806166	FBA2-40-S	K0806166-005	Lead	4.73	mg/Kg	*	J	9
K0806166	FBA2-56-S	K0806166-006	Lead	3.9	mg/Kg	*	J	9
K0806166	FBA3-22b-S	K0806166-015	Lead	3.93	mg/Kg	*	J	9
K0806166	FBA3-36-S	K0806166-007	Lead	4.9	mg/Kg	*	J	9
K0806166	FBA3-37-S	K0806166-008	Lead	5.75	mg/Kg	*	J	9
K0806166	FBA3-42-S	K0806166-009	Lead	4.18	mg/Kg	*	J	9
K0806166	FBA4-03-S	K0806166-010	Lead	3.56	mg/Kg	*	J	9
K0806166	FBA4-06-S	K0806166-011	Lead	3.38	mg/Kg	*	J	9
K0806166	FBA4-08-S	K0806166-012	Lead	3.39	mg/Kg	*	J	9
K0806166	FBA4-11-S	K0806166-013	Lead	4.6	mg/Kg	*	J	9
K0806166	FBA4-14-S	K0806166-014	Lead	2.23	mg/Kg	*	J	9
K0806166	FBA4-30-S	K0806166-016	Lead	3.62	mg/Kg	*	J	9
K0806166	FB-A1-09	K0806166-003	Mercury	0.033	mg/Kg		J	1
K0806166	FB-A1-14	K0806166-001	Mercury	0.032	mg/Kg		J	1
K0806166	FB-A1-18	K0806166-002	Mercury	0.034	mg/Kg		J	1
K0806166	FBA2-30-S	K0806166-004	Mercury	0.061	mg/Kg		J	1
K0806166	FBA2-40-S	K0806166-005	Mercury	0.046	mg/Kg		J	1
K0806166	FBA2-56-S	K0806166-006	Mercury	0.032	mg/Kg		J	1
K0806166	FBA3-03-S	K0806166-019	Mercury	0.086	mg/Kg		J	1
K0806166	FBA3-06-S	K0806166-020	Mercury	0.046	mg/Kg		J	1
K0806166	FBA3-18-S	K0806166-021	Mercury	0.05	mg/Kg		J	1
K0806166	FBA3-22b-S	K0806166-015	Mercury	0.025	mg/Kg		J	1
K0806166	FBA3-36-S	K0806166-007	Mercury	0.044	mg/Kg		J	1
K0806166	FBA3-37-S	K0806166-008	Mercury	0.044	mg/Kg		J	1
K0806166	FBA3-42-S	K0806166-009	Mercury	0.039	mg/Kg		J	1
K0806166	FBA4-03-S	K0806166-010	Mercury	0.008	mg/Kg	B	J	1
K0806166	FBA4-06-S	K0806166-011	Mercury	0.016	mg/Kg	B	J	1
K0806166	FBA4-08-S	K0806166-012	Mercury	0.013	mg/Kg	B	J	1
K0806166	FBA4-11-S	K0806166-013	Mercury	0.017	mg/Kg	B	J	1
K0806166	FBA4-14-S	K0806166-014	Mercury	0.014	mg/Kg	B	J	1

**Qualified Data Summary Table
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SDG	Sample_ID	Lab ID	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
K0806166	FBA4-28-S	K0806166-018	Mercury	0.016	mg/Kg	B	J	1
K0806166	FBA4-29-S	K0806166-017	Mercury	0.018	mg/Kg		J	1
K0806166	FBA4-30-S	K0806166-016	Mercury	0.02	mg/Kg	B	J	1
K0806166	FB-A1-09	K0806166-003	Sulfide	6.8	mg/Kg		J	1
K0806166	FB-A1-14	K0806166-001	Sulfide	15.1	mg/Kg		J	1
K0806166	FB-A1-18	K0806166-002	Sulfide	14.9	mg/Kg		J	1
K0806166	FBA2-30-S	K0806166-004	Sulfide	23.2	mg/Kg		J	1
K0806166	FBA2-40-S	K0806166-005	Sulfide	8.6	mg/Kg		J	1
K0806166	FBA2-56-S	K0806166-006	Sulfide	168	mg/Kg		J	1
K0806166	FBA3-03-S	K0806166-019	Sulfide	55.1	mg/Kg		J	1
K0806166	FBA3-06-S	K0806166-020	Sulfide	151	mg/Kg		J	1
K0806166	FBA3-18-S	K0806166-021	Sulfide	30.9	mg/Kg		J	1
K0806166	FBA3-22b-S	K0806166-015	Sulfide	97	mg/Kg		J	1
K0806166	FBA3-36-S	K0806166-007	Sulfide	152	mg/Kg		J	1
K0806166	FBA3-37-S	K0806166-008	Sulfide	248	mg/Kg		J	1
K0806166	FBA3-42-S	K0806166-009	Sulfide	186	mg/Kg		J	1
K0806166	FBA4-03-S	K0806166-010	Sulfide	0.7	mg/Kg	U	UJ	1
K0806166	FBA4-06-S	K0806166-011	Sulfide	0.7	mg/Kg	U	UJ	1
K0806166	FBA4-08-S	K0806166-012	Sulfide	0.7	mg/Kg	U	UJ	1
K0806166	FBA4-11-S	K0806166-013	Sulfide	0.7	mg/Kg	U	UJ	1
K0806166	FBA4-14-S	K0806166-014	Sulfide	0.07	mg/Kg	T	J	1
K0806166	FBA4-28-S	K0806166-018	Sulfide	20.6	mg/Kg		J	1
K0806166	FBA4-29-S	K0806166-017	Sulfide	96.4	mg/Kg		J	1
K0806166	FBA4-30-S	K0806166-016	Sulfide	96.9	mg/Kg		J	1
K0806166	FB-A1-09	K0806166-003	Total Organic Carbon	1.28	%		J	1
K0806166	FB-A1-14	K0806166-001	Total Organic Carbon	1.27	%		J	1
K0806166	FB-A1-18	K0806166-002	Total Organic Carbon	1.27	%		J	1
K0806166	FBA2-30-S	K0806166-004	Total Organic Carbon	1.52	%		J	1
K0806166	FBA2-40-S	K0806166-005	Total Organic Carbon	0.98	%		J	1
K0806166	FBA2-56-S	K0806166-006	Total Organic Carbon	0.76	%		J	1
K0806166	FBA3-03-S	K0806166-019	Total Organic Carbon	2.18	%		J	1
K0806166	FBA3-06-S	K0806166-020	Total Organic Carbon	2.41	%		J	1
K0806166	FBA3-18-S	K0806166-021	Total Organic Carbon	1.86	%		J	1
K0806166	FBA3-22b-S	K0806166-015	Total Organic Carbon	0.87	%		J	1
K0806166	FBA3-36-S	K0806166-007	Total Organic Carbon	1.02	%		J	1
K0806166	FBA3-37-S	K0806166-008	Total Organic Carbon	2.38	%		J	1
K0806166	FBA3-42-S	K0806166-009	Total Organic Carbon	2.65	%		J	1
K0806166	FBA4-03-S	K0806166-010	Total Organic Carbon	1.93	%		J	1
K0806166	FBA4-06-S	K0806166-011	Total Organic Carbon	1.55	%		J	1
K0806166	FBA4-08-S	K0806166-012	Total Organic Carbon	2.34	%		J	1
K0806166	FBA4-11-S	K0806166-013	Total Organic Carbon	1.91	%		J	1
K0806166	FBA4-14-S	K0806166-014	Total Organic Carbon	0.95	%		J	1
K0806166	FBA4-28-S	K0806166-018	Total Organic Carbon	5.27	%		J	1
K0806166	FBA4-29-S	K0806166-017	Total Organic Carbon	5.58	%		J	1
K0806166	FBA4-30-S	K0806166-016	Total Organic Carbon	3.25	%		J	1
K0806166	FB-A1-09	K0806166-003	Total Solids	53.7	%		J	1
K0806166	FB-A1-14	K0806166-001	Total Solids	50.5	%		J	1
K0806166	FB-A1-18	K0806166-002	Total Solids	50.1	%		J	1
K0806166	FBA2-30-S	K0806166-004	Total Solids	50.9	%		J	1
K0806166	FBA2-40-S	K0806166-005	Total Solids	57.8	%		J	1
K0806166	FBA2-56-S	K0806166-006	Total Solids	66.9	%		J	1

**Qualified Data Summary Table
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SDG	Sample_ID	Lab ID	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
K0806166	FBA3-03-S	K0806166-019	Total Solids	50.7	%		J	1
K0806166	FBA3-06-S	K0806166-020	Total Solids	67.1	%		J	1
K0806166	FBA3-18-S	K0806166-021	Total Solids	48.1	%		J	1
K0806166	FBA3-22b-S	K0806166-015	Total Solids	65.6	%		J	1
K0806166	FBA3-36-S	K0806166-007	Total Solids	58	%		J	1
K0806166	FBA3-37-S	K0806166-008	Total Solids	48.3	%		J	1
K0806166	FBA3-42-S	K0806166-009	Total Solids	60.7	%		J	1
K0806166	FBA4-03-S	K0806166-010	Total Solids	73.8	%		J	1
K0806166	FBA4-06-S	K0806166-011	Total Solids	74.1	%		J	1
K0806166	FBA4-08-S	K0806166-012	Total Solids	77.6	%		J	1
K0806166	FBA4-11-S	K0806166-013	Total Solids	77.2	%		J	1
K0806166	FBA4-14-S	K0806166-014	Total Solids	79.1	%		J	1
K0806166	FBA4-28-S	K0806166-018	Total Solids	65.1	%		J	1
K0806166	FBA4-29-S	K0806166-017	Total Solids	62.6	%		J	1
K0806166	FBA4-30-S	K0806166-016	Total Solids	68.5	%		J	1
K0806166	FB-A1-09	K0806166-003	Total Volatile Solids	4.37	%		J	1
K0806166	FB-A1-14	K0806166-001	Total Volatile Solids	4.78	%		J	1
K0806166	FB-A1-18	K0806166-002	Total Volatile Solids	4.82	%		J	1
K0806166	FBA2-30-S	K0806166-004	Total Volatile Solids	5.22	%		J	1
K0806166	FBA2-40-S	K0806166-005	Total Volatile Solids	3.74	%		J	1
K0806166	FBA2-56-S	K0806166-006	Total Volatile Solids	2.64	%		J	1
K0806166	FBA3-03-S	K0806166-019	Total Volatile Solids	6.66	%		J	1
K0806166	FBA3-06-S	K0806166-020	Total Volatile Solids	6.27	%		J	1
K0806166	FBA3-18-S	K0806166-021	Total Volatile Solids	6.43	%		J	1
K0806166	FBA3-22b-S	K0806166-015	Total Volatile Solids	3.2	%		J	1
K0806166	FBA3-36-S	K0806166-007	Total Volatile Solids	3.87	%		J	1
K0806166	FBA3-37-S	K0806166-008	Total Volatile Solids	8.46	%		J	1
K0806166	FBA3-42-S	K0806166-009	Total Volatile Solids	6.26	%		J	1
K0806166	FBA4-03-S	K0806166-010	Total Volatile Solids	2.51	%		J	1
K0806166	FBA4-06-S	K0806166-011	Total Volatile Solids	5.06	%		J	1
K0806166	FBA4-08-S	K0806166-012	Total Volatile Solids	4.37	%		J	1
K0806166	FBA4-11-S	K0806166-013	Total Volatile Solids	3.51	%		J	1
K0806166	FBA4-14-S	K0806166-014	Total Volatile Solids	2.46	%		J	1
K0806166	FBA4-28-S	K0806166-018	Total Volatile Solids	5.08	%		J	1
K0806166	FBA4-29-S	K0806166-017	Total Volatile Solids	7.14	%		J	1
K0806166	FBA4-30-S	K0806166-016	Total Volatile Solids	8.42	%		J	1
K0806166	FBA3-06-S	K0806166-020	Zinc	30.8	mg/Kg		J	16
K0806166	FBA3-18-S	K0806166-021	Zinc	57.7	mg/Kg		J	16
K0806166	FBA4-28-S	K0806166-018	Zinc	27.6	mg/Kg		J	16
K0806166	FBA4-29-S	K0806166-017	Zinc	25.2	mg/Kg		J	16
WG25699	A2R1-RR-tissue	L11328-15	1,2,3,4,6,7,8-HPCDD	0.056	PG/G	K J	U	21
WG25699	A2R2-SF	L11328-11	1,2,3,4,6,7,8-HPCDD	0.07	PG/G	K J	U	21
WG25699	A3R2-SF	L11328-8	1,2,3,4,6,7,8-HPCDD	0.069	PG/G	K J	U	21
WG25699	A2R1-RR-other	L11328-14	1,2,3,4,6,7,8-HPCDF	0.077	PG/G	K J	U	21
WG25699	A2R1-RR-tissue	L11328-15	1,2,3,4,6,7,8-HPCDF	0.027	PG/G	K J	U	21
WG25699	A2R1-RR-tissue	L11328-15	1,2,3,4,7,8,9-HPCDF	0.009	PG/G	K J	U	21
WG25699	A2R1-RR-hepato	L11328-13	1,2,3,4,7,8-HXCDD	0.211	PG/G	K J	U	21
WG25699	A2R1-RR-other	L11328-14	1,2,3,4,7,8-HXCDF	0.034	PG/G	K J	U	21
WG25699	A2R2-polychaeta	L11328-2 L	1,2,3,4,7,8-HXCDF	0.066	PG/G	K J	U	21
WG25699	A2R1-RR-other	L11328-14	1,2,3,6,7,8-HXCDD	0.097	PG/G	K J	U	21
WG25699	A2R2-SF	L11328-11	1,2,3,6,7,8-HXCDD	0.088	PG/G	K J	U	21

**Qualified Data Summary Table
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SDG	Sample_ID	Lab ID	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
WG25699	A3R1-ES	L11328-7	1,2,3,6,7,8-HXCDD	0.106	PG/G	K J	U	21
WG25699	A2R1-RR-other	L11328-14	1,2,3,6,7,8-HXCDF	0.017	PG/G	K J	U	21
WG25699	A2R1-RR-other	L11328-14	1,2,3,7,8,9-HXCDD	0.061	PG/G	K J	U	21
WG25699	A2R1-RR-tissue	L11328-15	1,2,3,7,8,9-HXCDD	0.019	PG/G	K J	U	21
WG25699	A2R2-polychaeta	L11328-2 L	1,2,3,7,8-PECDD	0.048	PG/G	K J	U	21
WG25699	A2R1-RR-other	L11328-14	1,2,3,7,8-PECDF	0.037	PG/G	K J	U	21
WG25699	A2R1-RR-hepato	L11328-13	2,3,4,6,7,8-HXCDF	0.071	PG/G	K J	U	21
WG25699	A2R1-RR-other	L11328-14	2,3,4,6,7,8-HXCDF	0.016	PG/G	K J	U	21
WG25699	A2R2-polychaeta	L11328-2 L	2,3,4,6,7,8-HXCDF	0.027	PG/G	K J	U	21
WG25699	A3R3-polychaeta	L11328-4	2,3,4,6,7,8-HXCDF	0.038	PG/G	K J	U	21
WG25699	A2R1-RR-tissue	L11328-15	2,3,4,7,8-PECDF	0.022	PG/G	K J	U	21
WG25699	A4R2-polychaeta	L11328-6	2,3,4,7,8-PECDF	0.076	PG/G	K J	U	21
WG25699	A2R1-RR-tissue	L11328-15	2,3,7,8-TCDD	0.032	PG/G	K J	U	21
WG25699	A2R1-SF	L11328-10 (A)	2,3,7,8-TCDD	0.047	PG/G	K J	U	21
WG25699	A2R2-polychaeta	L11328-2 L	2,3,7,8-TCDD	0.038	PG/G	K J	U	21
WG25699	A2R2-SF	L11328-11	2,3,7,8-TCDD	0.04	PG/G	K J	U	21
WG25699	A2R3-polychaeta	L11328-1	2,3,7,8-TCDD	0.031	PG/G	K J	U	21
WG25699	A2R3-SF	L11328-12	2,3,7,8-TCDD	0.038	PG/G	K J	U	21
WG25699	A3R1-ES	L11328-7	2,3,7,8-TCDD	0.041	PG/G	K J	U	21
WG25699	A3R1-polychaeta	L11328-3	2,3,7,8-TCDD	0.051	PG/G	K J	U	21
WG25699	A3R2-SF	L11328-8	2,3,7,8-TCDD	0.037	PG/G	K J	U	21
WG25699	A3R3-polychaeta	L11328-4	2,3,7,8-TCDD	0.067	PG/G	K J	U	21
WG25699	A3R3-SF	L11328-9	2,3,7,8-TCDD	0.029	PG/G	K J	U	21
WG25699	A4R1-polychaeta	L11328-5	2,3,7,8-TCDD	0.056	PG/G	K J	U	21
WG25699	A4R2-polychaeta	L11328-6	2,3,7,8-TCDD	0.041	PG/G	K J	U	21
WG25701	A3R1-DC-tissue	L11328-24	1,2,3,4,6,7,8-HPCDD	0.099	PG/G	K J	U	21
WG25701	A3R2-DC-other	L11328-25	1,2,3,4,6,7,8-HPCDF	0.118	PG/G	K J	U	21
WG25701	A2R3-bentnose	L11328-38	1,2,3,4,7,8-HXCDF	0.05	PG/G	K J	U	21
WG25701	A2R3-bentnose	L11328-38	1,2,3,7,8,9-HXCDD	0.098	PG/G	K J	U	21
WG25701	A2R3-DC-tissue	L11328-20	1,2,3,7,8-PECDD	0.064	PG/G	K J	U	21
WG25701	A2R3-DC-other	L11328-21	1,2,3,7,8-PECDF	0.091	PG/G	K J	U	21
WG25701	A3R1-DC-other	L11328-22	1,2,3,7,8-PECDF	0.057	PG/G	K J	U	21
WG25701	A2R2-DC-other	L11328-18	2,3,4,7,8-PECDF	0.14	PG/G	K J	U	21
WG25701	A3R2-DC-other	L11328-25	2,3,4,7,8-PECDF	0.085	PG/G	K J	U	21
WG25701	A1R1-manila	L11328-35	2,3,7,8-TCDD	0.03	PG/G	K J	U	21
WG25701	A2R2-DC-other	L11328-18	2,3,7,8-TCDD	0.134	PG/G	K	U	21
WG25701	A2R2-DC-tissue	L11328-17 (A)	2,3,7,8-TCDD	0.044	PG/G	K J	U	21
WG25701	A2R3-bentnose	L11328-38	2,3,7,8-TCDD	0.026	PG/G	K J	U	21
WG25701	A2R3-DC-other	L11328-21	2,3,7,8-TCDD	0.1	PG/G	K J	U	21
WG25701	A2R3-DC-tissue	L11328-20	2,3,7,8-TCDD	0.031	PG/G	K J	U	21
WG25701	A3R1-DC-other	L11328-22	2,3,7,8-TCDD	0.113	PG/G	K	U	21
WG25701	A3R1-DC-tissue	L11328-24	2,3,7,8-TCDD	0.033	PG/G	K J	U	21
WG25701	A3R3-manila	L11328-42 L	2,3,7,8-TCDD	0.023	PG/G	K J	U	21
WG25701	A4R2-bentnose	L11328-43	2,3,7,8-TCDD	0.032	PG/G	K J	U	21
WG25701	A2R3-bentnose	L11328-38	2,3,7,8-TCDF	0.082	PG/G	K J	U	21
WG25701	A3R1-DC-tissue	L11328-24	2,3,7,8-TCDF	0.064	PG/G	K J	U	21
WG25701	A3R3-manila	L11328-42	2,3,7,8-TCDF	0.053	PG/G	K J	U	21
WG25730	A3R2-DC-tissue	L11328-27	1,2,3,4,6,7,8-HPCDD	0.186	PG/G	K J	U	21
WG25730	A1R2-manila	L11328-34	1,2,3,4,6,7,8-HPCDF	0.157	PG/G	K J	U	21
WG25730	A3R2-DC-tissue	L11328-27	1,2,3,4,6,7,8-HPCDF	0.078	PG/G	K J	U	21
WG25730	A4R1-RR-tissue	L11328-28 i	1,2,3,4,7,8-HXCDD	0.1	PG/G	J	J	13

**Qualified Data Summary Table
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SDG	Sample_ID	Lab ID	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
WG25730	A3R2-DC-tissue	L11328-27	1,2,3,4,7,8-HXCDF	0.039	PG/G	K J	U	21
WG25730	A4R1-RR-tissue	L11328-28 i	1,2,3,4,7,8-HXCDF	0.052	PG/G	K J	U	21
WG25730	A2R1-manila	L11328-39	1,2,3,6,7,8-HXCDD	0.208	PG/G	K J	U	21
WG25730	A2R2-bentnose	L11328-37	1,2,3,6,7,8-HXCDD	0.085	PG/G	K J	U	21
WG25730	A4R1-RR-tissue	L11328-28 i	1,2,3,6,7,8-HXCDD	0.506	PG/G	K J	U	21
WG25730	A4R3-bentnose	L11328-44	1,2,3,6,7,8-HXCDF	0.049	PG/G	K J	U	21
WG25730	A4R1-bentnose	L11328-45	1,2,3,7,8-PECDD	0.236	PG/G	K J	U	21
WG25730	A2R1-manila	L11328-39	2,3,4,6,7,8-HXCDF	0.041	PG/G	K J	U	21
WG25730	A4R1-bentnose	L11328-45	2,3,4,6,7,8-HXCDF	0.217	PG/G	K J	U	21
WG25730	A1R2-manila	L11328-34	2,3,7,8-TCDD	0.027	PG/G	K J	U	21
WG25730	A1R3-manila	L11328-36	2,3,7,8-TCDD	0.024	PG/G	K J	U	21
WG25730	A2R1-manila	L11328-39	2,3,7,8-TCDD	0.026	PG/G	K J	U	21
WG25730	A3R1-horse	L11328-40 (A)	2,3,7,8-TCDD	0.022	PG/G	K J	U	21
WG25730	A3R2-DC-tissue	L11328-27	2,3,7,8-TCDD	0.039	PG/G	K J	U	21
WG25730	A3R2-macoma	L11328-41	2,3,7,8-TCDD	0.104	PG/G	K J	U	21
WG25730	A4R1-bentnose	L11328-45	2,3,7,8-TCDD	0.074	PG/G	K J	U	21
WG25730	A4R1-RR-tissue	L11328-28 i	2,3,7,8-TCDD	0.048	PG/G	K J	U	21
WG25730	A4R3-bentnose	L11328-44	2,3,7,8-TCDD	0.036	PG/G	K J	U	21
WG25730	A2R1-manila	L11328-39	2,3,7,8-TCDF	0.099	PG/G	K J	U	21
WG25730	A2R2-bentnose	L11328-37	2,3,7,8-TCDF	0.081	PG/G	K J	U	21
WG25730	A4R1-bentnose	L11328-45	2,3,7,8-TCDF	0.138	PG/G	K	U	21
WG25730	A4R2-RR-other	L11328-32	2,3,7,8-TCDF	0.288	PG/G	K	U	21
WG25730	A3R2-DC-tissue	L11328-27	OCDD	0.214	PG/G	K J	U	21
WG25754	FBA4-04-S	L10342-46 (A)	1,2,3,4,6,7,8-HPCDD	31.3	PG/G		J	9
WG25754	FBA4-11-S	L11365-4	1,2,3,4,7,8-HXCDD	0.199	PG/G	K J	U	21
WG25754	FBA4-06-S	L11365-2	2,3,4,7,8-PECDF	0.097	PG/G	K J	U	21
WG25754	FBA4-03-S	L11365-1	2,3,7,8-TCDD	0.051	PG/G	K J	U	21
WG25754	FBA4-04-S	L10342-46 (A)	2,3,7,8-TCDD	0.096	PG/G	K J	U	21
WG25754	FBA4-06-S	L11365-2	2,3,7,8-TCDD	0.063	PG/G	K J	U	21
WG25754	FBA4-08-S	L11365-3	2,3,7,8-TCDD	0.052	PG/G	K J	U	21
WG25754	FBA4-03-S	L11365-1	2,3,7,8-TCDF	0.121	PG/G	K J	U	21
WG25754	FBA4-11-S	L11365-4	2,3,7,8-TCDF	0.174	PG/G	K J	U	21
WG25754	FBA4-04-S	L10342-46 (A)	OCDD	257	PG/G		J	9
WG25754	FBA4-04-S	L10342-46 (A)	OCDF	10.9	PG/G		J	9