APPENDIX F

DATA VALIDATION REPORT FOR ANALYSES BY SGS-ANALYTICAL PERSPECTIVES

EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT

WESTERN PORT ANGELES HARBOR RI/FS

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EcoChem Project: C15217-1

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Approved for Release

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Project Manager

Basis for Data Validation

This report summarizes the results of validation (Stage 2A, 2B, & 4) performed on tissue, SPME fibers, and quality control (QC) sample data for the Western Port Angeles Harbor RI/FS. Field sample ID, laboratory sample ID, and requested analyses are provided in the **Sample Index**. Laboratory batch ID numbers and associated level of validation are provided at the beginning of each technical section.

Samples were analyzed by Samples were analyzed by SGS-Analytical Perspectives, Wilmington, North Carolina. The analytical methods and EcoChem project chemists are listed below.

Analysis	Method of Analysis	Primary Review	Secondary Review
Dioxin Furan Compounds	EPA1613B	E. Clayton	M. Swanson
Polychlorinated Biphenyls	EPA1668A	M. Swanson	C. Mott-Frans

The data were reviewed using guidance and quality control criteria documented in the analytical methods and the following project and guidance documents:

- Sampling and Analysis Plan - *Western Port Angeles Harbor RI/FS* (Integral/Anchor QEA/Exponent/Floyd|Snider, June 2013)
- *USEPA National Functional Guidelines for Organic Data Review* (USEPA 2008)
- *USEPA National Functional Guidelines for Chlorinated Dioxin/Furan Data Review* (USEPA, September 2005)

EcoChem's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Data qualifier definitions, reason codes, and validation criteria are included as **Appendix A**. The qualified data summary table is included as **Appendix B.** Data Validation Worksheets will be kept on file at EcoChem, Inc. A qualified laboratory electronic data deliverable (EDD) was also submitted with this report.

Sample Index
Western Port Angeles Harbor RI/FS

SDG	Sample ID	Lab ID	PCB	Dioxin
A5874	Mn Pretest	A5874_11302_001	✓	✓
A5874	Nc Pretest	A5874_11302_002	✓	✓
A5874	Mn SD0004 Rep 1	A5874_11302_003	✓	✓
A5874	Mn SD0004 Rep 2	A5874_11302_004	✓	✓
A5874	Mn SD0004 Rep 3	A5874_11302_005	✓	✓
A5874	Nc SD0004 Rep 1	A5874_11302_006	✓	✓
A5874	Nc SD0004 Rep 2	A5874_11302_007	✓	✓
A5874	Nc SD0004 Rep 3	A5874_11302_008	✓	✓
A5874	Mn SD0009	A5874_11302_009	✓	✓
A5874	Nc SD0009	A5874_11302_010	✓	✓
A5874	Mn SD0010	A5874_11302_011	✓	✓
A5874	Nc SD0010	A5874_11302_012	✓	✓
A5874	Mn SD0011	A5874_11302_013	✓	✓
A5874	Nc SD0011	A5874_11302_014	✓	✓
A5874	Mn SD0013	A5874_11302_015	✓	✓
A5874	Nc SD0013	A5874_11302_016	✓	✓
A5874	Mn SD0015	A5874_11302_017	✓	✓
A5874	Nc SD0015	A5874_11302_018	✓	✓
A5874	Mn SD0018	A5874_11302_019	✓	✓
A5874	Nc SD0018	A5874_11302_020	✓	✓
A5875	Mn SD0025	A5875_11306_001	✓	✓
A5875	Nc SD0025	A5875_11306_002	✓	✓
A5875	Mn SD0026	A5875_11306_003	✓	✓
A5875	Nc SD0026	A5875_11306_004	✓	✓
A5875	Mn SD0028	A5875_11306_005	✓	✓
A5875	Nc SD0028	A5875_11306_006	✓	✓
A5875	Mn SD0051	A5875_11306_007	✓	✓
A5875	Nc SD0051	A5875_11306_008	✓	✓
A5875	Mn SD0052	A5875_11306_009	✓	✓
A5875	Nc SD0052	A5875_11306_010	✓	✓
A5875	Mn SD0053 Rep 1	A5875_11306_011	✓	✓
A5875	Mn SD0053 Rep 2	A5875_11306_012	✓	✓
A5875	Mn SD0053 Rep 3	A5875_11306_013	✓	✓
A5875	Nc SD0053 Rep 1	A5875_11306_014	✓	✓
A5875	Nc SD0053 Rep 2	A5875_11306_015	✓	✓
A5875	Nc SD0053 Rep 3	A5875_11306_016	✓	✓
A5875	Mn SD0054	A5875_11306_017	✓	✓
A5875	Nc SD0054	A5875_11306_018	✓	✓
A5875	Mn SD0055	A5875_11306_019	✓	✓
A5875	Nc SD0055	A5875_11306_020	✓	✓
A5876	Mn SD0053-AC	A5876_11309_001	✓	✓
A5876	Nc SD0053-AC	A5876_11309_002	✓	✓
A5876	Mn SD0054-AC	A5876_11309_003	✓	✓
A5876	Nc SD0054-AC	A5876_11309_004	✓	✓
A5877	SD0025 PCB	A5877_11299_001	✓	

Sample Index
Western Port Angeles Harbor RI/FS

SDG	Sample ID	Lab ID	PCB	Dioxin
A5877	SD0054 PCB	A5877_11299_002	✓	
A5877	SD0018 PCB	A5877_11299_003	✓	
A5877	SD0053-AC PCB	A5877_11299_004	✓	
A5877	SD0051 PCB	A5877_11299_005	✓	
A5877	SD0010 PCB	A5877_11299_006	✓	
A5877	SD0028 PCB	A5877_11299_007	✓	
A5877	SD0053-1 PCB	A5877_11299_008	✓	
A5877	SD0054-AC PCB	A5877_11299_009	✓	
A5877	SD0026 PCB	A5877_11299_010	✓	
A5877	SD004-2 PCB	A5877_11299_011	✓	
A5877	SD0055 PCB	A5877_11299_012	✓	
A5877	SD0053-2 PCB	A5877_11299_013	✓	
A5877	SD0053-3 PCB	A5877_11299_014	✓	
A5877	SD004-1 PCB	A5877_11299_015	✓	
A5877	SD009 PCB	A5877_11299_016	✓	
A5877	SD0015 PCB	A5877_11299_017	✓	
A5877	SD0013 PCB	A5877_11299_018	✓	
A5877	SD004-3 PCB	A5877_11299_019	✓	
A5877	SD0011 PCB	A5877_11299_020	✓	
A5877	SD0052 PCB	A5877_11299_021	✓	
A5877	Fiber Blank 1	A5877_11299_022	✓	
A5877	Fiber Blank 2	A5877_11299_023	✓	
A5878	SD0025 D/F	A5878_11298_001		✓
A5878	SD0054 D/F	A5878_11298_002		✓
A5878	SD0018 D/F	A5878_11298_003		✓
A5878	SD0053 AC D/F	A5878_11298_004		✓
A5878	SD0051 D/F	A5878_11298_005		✓
A5878	SD0010 D/F	A5878_11298_006		✓
A5878	SD0028 D/F	A5878_11298_007		✓
A5878	SD0053-1 D/F	A5878_11298_008		✓
A5878	SD0054-AC D/F	A5878_11298_009		✓
A5878	SD0026 D/F	A5878_11298_010		✓
A5878	SD004-2 D/F	A5878_11298_011		✓
A5878	SD0055 D/F	A5878_11298_012		✓
A5878	SD0053-2 D/F	A5878_11298_013		✓
A5878	SD0053-3 D/F	A5878_11298_014		✓
A5878	SD004-1 D/F	A5878_11298_015		✓
A5878	SD009 D/F	A5878_11298_016		✓
A5878	SD0015 D/F	A5878_11298_017		✓
A5878	SD0013 D/F	A5878_11298_018		✓
A5878	SD004-3 D/F	A5878_11298_019		✓
A5878	SD0011 D/F	A5878_11298_020		✓
A5878	SD0052 D/F	A5878_11298_021		✓
A5878	Fiber Blank D/F	A5878_11298_022		✓
A5878	Fiber Blank D/F	A5878_11298_022RJ		✓

DATA VALIDATION REPORT
City of Port Angeles WPAHG
PCB Congeners by Method EPA 1668A

This report documents the review of analytical data from the analysis of tissue samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by SGS-Analytical Perspectives, Wilmington, North Carolina. Refer to the **Sample Index** for a complete list of samples.

SDG	Number of Samples	Validation Level
A5874	20 Tissue	EPA Stage 2B
A5875	20 Tissue	EPA Stage 2B
A5876	4 Tissue	EPA Stage 4

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 LABORATORY REPORT PACKAGE VERIFICATION

A complete (10%) verification of the electronic data deliverable (EDD) results was performed by comparison to the laboratory data package. No errors were noted.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Sample Receipt, Preservation, and Holding Times	2	Matrix Spike/Matrix Spike Duplicate (MS/MSD)
✓	GC/MS Instrument Performance Check	2	Laboratory Duplicates
✓	Initial Calibration (ICAL)	2	Compound Identification
✓	Continuing Calibration (CCAL)	✓	Reported Results
2	Method Blanks	✓	Reporting Limits
2	Labeled Compounds	1	Calculation Verification
1	Ongoing Precision and Recovery (OPR)		

√ Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.
[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.

Sample Receipt, Preservation, and Holding Times

SDG A5874: Sample Nc̲ Pretest was noted on the chain-of-custody (COC) as Nv̲ Pretest, but the sample container was labeled Nc̲ Pretest. This sample was reported as Nc Pretest in the data package and EDD. Beyond noting this discrepancy, no further action was taken.

Method Blanks

Method blanks were analyzed at the appropriate frequency. To assess the impact of each blank contaminant on the reported sample results, an action level was established at five times the concentration detected in the blank and the sample results were compared to these action levels. The laboratory assigned "K" flag to values when a peak was detected but did not meet identification criteria. These values cannot be considered as positive identifications, but are “estimated maximum possible concentrations”. When these occurred in the method blank the results were considered as false positives. No action levels were established for these analytes.

SDG A5874: Seventeen (17) PCB congeners were detected in the method blank associated with the dilution analysis run. Ten (10) results were qualified as not detected (U-7) in sample Nc SD0011.

SDG A5875: Several PCB congeners were detected in the method blanks. All associated results were either not detected or detected at concentrations greater than the action levels; no data were qualified.

SDG A5876: Several PCB congeners were detected in the method blanks. In all four (4) samples PCB 11 was qualified as not detected (U-7).

Labeled Compound Recovery

Labeled compounds were added to all samples. The labeled compound percent recovery (%R) values were evaluated using the laboratory control limits.

SDG A5874: The %R values for labeled compounds 13C-PCB 170 and 13C-PCB 180 were greater than the upper control limits in all samples. These labeled compounds are not used to quantitate any native PCB congeners; no data were qualified for these outliers.

The %R values for 13C-PCB 169 were less than the lower control limit in Samples Nc SD0004 Rep2, Nc SD0004 Rep3, Mn SD0009, and Mn SD0010, indicating a potential low bias. The %R values for 13C-PCB 189 were greater than the upper control limit in Samples Nc SD0004 Rep1 and Nc SD0015, indicating a potential high bias. The associated positive results were estimated (J-13H) in these samples. The %R values for 13C-PCB189 and 13C-PCB 208 were greater than the upper control limit in Sample Nc SD0011 and the laboratory duplicate of Sample Nc SD0015, indicating a potential high bias. The associated positive results were estimated (J-13H) in sample Nc SD0011; data were not qualified in the QC sample.

SDG A5875: The %R values for labeled compounds 13C-PCB 170 and 13C-PCB 180 were greater than the upper control limits in all samples. These labeled compounds are not used to quantitate any native PCB congeners; no data were qualified for these outliers.

The %R values for 13C-PCB 189 and 13C-PCB 208 were greater than the upper control limit in Samples Nc SD0025, Nc SD0026, and, Nc SD0028 indicating a potential high bias; the associated positive results were estimated (J-13H) in these samples . Additionally the %R values for 13C-PCB 189, 13C-PCB 206, and 13C-PCB 208 were greater than the upper control limit in Sample Nc SD0028. The associated results for these labeled compounds were not detected and no qualifiers were applied. The %R values for 13C-PCB 209 were greater than the upper control limit in Samples Nc SD0028, and Nc SD0051, and 13C-PCB 208 was greater than the upper control limit in Sample Mn SD0055, indicating a potential high bias. The associated positive results were estimated (J-13H) in these samples. The %R values for 13C-PCB 208 were greater than the upper control limit in the laboratory duplicate, the matrix spike sample and the matrix spike duplicate sample, indicating a potential high bias. No data were qualified in these QC samples.

SDG A5876: The %R values for 13C-PCB 126 and 13C-PCB 169 in Sample Mn SD0053-AC were greater than the upper control limit, indicating a potential high bias. The associated positive results were estimated (J-13H) in this sample. The %R value for 13C-PCB1 was less than the lower control limit and the %R for 13C-PCB 15 was greater than the upper control limit in the ongoing precision and recovery (OPR). No data were qualified in this QC sample.

Ongoing Precision and Recovery

All SDG: Accuracy was also assessed using ongoing precision and recovery samples (OPR) as well as BCS3 samples. The BCS3 is a QC sample that goes through the entire extraction process prior to analysis. Precision was monitored by the laboratory by comparing the BCS3 results between extraction batches.

Matrix Spike/Matrix Spike Duplicate

SDG A5874: Sample Nc SD0010 was analyzed as the matrix spike/matrix spike duplicate (MS/MSD). The %R values for PCB 105 and PCB 118 were less than the lower control limit, indicating a potential low bias, and their relative percent difference (RPD) values were greater than the control limit. The results for these congeners in the parent sample were estimated (J-8L,9).

SDG A5875: Sample Mn SD0055 was analyzed as the MS/MSD. The RPD value for PCB 118 was greater than the control limit. The result for PCB 118 in the parent sample was estimated (J-9).

Laboratory Duplicates

SDG A5874: Sample Nc SD0015 was analyzed in duplicate. The RPD values for 29 congeners and two (2) homolog groups were greater than the control limit. Results for these congeners were estimated (J/UJ-9) in the parent sample; no qualifiers were applied to homolog groups.

SDG A5875: Sample Mn SD0054 was analyzed in duplicate. The RPD values for 76 congeners and five (5) homolog groups were greater than the control limit. Results for these congeners were estimated (J/UJ-9) in the parent sample; no qualifiers were applied to homolog groups.

SDG A5876: Precision was assessed using BCS3 samples. This QC sample goes through the entire extraction process prior to analysis. Precision was monitored by the laboratory by comparing the BCS3 results between extraction batches. Precision was acceptable.

Compound Identification

The laboratory reported EMPC or "estimated maximum possible concentrations" values for one or more of the target analytes in all samples. An EMPC value was reported when a peak was detected but did not meet identification criteria as required by the method; therefore the result cannot be considered as positive identification for the analyte. The EMPC values were qualified as not detected (U-25) to indicate that the result is not-detected at an elevated reporting limit. The EMPC values for total homolog groups were qualified as estimated (J-25) at the reported values.

Calculation Verification

SDG A5876: Several results were verified by recalculation from the raw data. No transcription or calculation errors were found.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. With the exceptions noted above, accuracy was acceptable as demonstrated by the labeled compound, OPR, BCS3, and MS/MSD recoveries. With the exceptions noted above, precision was also acceptable as reported by the BCS3 recoveries from multiple extraction batches, and MS/MSD and laboratory duplicate RPD values.

Data were estimated due to labeled compound and MS/MSD accuracy outliers, and MS/MSD and laboratory duplicate precision outliers. Detection limits were elevated due to ion ratio outliers and method blank contamination.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Western Port Angeles Harbor RI/FS
PCB Congeners by Method EPA 1668A

This report documents the review of analytical data from the analysis of SPME fiber samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by SGS-Analytical Perspectives, Wilmington, North Carolina. Refer to the **Sample Index** for a complete list of samples.

SDG	Number of Samples	Validation Level
A5877	21 SPME Fiber 2 Fiber Blanks	EPA Stage 2B EPA Stage 2A

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 LABORATORY REPORT PACKAGE VERIFICATION

A complete (10%) verification of the electronic data deliverable (EDD) results was performed by comparison to the laboratory data package. No errors were noted.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

✓	Sample Receipt, Preservation, and Holding Times	1	Ongoing Precision and Recovery (OPR)
✓	GC/MS Instrument Performance Check	✓	Laboratory Duplicates
✓	Initial Calibration (ICAL)	1	Field Triplicates
✓	Continuing Calibration (CCAL)	2	Compound Identification
1	Method Blanks	✓	Reported Results
2	Field Blanks	✓	Reporting Limits
✓	Labeled Compounds		

✓ Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.
[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.

Method Blanks

The samples were received by the laboratory as hexane extracts. Clean fibers were used as field blanks to assess any potential contamination during further sample handling and analysis.

Field Blanks

The field blanks for this project were blank fiber samples. To evaluate the effect on the sample data, action levels of five times (5x) the blank concentrations were established. If a contaminant is detected in an associated field sample and the concentration is less than the action level, the result is qualified (U-6) at the reported concentration to indicate an elevation of the reporting limit. No action is taken if the sample result is greater than the action level, or for non-detected results.

Positive results for PCB 8 and PCB 11 were reported in Fiber Blank 1 and positive results for PCB 8, PCB 11, PCB, 20/28, PCB 21/33, PCB 31, and PCB 52 were reported in Fiber Blank 2. Five (5) results for PCB 8 and 18 results for PCB 11 were qualified as not detected (U-6).

Ongoing Precision and Recovery

Accuracy was also assessed using BCS3 samples. This QC sample goes through the entire extraction process prior to analysis. Precision was monitored by the laboratory by comparing the BCS3 results between extraction batches.

Field Triplicates

Fibers from two of the SPME test chambers (Samples SD004-1, SD004-2, & SD004-3 and SD0053-1, SD0053-2, & SD0053-3) were analyzed in triplicate to assess inter-chamber variability. In the set using Samples SD0053-1, SD0053-2, & SD0053-3 the relative standard deviation (RSD) values for PCB 176 and PCB 176 were greater than 22% and 23%, respectively. For results greater than five times the reporting limit all other RSD values were less than 20%. No data were qualified based on these precision outliers. Data users should consider the impact of field precision outliers on the reported results.

Compound Identification

The laboratory reported EMPC or "estimated maximum possible concentrations" values for one or more of the target analytes in all samples. An EMPC value was reported when a peak was detected but did not meet identification criteria as required by the method; therefore the result cannot be considered as positive identification for the analyte. The EMPC values were qualified as not detected (U-25) to indicate that the result is not-detected at an elevated reporting limit. The EMPC values for total homolog groups were qualified as estimated (J-25) at the reported values.

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 BCS3 recoveries. Precision was also acceptable as reported by the BCS3 recoveries from multiple extraction batches

Detection limits were elevated due to ion ratio outliers and field blank contamination.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Western Port Angeles Harbor RI/FS
Dioxin & Furan Compounds by EPA 1613B & Percent Lipids

This report documents the review of analytical data from the analysis of tissue samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by SGS-Analytical Perspectives, Wilmington, North Carolina. Refer to the **Sample Index** for a complete list of samples.

SDG	Number of Samples	Validation Level
A5874	20 Tissue	EPA Stage 2B
A5875	20 Tissue	EPA Stage 2B
A5876	4 Tissue	EPA Stage 4

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 LABORATORY REPORT PACKAGE VERIFICATION

A complete (10%) verification of the electronic data deliverable (EDD) results was performed by comparison to the laboratory data package. No errors were noted.

III. TECHNICAL DATA VALIDATION

The QC requirements reviewed are summarized in the following table:

✓	Sample Receipt, Preservation, and Holding Time	1	Ongoing Precision and Recovery (OPR)
1	System Performance and Resolution Checks	2	Matrix Spike/Matrix Spike Duplicates (MS/MSD)
✓	Initial Calibration (ICAL)	1	Laboratory Duplicates
✓	Calibration Verification (CVER)	✓	Target Analyte List
2	Method Blanks	2	Compound Identification
✓	Labeled Compound Recovery	1	Calculation Verification

✓ Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.
^{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.

System Performance and Resolution Checks

The method requires the analysis of an isomer-specificity test solution. The analysis of this solution (performed near the beginning of an analytical sequence) demonstrates that the GC column can successfully separate 2,3,7,8-TCDD (on the DB5 column) and 2,3,7,8-TCDF (on the DB225 or equivalent column) from closely eluting non-target isomers.

The isomer-specificity analysis was acceptable for 2,3,7,8-TCDD. However, the laboratory does not perform second column analysis. Instead, the laboratory includes the known co-eluting isomers in the ongoing precision and recovery (OPR) spike solution. This QC sample goes through the entire extraction process prior to analysis. Isomer specificity is verified using the results of the OPR analysis.

The method criteria for evaluating the isomer-specificity test is that the peak-to-valley ratio between the 2,3,7,8-isomer and the closest eluting non-target isomer must be less than or equal to 25%. The laboratory uses a 10% criterion for 2,3,7,8-TCDD, and a 40% criterion for 2,3,7,8-TCDF.

For 2,3,7,8-TCDF, the method criterion of 25% is for analyses performed using a DB225 (or equivalent) column. The laboratory uses a DB5MS column (see the **Compound Identification** section for further discussion). Although the laboratory criterion for 2,3,7,8-TCDF is greater than 25%, the laboratory also requires that despite the presence of a potentially interfering peak, the 2,3,7,8-TCDF recovery and retention time must still meet the OPR control limits, proving that 2,3,7,8-TCDF was adequately resolved.

The 2,3,7,8-TCDF peak was judged to be adequately resolved and no further action was necessary given that the 2,3,7,8-TCDF peak-to-valley ratio was less than 40% and all other OPR control limits were met.

Method Blanks

In order to assess the impact of blank contamination on the reported sample results, action levels are established at five times the blank concentrations. If the concentrations in the associated field samples are less than the action levels, the results are qualified as not detected (U-7).

The laboratory assigned an "EMPC" flag to an analyte result when a peak was detected but did not meet identification criteria. These values cannot be considered as positive identifications, but are “estimated maximum possible concentrations”. When a result in the method blank had an “EMPC” flag, the result was treated as a non-detect at an elevated detection limit; therefore no action level was established for these analytes.

SDG A5874: The analyte OCDD was detected in both method blanks and 1,2,3,4,6,7,8-HpCDD was detected in one method blank. Only the OCDD result in Sample Nc Pretest was qualified as not detected (U-7), all other results were either not detected or detected at concentrations greater than the action level.

SDG A5875: The analyte OCDD was detected in both method blanks and 1,2,3,7,8,9-HxCDD and 1,2,3,4,6,7,8-HpCDD were each detected in one method blank. Results for 1,2,3,7,8,9-HxCDD were qualified as not detected (U-7) in 11 samples, all other results were either not detected or detected at concentrations greater than the action level.

SDG A5876: The analyte 1,2,3,7,8,9-HxCDD was detected in the method blank. Results for 1,2,3,7,8,9-HxCDD were qualified as not detected (U-7) in Samples Nc SD0053-AC and Nc SD0054-AC.

Ongoing Precision and Recovery

Accuracy was also assessed using BCS3 samples. This QC sample goes through the entire extraction process prior to analysis. Precision was monitored by the laboratory by comparing the BCS3 results between extraction batches.

Matrix Spike/Matrix Spike Duplicates

SDG A5874: Sample Nc SD0010 was analyzed as the matrix spike/matrix spike duplicate (MS/MSD). The percent recovery (%R) values for 1,2,3,4,6,7,8-HpCDD and OCDD were less than the lower control limit. The parent concentration of OCDD was greater than four times the spike concentration; no data were qualified for this outlier. The result for 1,2,3,4,6,7,8-HpCDD was estimated (J-8L) to indicate a potential low bias. The relative percent difference (RPD) value for 1,2,3,4,6,7,8-HpCDD was greater than the control limit; the result for this sample was estimated (J-9).

Laboratory Duplicates

SDG A5874: Sample Nc SD0015 was analyzed in duplicate. The RPD values for 1,2,3,7,8,9-HxCDD, total PeCDD, and total TCDF were greater than the control limit. The result for 1,2,3,7,8,9-HxCDD was estimated (J-9) in the parent sample; no qualifiers were applied to homolog groups.

SDG A5875: Sample Mn SD0054 was analyzed in duplicate. The RPD values for 1,2,3,6,7,8-HxCDD, 1,2,3,4,6,7,8-HpCDD, OCDD, 1,2,3,4,7,8-HxCDF, 1,2,3,6,7,8-HxCDF, 2,3,4,6,7,8-HxCDF, 1,2,3,4,6,7,8-HpCDF, total HxCDD, total HpCDD, and total HpCDF were greater than the control limit. The result for these congeners were estimated (J-9) in the parent sample; no qualifiers were applied to homolog groups.

Compound Identification

The method requires the confirmation of 2,3,7,8-TCDF detects using an alternate GC column. The DB5 column that is typically used cannot fully separate 2,3,7,8-TCDF from closely eluting non-target TCDF isomers. The laboratory did not perform a second column confirmation; however the laboratory uses a DB5MS column. This modified column has been proven to adequately resolve the TCDF isomers. The laboratory also includes the interfering TCDF isomer as a spiked compound in the OPR solution to demonstrate acceptable resolution, as discussed in the **Instrument Performance** section above. Since the 2,3,7,8-TCDF resolution was acceptable, no further action was necessary.

The laboratory assigned an "EMPC" flag to one or more analytes to indicate that the ion ratio criterion for positive identification was 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. These “EMPC” flagged results were qualified as not detected (U-25) at the reported concentration. The “EMPC” flagged results for total homolog groups were estimated (J-25).

Calculation Verification

SDG A5876: Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. With the exceptions noted above, accuracy was acceptable as demonstrated by the labeled compound, ongoing precision and recovery standard, MS/MSD, and BCS3 standard recoveries. With the exceptions noted above, precision was acceptable as demonstrated by the BCS3 recoveries from multiple extraction batches, the MS/MSD and laboratory RPD, and field triplicate RSD values.

Detection limits were elevated based on ion ratio outliers and method blank contamination. Data were estimated based on MS/MSD recovery outliers and MS/MSD and laboratory duplicate precision outliers.

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

DATA VALIDATION REPORT
Western Port Angeles Harbor RI/FS
Dioxin & Furan Compounds by EPA 1613B

This report documents the review of analytical data from the analysis of SPME fiber samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by SGS-Analytical Perspectives, Wilmington, North Carolina. Refer to the **Sample Index** for a complete list of samples.

SDG	Number of Samples	Validation Level
A5878	21 SPME Fiber 1 Fiber Blank	EPA Stage 2B EPA Stage 2A

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. The laboratory did not report values for the total homolog groups in the data package.

II. EDD TO LABORATORY REPORT PACKAGE VERIFICATION

A complete (10%) verification of the electronic data deliverable (EDD) results was performed by comparison to the laboratory data package. The laboratory did not report values for the total homolog groups in the EDD.

III. TECHNICAL DATA VALIDATION

The QC requirements reviewed are summarized in the following table:

✓	Sample Receipt, Preservation, and Holding Time	✓	Labeled Compound Recovery
1	System Performance and Resolution Checks	1	Ongoing Precision and Recovery (OPR)
✓	Initial Calibration (ICAL)	1	Laboratory Duplicates
✓	Calibration Verification (CVER)	1	Field Triplicates
1	Method Blanks	✓	Target Analyte List
1	Field Blanks	2	Compound Identification

✓ ***Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.***

[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.***

System Performance and Resolution Checks

The method requires the analysis of an isomer-specificity test solution. The analysis of this solution (performed near the beginning of an analytical sequence) demonstrates that the GC column can successfully separate 2,3,7,8-TCDD (on the DB5 column) and 2,3,7,8-TCDF (on the DB225 or equivalent column) from closely eluting non-target isomers.

The isomer-specificity analysis was acceptable for 2,3,7,8-TCDD. However, the laboratory does not perform second column analysis. Instead, the laboratory includes the known co-eluting isomers in the ongoing precision and recovery (OPR) spike solution. This QC sample goes through the entire extraction process prior to analysis. Isomer specificity is verified using the results of the OPR analysis.

The method criteria for evaluating the isomer-specificity test is that the peak-to-valley ratio between the 2,3,7,8-isomer and the closest eluting non-target isomer must be less than or equal to 25%. The laboratory uses a 10% criterion for 2,3,7,8-TCDD, and a 40% criterion for 2,3,7,8-TCDF.

For 2,3,7,8-TCDF, the method criterion of 25% is for analyses performed using a DB225 (or equivalent) column. The laboratory uses a DB5MS column (see the **Compound Identification** section for further discussion). Although the laboratory criterion for 2,3,7,8-TCDF is greater than 25%, the laboratory also requires that despite the presence of a potentially interfering peak, the 2,3,7,8-TCDF recovery and retention time must still meet the OPR control limits, proving that 2,3,7,8-TCDF was adequately resolved.

The 2,3,7,8-TCDF peak was judged to be adequately resolved and no further action was necessary given that the 2,3,7,8-TCDF peak-to-valley ratio was less than 40% and all other OPR control limits were met.

Method Blanks

The samples were received by the laboratory as hexane extracts. A clean fiber was used as a field blank to assess any potential contamination during further sample handling and analysis.

Field Blanks

The field blank for this project was a blank fiber sample, Fiber Blank. No dioxin or furan compounds were detected in this sample.

Ongoing Precision and Recovery

Accuracy was also assessed using BCS3 samples. This QC sample goes through the entire extraction process prior to analysis. Precision was monitored by the laboratory by comparing the BCS3 results between extraction batches.

Laboratory Duplicates

No laboratory duplicates were analyzed with this data set. Precision was measured by comparing the BCS3 results between extraction batches. Precision was acceptable.

Field Triplicates

Fibers from two of the SPME test chambers (Samples SD004-1, SD004-2, & SD004-3 and SD0053-1, SD0053-2, & SD0053-3) were analyzed in triplicate to assess inter-chamber variability. In the set using Samples SD0053-1, SD0053-2, & SD0053-3 the relative standard deviation (RSD) values for 1,2,3,4,6,7,8-HpCDD and 2,3,4,6,7,8,-HxCDF were greater than 50%.

For results greater than five times the reporting limit all other RSD values were less than 20%. No data were qualified based on these precision outliers. Data users should consider the impact of field precision outliers on the reported results.

Compound Identification

The method requires the confirmation of 2,3,7,8-TCDF detects using an alternate GC column. The DB5 column that is typically used cannot fully separate 2,3,7,8-TCDF from closely eluting non-target TCDF isomers. The laboratory did not perform a second column confirmation; however the laboratory uses a DB5MS column. This modified column has been proven to adequately resolve the TCDF isomers. The laboratory also includes the interfering TCDF isomer as a spiked compound in the OPR solution to demonstrate acceptable resolution, as discussed in the **Instrument Performance** section above. Since the 2,3,7,8-TCDF resolution was acceptable, no further action was necessary.

The laboratory assigned an "EMPC" flag to one or more analytes to indicate that the ion ratio criterion for positive identification was 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. These “EMPC” flagged results were qualified as not detected (U-25) at the reported concentration. The “EMPC” flagged results for total homolog groups were estimated (J-25).

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 BCS3 standard recoveries and precision was acceptable as demonstrated by the BCS3 recoveries from multiple extraction batches.

Detection limits were elevated based on ion ratio outliers.

All other 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
Based on 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.
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.

DATA QUALIFIER REASON CODES

Group	Code	Reason for Qualification
Sample Handling	1	Improper Sample Handling or Sample Preservation (i.e., headspace, cooler temperature, pH, summa canister pressure); Exceeded Holding Times
Instrument Performance	24	Instrument Performance (i.e., tune, resolution, retention time window, endrin breakdown, lock-mass)
	5A	Initial Calibration (RF, %RSD, r^2)
	5B	Calibration Verification (ICV, CCV, CCAL; RF, %D, %R) Use bias flags (H,L)[1] where appropriate
Blank Contamination	6	Field Blank Contamination (Equipment Rinsate, Trip Blank, etc.)
	7	Lab Blank Contamination (i.e., method blank, instrument blank, etc.) Use low bias flag (L)[1] for negative instrument blanks
Precision and Accuracy	8	Matrix Spike (MS &/or MSD) Recoveries Use bias flags (H,L)[1] where appropriate
	9	Precision (all replicates: LCS/LCSD, MS/MSD, Lab Replicate, Field Replicate)
	10	Laboratory Control Sample Recoveries (a.k.a. Blank Spikes) Use bias flags (H,L)[1] where appropriate
	12	Reference Material Use bias flags (H,L)[1] where appropriate
	13	Surrogate Spike Recoveries (a.k.a. labeled compounds, recovery standards) Use bias flags (H,L)[1] where appropriate
Interferences	16	ICP/ICP-MS Serial Dilution Percent Difference
	17	ICP/ICP-MS Interference Check Standard Recovery Use bias flags (H,L)[1] where appropriate
	19	Internal Standard Performance (i.e., area, retention time, recovery)
	22	Elevated Detection Limit due to Interference (i.e., chemical and/or matrix)
	23	Bias from Matrix Interference (i.e. diphenyl ether, PCB/pesticides)
Identification and Quantitation	2	Chromatographic pattern in sample does not match pattern of calibration standard
	3	2nd column confirmation (RPD or %D)
	4	Tentatively Identified Compound (TIC) (associated with NJ only)
	20	Calibration Range or Linear Range Exceeded
	25	Compound Identification (i.e., ion ratio, retention time, relative abundance, etc.)
Miscellaneous	11	A more appropriate result is reported (multiple reported analyses i.e., dilutions, re-extractions, etc. Associated with "R" and "DNR" only)
	14	Other (See DV report for details)
	26	Method QC information not provided

[1] H = high bias indicated
L = low bias indicated

EcoChem Validation Guidelines for PCB Congener Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 1, 12/1995 & EPA SW-846, Method 1668)

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	Samples: Up to one year if stored in the dark & temp as above. Extracts: Up to 1 year if stored at <-10°C and in the dark	J(+)/UJ(-) if HT > 1 year EcoChem PJ, see TM-05	1
Mass Resolution	>=10,000 resolving power at m/z 330.9792 <5 ppm deviation from each m/z listed in Table 7 of method. Analyzed prior to ICAL and at the beginning and end of each 12 hr. shift	R(+/-) if not met	14
Column Resolution 209 Congener Solution	Mix of all 209 PCBs run prior to each ICAL and each 12 hour shift RT of PCB209 must be > 55 min PCB 156 & 157 must coelute w/in 2 sec PCB34 & 23 and PCB187 & 182 must be resolved where ((x/y)*100%) < 40% x = ht. of valley and y = ht of shortest peak	J(+) if valley >40%	5A (ICAL) 5B (CCAL)
Initial Calibration	Minimum of five standards %RSD < 20% for native compounds %RSD < 35% for labeled compounds	J(+) natives if %RSD > 20%	5A
	Ion Abundance ratios within QC limits (Method 1668, Table 8) in CS1 std.	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(-)	
Continuing Calibration	Every 12 hours: Concentrations must meet criteria specified in Method 1668, Table 6	J(+)/(UJ(-) natives if %D = 30% - 50% J(+)/R(-) natives if %D > 75%	5B
	Absolute RT of all Labelled Compounds and Window Defining Congeners must be +/- 15 sec of RT in ICAL RRT of all compounds must meet Table 2 of method.	EcoChem PJ, see ICAL section of TM-05	
	S/N ratio > 10	If <10, elevate Det. Limit or R(-)	
	Ion Abundance ratios must meet criteria specified in Method 1668, Table 8	EcoChem PJ, see TM-05	
Method Blank	One per matrix per batch No positive results	If sample result <5X action level, qualify U at reported value.	7

EcoChem Validation Guidelines for PCB Congener Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 1, 12/1995 & EPA SW-846, Method 1668)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Rinse/Field Blank (if required)	One per matrix per batch No positive results	If sample result <5X action level, qualify U at reported value.	6
LCS / OPR	One per matrix per batch %R Values w/in limits specified in Method 1668, Table 6	J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) using PJ if %R <<LCL (< 10%)	10
MS/MSD (if required)	Accuracy: %R values within laboratory limits	Qualify parent sample 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
	Precision: RPD < 20%	J(+) in parent sample if RPD > 20%	9
Duplicate (if required)	RPD <25%	J(+)/UJ(-) if outside limts	9
Labeled Compounds / Internal Standards	%R must meet limits specified in Method 1668, Table 6.	J(+)/UJ(-) if %R = 10% to LCL J(+) if %R > UCL J(+)/R(-) if %R < 10%	13
Quantitation/ Identification	Ions for analyte, IS, and rec. std. must max w/in 2 sec. S/N >2.5 Ion abundance (IA ratios) must meet limits stated in Table 8 of Method 1668 Relative retention times (RRT) must be w/in limits stated in Table 2 of Method 1668	If RT criteria not met, use PJ (see TM-05) J(+) if S/N criteria not met if unlabelled ion abundance not met, change to EMPC J(+) if labelled ion abundance not met.	21
Interferences	Lock masses must not deviate +/- 20%	Change result to EMPC	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 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 to avoid reporting two results for one sample	11

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 *Note:* 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}C12-123789-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 limts	9
Labeled Compounds / Internal Standards	*Method 8290:* %R = 40% - 135% in all samples *Method 1613B:* %R must meet limits specified in Table 7, Method 1613	J(+)/UJ(-) if %R = 10% to LCL J(+) if %R > UCL J(+)/R(-) if %R < 10%	13
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 idenfication 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 PCDPE	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

APPENDIX B

QUALIFIED DATA SUMMARY TABLE

Qualified Data Summary Table
Western Port Angeles Harbor RI/FS

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5874	Mn Pretest	A5874_11302_DF_001	EPA1613B	Heptachlorodibenzofuran (Total)	0.139	pg/g	EMPC	J	25
A5874	Mn Pretest	A5874_11302_DF_001	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	0.324	pg/g	EMPC	J	25
A5874	Mn Pretest	A5874_11302_DF_001	EPA1613B	Tetrachlorodibenzodioxin (Total)	0.0932	pg/g	EMPC	J	25
A5874	Nc Pretest	A5874_11302_DF_002	EPA1613B	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.257	pg/g	EMPC J	U	25
A5874	Nc Pretest	A5874_11302_DF_002	EPA1613B	Heptachlorodibenzo-p-dioxin (Total)	0.551	pg/g	EMPC	J	25
A5874	Nc Pretest	A5874_11302_DF_002	EPA1613B	Octachlorodibenzo-p-dioxin	0.655	pg/g	J B	U	7
A5874	Nc Pretest	A5874_11302_DF_002	EPA1613B	Tetrachlorodibenzofuran (Total)	0.203	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 1	A5874_11302_DF_003	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzofuran	0.158	pg/g	EMPC J	U	25
A5874	Mn SD0004 Rep 1	A5874_11302_DF_003	EPA1613B	1,2,3,7,8-Pentachlorodibenzofuran	0.118	pg/g	EMPC J	U	25
A5874	Mn SD0004 Rep 1	A5874_11302_DF_003	EPA1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.199	pg/g	EMPC J	U	25
A5874	Mn SD0004 Rep 1	A5874_11302_DF_003	EPA1613B	2,3,4,7,8-Pentachlorodibenzofuran	0.174	pg/g	EMPC J	U	25
A5874	Mn SD0004 Rep 1	A5874_11302_DF_003	EPA1613B	Hexachlorodibenzofuran (Total)	9.5	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 1	A5874_11302_DF_003	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	8.95	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 1	A5874_11302_DF_003	EPA1613B	Pentachlorodibenzofuran (Total)	3.99	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 1	A5874_11302_DF_003	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.97	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 1	A5874_11302_DF_003	EPA1613B	Tetrachlorodibenzodioxin (Total)	1.52	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 1	A5874_11302_DF_003	EPA1613B	Tetrachlorodibenzofuran (Total)	2.56	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 2	A5874_11302_DF_004	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0843	pg/g	EMPC J	U	25
A5874	Mn SD0004 Rep 2	A5874_11302_DF_004	EPA1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.167	pg/g	EMPC J	U	25
A5874	Mn SD0004 Rep 2	A5874_11302_DF_004	EPA1613B	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.116	pg/g	EMPC J	U	25
A5874	Mn SD0004 Rep 2	A5874_11302_DF_004	EPA1613B	Hexachlorodibenzofuran (Total)	8.02	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 2	A5874_11302_DF_004	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	7.35	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 2	A5874_11302_DF_004	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.73	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 2	A5874_11302_DF_004	EPA1613B	Tetrachlorodibenzodioxin (Total)	2.15	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 2	A5874_11302_DF_004	EPA1613B	Tetrachlorodibenzofuran (Total)	3.36	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 3	A5874_11302_DF_005	EPA1613B	2,3,4,6,7,8-Hexachlorodibenzofuran	0.244	pg/g	EMPC J	U	25
A5874	Mn SD0004 Rep 3	A5874_11302_DF_005	EPA1613B	Heptachlorodibenzofuran (Total)	20.7	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 3	A5874_11302_DF_005	EPA1613B	Hexachlorodibenzofuran (Total)	9.55	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 3	A5874_11302_DF_005	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	8.53	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 3	A5874_11302_DF_005	EPA1613B	Pentachlorodibenzofuran (Total)	4.23	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 3	A5874_11302_DF_005	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.85	pg/g	EMPC	J	25

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5874	Mn SD0004 Rep 3	A5874_11302_DF_005	EPA1613B	Tetrachlorodibenzofuran (Total)	3.32	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 1	A5874_11302_DF_006	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzofuran	0.088	pg/g	EMPC J	U	25
A5874	Nc SD0004 Rep 1	A5874_11302_DF_006	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.161	pg/g	EMPC J B	U	25
A5874	Nc SD0004 Rep 1	A5874_11302_DF_006	EPA1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0909	pg/g	EMPC J	U	25
A5874	Nc SD0004 Rep 1	A5874_11302_DF_006	EPA1613B	2,3,4,7,8-Pentachlorodibenzofuran	0.0416	pg/g	EMPC J	U	25
A5874	Nc SD0004 Rep 1	A5874_11302_DF_006	EPA1613B	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.0739	pg/g	EMPC J	U	25
A5874	Nc SD0004 Rep 1	A5874_11302_DF_006	EPA1613B	Hexachlorodibenzofuran (Total)	5.57	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 1	A5874_11302_DF_006	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	3.82	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 1	A5874_11302_DF_006	EPA1613B	Octachlorodibenzofuran	0.837	pg/g	EMPC J	U	25
A5874	Nc SD0004 Rep 1	A5874_11302_DF_006	EPA1613B	Pentachlorodibenzofuran (Total)	3.97	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 1	A5874_11302_DF_006	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.31	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 1	A5874_11302_DF_006	EPA1613B	Tetrachlorodibenzodioxin (Total)	1.68	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 1	A5874_11302_DF_006	EPA1613B	Tetrachlorodibenzofuran (Total)	2.66	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 2	A5874_11302_DF_007	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.462	pg/g	EMPC J B	U	25
A5874	Nc SD0004 Rep 2	A5874_11302_DF_007	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.144	pg/g	EMPC J B	U	25
A5874	Nc SD0004 Rep 2	A5874_11302_DF_007	EPA1613B	Hexachlorodibenzofuran (Total)	5.23	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 2	A5874_11302_DF_007	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	3.24	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 2	A5874_11302_DF_007	EPA1613B	Pentachlorodibenzofuran (Total)	3.76	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 2	A5874_11302_DF_007	EPA1613B	Tetrachlorodibenzofuran (Total)	2.6	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 3	A5874_11302_DF_008	EPA1613B	1,2,3,7,8-Pentachlorodibenzofuran	0.076	pg/g	EMPC J	U	25
A5874	Nc SD0004 Rep 3	A5874_11302_DF_008	EPA1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.11	pg/g	EMPC J	U	25
A5874	Nc SD0004 Rep 3	A5874_11302_DF_008	EPA1613B	2,3,4,6,7,8-Hexachlorodibenzofuran	0.134	pg/g	EMPC J	U	25
A5874	Nc SD0004 Rep 3	A5874_11302_DF_008	EPA1613B	2,3,4,7,8-Pentachlorodibenzofuran	0.145	pg/g	EMPC J	U	25
A5874	Nc SD0004 Rep 3	A5874_11302_DF_008	EPA1613B	Hexachlorodibenzofuran (Total)	6.31	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 3	A5874_11302_DF_008	EPA1613B	Pentachlorodibenzofuran (Total)	4.14	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 3	A5874_11302_DF_008	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.21	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 3	A5874_11302_DF_008	EPA1613B	Tetrachlorodibenzodioxin (Total)	1.54	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 3	A5874_11302_DF_008	EPA1613B	Tetrachlorodibenzofuran (Total)	2.93	pg/g	EMPC	J	25
A5874	Mn SD0009	A5874_11302_DF_009	EPA1613B	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.316	pg/g	EMPC J	U	25
A5874	Mn SD0009	A5874_11302_DF_009	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzofuran	0.227	pg/g	EMPC J	U	25
A5874	Mn SD0009	A5874_11302_DF_009	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.413	pg/g	EMPC J B	U	25

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5874	Mn SD0009	A5874_11302_DF_009	EPA1613B	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.169	pg/g	EMPC J	U	25
A5874	Mn SD0009	A5874_11302_DF_009	EPA1613B	Heptachlorodibenzofuran (Total)	30.9	pg/g	EMPC	J	25
A5874	Mn SD0009	A5874_11302_DF_009	EPA1613B	Hexachlorodibenzofuran (Total)	18.5	pg/g	EMPC	J	25
A5874	Mn SD0009	A5874_11302_DF_009	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	14	pg/g	EMPC	J	25
A5874	Mn SD0009	A5874_11302_DF_009	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	2.92	pg/g	EMPC	J	25
A5874	Mn SD0009	A5874_11302_DF_009	EPA1613B	Tetrachlorodibenzodioxin (Total)	3.45	pg/g	EMPC	J	25
A5874	Mn SD0009	A5874_11302_DF_009	EPA1613B	Tetrachlorodibenzofuran (Total)	5.17	pg/g	EMPC	J	25
A5874	Nc SD0009	A5874_11302_DF_010	EPA1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.123	pg/g	EMPC J	U	25
A5874	Nc SD0009	A5874_11302_DF_010	EPA1613B	Pentachlorodibenzofuran (Total)	9.06	pg/g	EMPC	J	25
A5874	Nc SD0009	A5874_11302_DF_010	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	3.05	pg/g	EMPC	J	25
A5874	Nc SD0009	A5874_11302_DF_010	EPA1613B	Tetrachlorodibenzodioxin (Total)	3.94	pg/g	EMPC	J	25
A5874	Nc SD0009	A5874_11302_DF_010	EPA1613B	Tetrachlorodibenzofuran (Total)	5.7	pg/g	EMPC	J	25
A5874	Mn SD0010	A5874_11302_DF_011	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzofuran	0.32	pg/g	EMPC J	U	25
A5874	Mn SD0010	A5874_11302_DF_011	EPA1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.23	pg/g	EMPC J	U	25
A5874	Mn SD0010	A5874_11302_DF_011	EPA1613B	2,3,4,7,8-Pentachlorodibenzofuran	0.306	pg/g	EMPC J	U	25
A5874	Mn SD0010	A5874_11302_DF_011	EPA1613B	Heptachlorodibenzofuran (Total)	44.1	pg/g	EMPC	J	25
A5874	Mn SD0010	A5874_11302_DF_011	EPA1613B	Hexachlorodibenzofuran (Total)	21.5	pg/g	EMPC	J	25
A5874	Mn SD0010	A5874_11302_DF_011	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	13.4	pg/g	EMPC	J	25
A5874	Mn SD0010	A5874_11302_DF_011	EPA1613B	Pentachlorodibenzofuran (Total)	7.12	pg/g	EMPC	J	25
A5874	Mn SD0010	A5874_11302_DF_011	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	2.19	pg/g	EMPC	J	25
A5874	Mn SD0010	A5874_11302_DF_011	EPA1613B	Tetrachlorodibenzofuran (Total)	4.2	pg/g	EMPC	J	25
A5874	Nc SD0010	A5874_11302_DF_012	EPA1613B	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	159	pg/g		J	8L,9
A5874	Nc SD0010	A5874_11302_DF_012	EPA1613B	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.419	pg/g	EMPC J	U	25
A5874	Nc SD0010	A5874_11302_DF_012	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzofuran	0.163	pg/g	EMPC J	U	25
A5874	Nc SD0010	A5874_11302_DF_012	EPA1613B	2,3,4,6,7,8-Hexachlorodibenzofuran	0.236	pg/g	EMPC J	U	25
A5874	Nc SD0010	A5874_11302_DF_012	EPA1613B	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.0658	pg/g	EMPC J	U	25
A5874	Nc SD0010	A5874_11302_DF_012	EPA1613B	Heptachlorodibenzofuran (Total)	33.2	pg/g	EMPC	J	25
A5874	Nc SD0010	A5874_11302_DF_012	EPA1613B	Hexachlorodibenzofuran (Total)	18.7	pg/g	EMPC	J	25
A5874	Nc SD0010	A5874_11302_DF_012	EPA1613B	Pentachlorodibenzofuran (Total)	7.49	pg/g	EMPC	J	25
A5874	Nc SD0010	A5874_11302_DF_012	EPA1613B	Tetrachlorodibenzodioxin (Total)	3.22	pg/g	EMPC	J	25
A5874	Nc SD0010	A5874_11302_DF_012	EPA1613B	Tetrachlorodibenzofuran (Total)	4.48	pg/g	EMPC	J	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5874	Mn SD0011	A5874_11302_DF_013	EPA1613B	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.146	pg/g	EMPC J	U	25
A5874	Mn SD0011	A5874_11302_DF_013	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzofuran	0.203	pg/g	EMPC J	U	25
A5874	Mn SD0011	A5874_11302_DF_013	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.349	pg/g	EMPC J B	U	25
A5874	Mn SD0011	A5874_11302_DF_013	EPA1613B	Heptachlorodibenzofuran (Total)	14.8	pg/g	EMPC	J	25
A5874	Mn SD0011	A5874_11302_DF_013	EPA1613B	Hexachlorodibenzofuran (Total)	8.62	pg/g	EMPC	J	25
A5874	Mn SD0011	A5874_11302_DF_013	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	7.09	pg/g	EMPC	J	25
A5874	Mn SD0011	A5874_11302_DF_013	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.68	pg/g	EMPC	J	25
A5874	Mn SD0011	A5874_11302_DF_013	EPA1613B	Tetrachlorodibenzodioxin (Total)	1.91	pg/g	EMPC	J	25
A5874	Mn SD0011	A5874_11302_DF_013	EPA1613B	Tetrachlorodibenzofuran (Total)	3.23	pg/g	EMPC	J	25
A5874	Nc SD0011	A5874_11302_DF_014	EPA1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0705	pg/g	EMPC J	U	25
A5874	Nc SD0011	A5874_11302_DF_014	EPA1613B	2,3,4,6,7,8-Hexachlorodibenzofuran	0.112	pg/g	EMPC J	U	25
A5874	Nc SD0011	A5874_11302_DF_014	EPA1613B	2,3,7,8-Tetrachlorodibenzofuran	0.107	pg/g	EMPC J	U	25
A5874	Nc SD0011	A5874_11302_DF_014	EPA1613B	Hexachlorodibenzofuran (Total)	6.27	pg/g	EMPC	J	25
A5874	Nc SD0011	A5874_11302_DF_014	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.07	pg/g	EMPC	J	25
A5874	Nc SD0011	A5874_11302_DF_014	EPA1613B	Tetrachlorodibenzofuran (Total)	6.62	pg/g	EMPC	J	25
A5874	Mn SD0013	A5874_11302_DF_015	EPA1613B	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.196	pg/g	EMPC J	U	25
A5874	Mn SD0013	A5874_11302_DF_015	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.183	pg/g	EMPC J	U	25
A5874	Mn SD0013	A5874_11302_DF_015	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzofuran	0.101	pg/g	EMPC J	U	25
A5874	Mn SD0013	A5874_11302_DF_015	EPA1613B	2,3,7,8-Tetrachlorodibenzofuran	0.178	pg/g	EMPC J	U	25
A5874	Mn SD0013	A5874_11302_DF_015	EPA1613B	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.0729	pg/g	EMPC J	U	25
A5874	Mn SD0013	A5874_11302_DF_015	EPA1613B	Heptachlorodibenzofuran (Total)	17.3	pg/g	EMPC	J	25
A5874	Mn SD0013	A5874_11302_DF_015	EPA1613B	Hexachlorodibenzofuran (Total)	7.24	pg/g	EMPC	J	25
A5874	Mn SD0013	A5874_11302_DF_015	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	7.17	pg/g	EMPC	J	25
A5874	Mn SD0013	A5874_11302_DF_015	EPA1613B	Pentachlorodibenzofuran (Total)	3.63	pg/g	EMPC	J	25
A5874	Mn SD0013	A5874_11302_DF_015	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.47	pg/g	EMPC	J	25
A5874	Mn SD0013	A5874_11302_DF_015	EPA1613B	Tetrachlorodibenzodioxin (Total)	1.89	pg/g	EMPC	J	25
A5874	Mn SD0013	A5874_11302_DF_015	EPA1613B	Tetrachlorodibenzofuran (Total)	2.72	pg/g	EMPC	J	25
A5874	Nc SD0013	A5874_11302_DF_016	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0591	pg/g	EMPC J	U	25
A5874	Nc SD0013	A5874_11302_DF_016	EPA1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0859	pg/g	EMPC J	U	25
A5874	Nc SD0013	A5874_11302_DF_016	EPA1613B	Hexachlorodibenzofuran (Total)	6.3	pg/g	EMPC	J	25
A5874	Nc SD0013	A5874_11302_DF_016	EPA1613B	Pentachlorodibenzofuran (Total)	3.66	pg/g	EMPC	J	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5874	Nc SD0013	A5874_11302_DF_016	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.56	pg/g	EMPC	J	25
A5874	Nc SD0013	A5874_11302_DF_016	EPA1613B	Tetrachlorodibenzodioxin (Total)	1.2	pg/g	EMPC	J	25
A5874	Nc SD0013	A5874_11302_DF_016	EPA1613B	Tetrachlorodibenzofuran (Total)	2.22	pg/g	EMPC	J	25
A5874	Mn SD0015	A5874_11302_DF_017	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0836	pg/g	EMPC J	U	25
A5874	Mn SD0015	A5874_11302_DF_017	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.58	pg/g	EMPC J B	U	25
A5874	Mn SD0015	A5874_11302_DF_017	EPA1613B	Hexachlorodibenzofuran (Total)	2.93	pg/g	EMPC	J	25
A5874	Mn SD0015	A5874_11302_DF_017	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	3.38	pg/g	EMPC	J	25
A5874	Mn SD0015	A5874_11302_DF_017	EPA1613B	Pentachlorodibenzofuran (Total)	1.88	pg/g	EMPC	J	25
A5874	Mn SD0015	A5874_11302_DF_017	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.26	pg/g	EMPC	J	25
A5874	Mn SD0015	A5874_11302_DF_017	EPA1613B	Tetrachlorodibenzodioxin (Total)	1.09	pg/g	EMPC	J	25
A5874	Mn SD0015	A5874_11302_DF_017	EPA1613B	Tetrachlorodibenzofuran (Total)	1.55	pg/g	EMPC	J	25
A5874	Nc SD0015	A5874_11302_DF_018	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.331	pg/g	EMPC J B	U	25
A5874	Nc SD0015	A5874_11302_DF_018	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.156	pg/g	J B	J	9
A5874	Nc SD0015	A5874_11302_DF_018	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	2.49	pg/g	EMPC	J	25
A5874	Nc SD0015	A5874_11302_DF_018	EPA1613B	Octachlorodibenzofuran	0.701	pg/g	EMPC J	U	25
A5874	Nc SD0015	A5874_11302_DF_018	EPA1613B	Pentachlorodibenzofuran (Total)	1.91	pg/g	EMPC	J	25
A5874	Nc SD0015	A5874_11302_DF_018	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.06	pg/g	EMPC	J	25
A5874	Nc SD0015	A5874_11302_DF_018	EPA1613B	Tetrachlorodibenzodioxin (Total)	1.03	pg/g	EMPC	J	25
A5874	Mn SD0018	A5874_11302_DF_019	EPA1613B	1,2,3,7,8-Pentachlorodibenzofuran	0.0915	pg/g	EMPC J	U	25
A5874	Mn SD0018	A5874_11302_DF_019	EPA1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.134	pg/g	EMPC J	U	25
A5874	Mn SD0018	A5874_11302_DF_019	EPA1613B	2,3,4,7,8-Pentachlorodibenzofuran	0.123	pg/g	EMPC J	U	25
A5874	Mn SD0018	A5874_11302_DF_019	EPA1613B	Pentachlorodibenzofuran (Total)	2.35	pg/g	EMPC	J	25
A5874	Mn SD0018	A5874_11302_DF_019	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.87	pg/g	EMPC	J	25
A5874	Mn SD0018	A5874_11302_DF_019	EPA1613B	Tetrachlorodibenzodioxin (Total)	1.28	pg/g	EMPC	J	25
A5874	Mn SD0018	A5874_11302_DF_019	EPA1613B	Tetrachlorodibenzofuran (Total)	1.5	pg/g	EMPC	J	25
A5874	Nc SD0018	A5874_11302_DF_020	EPA1613B	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.915	pg/g	EMPC J	U	25
A5874	Nc SD0018	A5874_11302_DF_020	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0951	pg/g	EMPC J	U	25
A5874	Nc SD0018	A5874_11302_DF_020	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.374	pg/g	EMPC J B	U	25
A5874	Nc SD0018	A5874_11302_DF_020	EPA1613B	Heptachlorodibenzofuran (Total)	3.14	pg/g	EMPC	J	25
A5874	Nc SD0018	A5874_11302_DF_020	EPA1613B	Hexachlorodibenzofuran (Total)	3.47	pg/g	EMPC	J	25
A5874	Nc SD0018	A5874_11302_DF_020	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	3.34	pg/g	EMPC	J	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5874	Nc SD0018	A5874_11302_DF_020	EPA1613B	Pentachlorodibenzofuran (Total)	2.41	pg/g	EMPC	J	25
A5874	Nc SD0018	A5874_11302_DF_020	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.01	pg/g	EMPC	J	25
A5874	Nc SD0018	A5874_11302_DF_020	EPA1613B	Tetrachlorodibenzodioxin (Total)	0.963	pg/g	EMPC	J	25
A5874	Nc SD0018	A5874_11302_DF_020	EPA1613B	Tetrachlorodibenzofuran (Total)	0.963	pg/g	EMPC	J	25
A5875	Mn SD0025	A5875_11306_DF_001	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0587	pg/g	EMPC J	U	25
A5875	Mn SD0025	A5875_11306_DF_001	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.27	pg/g	EMPC J B	U	25
A5875	Mn SD0025	A5875_11306_DF_001	EPA1613B	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.103	pg/g	EMPC J	U	25
A5875	Mn SD0025	A5875_11306_DF_001	EPA1613B	Hexachlorodibenzofuran (Total)	3.1	pg/g	EMPC	J	25
A5875	Mn SD0025	A5875_11306_DF_001	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	4.49	pg/g	EMPC	J	25
A5875	Mn SD0025	A5875_11306_DF_001	EPA1613B	Pentachlorodibenzofuran (Total)	2.5	pg/g	EMPC	J	25
A5875	Mn SD0025	A5875_11306_DF_001	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.44	pg/g	EMPC	J	25
A5875	Mn SD0025	A5875_11306_DF_001	EPA1613B	Tetrachlorodibenzodioxin (Total)	1.77	pg/g	EMPC	J	25
A5875	Mn SD0025	A5875_11306_DF_001	EPA1613B	Tetrachlorodibenzofuran (Total)	3.74	pg/g	EMPC	J	25
A5875	Nc SD0025	A5875_11306_DF_002	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.14	pg/g	EMPC J B	U	25
A5875	Nc SD0025	A5875_11306_DF_002	EPA1613B	Hexachlorodibenzofuran (Total)	2.63	pg/g	EMPC	J	25
A5875	Nc SD0025	A5875_11306_DF_002	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	2.86	pg/g	EMPC	J	25
A5875	Nc SD0025	A5875_11306_DF_002	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	0.923	pg/g	EMPC	J	25
A5875	Nc SD0025	A5875_11306_DF_002	EPA1613B	Tetrachlorodibenzodioxin (Total)	1.41	pg/g	EMPC	J	25
A5875	Nc SD0025	A5875_11306_DF_002	EPA1613B	Tetrachlorodibenzofuran (Total)	2.48	pg/g	EMPC	J	25
A5875	Mn SD0026	A5875_11306_DF_003	EPA1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.47	pg/g	EMPC J	U	25
A5875	Mn SD0026	A5875_11306_DF_003	EPA1613B	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.107	pg/g	EMPC J	U	25
A5875	Mn SD0026	A5875_11306_DF_003	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	10.5	pg/g	EMPC	J	25
A5875	Mn SD0026	A5875_11306_DF_003	EPA1613B	Pentachlorodibenzofuran (Total)	4.51	pg/g	EMPC	J	25
A5875	Mn SD0026	A5875_11306_DF_003	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	2.82	pg/g	EMPC	J	25
A5875	Mn SD0026	A5875_11306_DF_003	EPA1613B	Tetrachlorodibenzodioxin (Total)	2.22	pg/g	EMPC	J	25
A5875	Mn SD0026	A5875_11306_DF_003	EPA1613B	Tetrachlorodibenzofuran (Total)	4.26	pg/g	EMPC	J	25
A5875	Nc SD0026	A5875_11306_DF_004	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzofuran	0.133	pg/g	EMPC J	U	25
A5875	Nc SD0026	A5875_11306_DF_004	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.362	pg/g	EMPC J B	U	25
A5875	Nc SD0026	A5875_11306_DF_004	EPA1613B	2,3,4,6,7,8-Hexachlorodibenzofuran	0.148	pg/g	EMPC J	U	25
A5875	Nc SD0026	A5875_11306_DF_004	EPA1613B	Hexachlorodibenzofuran (Total)	5	pg/g	EMPC	J	25
A5875	Nc SD0026	A5875_11306_DF_004	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	6.29	pg/g	EMPC	J	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5875	Nc SD0026	A5875_11306_DF_004	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	2.19	pg/g	EMPC	J	25
A5875	Mn SD0028	A5875_11306_DF_005	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.0752	pg/g	EMPC J	U	25
A5875	Mn SD0028	A5875_11306_DF_005	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0704	pg/g	EMPC J	U	25
A5875	Mn SD0028	A5875_11306_DF_005	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.169	pg/g	J B	U	7
A5875	Mn SD0028	A5875_11306_DF_005	EPA1613B	Hexachlorodibenzofuran (Total)	1.99	pg/g	EMPC	J	25
A5875	Mn SD0028	A5875_11306_DF_005	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	2.49	pg/g	EMPC	J	25
A5875	Mn SD0028	A5875_11306_DF_005	EPA1613B	Pentachlorodibenzofuran (Total)	1.79	pg/g	EMPC	J	25
A5875	Mn SD0028	A5875_11306_DF_005	EPA1613B	Tetrachlorodibenzodioxin (Total)	0.973	pg/g	EMPC	J	25
A5875	Mn SD0028	A5875_11306_DF_005	EPA1613B	Tetrachlorodibenzofuran (Total)	1.62	pg/g	EMPC	J	25
A5875	Nc SD0028	A5875_11306_DF_006	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.108	pg/g	EMPC J B	U	25
A5875	Nc SD0028	A5875_11306_DF_006	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	1.67	pg/g	EMPC	J	25
A5875	Nc SD0028	A5875_11306_DF_006	EPA1613B	Pentachlorodibenzofuran (Total)	2.47	pg/g	EMPC	J	25
A5875	Nc SD0028	A5875_11306_DF_006	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	0.572	pg/g	EMPC	J	25
A5875	Nc SD0028	A5875_11306_DF_006	EPA1613B	Tetrachlorodibenzodioxin (Total)	1.1	pg/g	EMPC	J	25
A5875	Nc SD0028	A5875_11306_DF_006	EPA1613B	Tetrachlorodibenzofuran (Total)	1.71	pg/g	EMPC	J	25
A5875	Mn SD0051	A5875_11306_DF_007	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.447	pg/g	J B	U	7
A5875	Mn SD0051	A5875_11306_DF_007	EPA1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.216	pg/g	EMPC J	U	25
A5875	Mn SD0051	A5875_11306_DF_007	EPA1613B	2,3,4,6,7,8-Hexachlorodibenzofuran	0.278	pg/g	EMPC J	U	25
A5875	Mn SD0051	A5875_11306_DF_007	EPA1613B	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.136	pg/g	EMPC J	U	25
A5875	Mn SD0051	A5875_11306_DF_007	EPA1613B	Heptachlorodibenzofuran (Total)	8.52	pg/g	EMPC	J	25
A5875	Mn SD0051	A5875_11306_DF_007	EPA1613B	Hexachlorodibenzofuran (Total)	6.75	pg/g	EMPC	J	25
A5875	Mn SD0051	A5875_11306_DF_007	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	2.15	pg/g	EMPC	J	25
A5875	Mn SD0051	A5875_11306_DF_007	EPA1613B	Tetrachlorodibenzodioxin (Total)	2.27	pg/g	EMPC	J	25
A5875	Mn SD0051	A5875_11306_DF_007	EPA1613B	Tetrachlorodibenzofuran (Total)	3.61	pg/g	EMPC	J	25
A5875	Nc SD0051	A5875_11306_DF_008	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzofuran	0.135	pg/g	EMPC J	U	25
A5875	Nc SD0051	A5875_11306_DF_008	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.309	pg/g	J B	U	7
A5875	Nc SD0051	A5875_11306_DF_008	EPA1613B	1,2,3,7,8-Pentachlorodibenzofuran	0.0992	pg/g	EMPC J	U	25
A5875	Nc SD0051	A5875_11306_DF_008	EPA1613B	Hexachlorodibenzofuran (Total)	5.34	pg/g	EMPC	J	25
A5875	Nc SD0051	A5875_11306_DF_008	EPA1613B	Pentachlorodibenzofuran (Total)	6.31	pg/g	EMPC	J	25
A5875	Nc SD0051	A5875_11306_DF_008	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	2.04	pg/g	EMPC	J	25
A5875	Nc SD0051	A5875_11306_DF_008	EPA1613B	Tetrachlorodibenzodioxin (Total)	3.05	pg/g	EMPC	J	25

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5875	Nc SD0051	A5875_11306_DF_008	EPA1613B	Tetrachlorodibenzofuran (Total)	4.58	pg/g	EMPC	J	25
A5875	Mn SD0052	A5875_11306_DF_009	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0934	pg/g	EMPC J	U	25
A5875	Mn SD0052	A5875_11306_DF_009	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.285	pg/g	J B	U	7
A5875	Mn SD0052	A5875_11306_DF_009	EPA1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.138	pg/g	EMPC J	U	25
A5875	Mn SD0052	A5875_11306_DF_009	EPA1613B	2,3,4,7,8-Pentachlorodibenzofuran	0.142	pg/g	EMPC J	U	25
A5875	Mn SD0052	A5875_11306_DF_009	EPA1613B	Hexachlorodibenzofuran (Total)	4.51	pg/g	EMPC	J	25
A5875	Mn SD0052	A5875_11306_DF_009	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	4.71	pg/g	EMPC	J	25
A5875	Mn SD0052	A5875_11306_DF_009	EPA1613B	Pentachlorodibenzofuran (Total)	3.21	pg/g	EMPC	J	25
A5875	Mn SD0052	A5875_11306_DF_009	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.51	pg/g	EMPC	J	25
A5875	Mn SD0052	A5875_11306_DF_009	EPA1613B	Tetrachlorodibenzodioxin (Total)	2.19	pg/g	EMPC	J	25
A5875	Mn SD0052	A5875_11306_DF_009	EPA1613B	Tetrachlorodibenzofuran (Total)	2.97	pg/g	EMPC	J	25
A5875	Nc SD0052	A5875_11306_DF_010	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0721	pg/g	EMPC J	U	25
A5875	Nc SD0052	A5875_11306_DF_010	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0679	pg/g	EMPC J	U	25
A5875	Nc SD0052	A5875_11306_DF_010	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.299	pg/g	EMPC J	U	25
A5875	Nc SD0052	A5875_11306_DF_010	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.166	pg/g	J B	U	7
A5875	Nc SD0052	A5875_11306_DF_010	EPA1613B	2,3,4,6,7,8-Hexachlorodibenzofuran	0.0723	pg/g	EMPC J	U	25
A5875	Nc SD0052	A5875_11306_DF_010	EPA1613B	2,3,4,7,8-Pentachlorodibenzofuran	0.129	pg/g	EMPC J	U	25
A5875	Nc SD0052	A5875_11306_DF_010	EPA1613B	2,3,7,8-Tetrachlorodibenzofuran	0.116	pg/g	EMPC J	U	25
A5875	Nc SD0052	A5875_11306_DF_010	EPA1613B	Hexachlorodibenzofuran (Total)	2.97	pg/g	EMPC	J	25
A5875	Nc SD0052	A5875_11306_DF_010	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	2.77	pg/g	EMPC	J	25
A5875	Nc SD0052	A5875_11306_DF_010	EPA1613B	Pentachlorodibenzofuran (Total)	2.99	pg/g	EMPC	J	25
A5875	Nc SD0052	A5875_11306_DF_010	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	0.996	pg/g	EMPC	J	25
A5875	Nc SD0052	A5875_11306_DF_010	EPA1613B	Tetrachlorodibenzodioxin (Total)	1.91	pg/g	EMPC	J	25
A5875	Nc SD0052	A5875_11306_DF_010	EPA1613B	Tetrachlorodibenzofuran (Total)	2.66	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 1	A5875_11306_DF_011	EPA1613B	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.377	pg/g	EMPC J	U	25
A5875	Mn SD0053 Rep 1	A5875_11306_DF_011	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.52	pg/g	J B	U	7
A5875	Mn SD0053 Rep 1	A5875_11306_DF_011	EPA1613B	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.233	pg/g	EMPC J	U	25
A5875	Mn SD0053 Rep 1	A5875_11306_DF_011	EPA1613B	Heptachlorodibenzofuran (Total)	41.3	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 1	A5875_11306_DF_011	EPA1613B	Hexachlorodibenzofuran (Total)	24.8	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 1	A5875_11306_DF_011	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	11.1	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 1	A5875_11306_DF_011	EPA1613B	Pentachlorodibenzofuran (Total)	8.7	pg/g	EMPC	J	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5875	Mn SD0053 Rep 1	A5875_11306_DF_011	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	2.23	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 1	A5875_11306_DF_011	EPA1613B	Tetrachlorodibenzodioxin (Total)	4.01	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 1	A5875_11306_DF_011	EPA1613B	Tetrachlorodibenzofuran (Total)	5.64	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 2	A5875_11306_DF_012	EPA1613B	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.437	pg/g	EMPC J	U	25
A5875	Mn SD0053 Rep 2	A5875_11306_DF_012	EPA1613B	Heptachlorodibenzofuran (Total)	48.3	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 2	A5875_11306_DF_012	EPA1613B	Hexachlorodibenzofuran (Total)	30.8	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 2	A5875_11306_DF_012	EPA1613B	Pentachlorodibenzofuran (Total)	11.1	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 2	A5875_11306_DF_012	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	2.89	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 2	A5875_11306_DF_012	EPA1613B	Tetrachlorodibenzodioxin (Total)	4.65	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 2	A5875_11306_DF_012	EPA1613B	Tetrachlorodibenzofuran (Total)	6.39	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 3	A5875_11306_DF_013	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.232	pg/g	EMPC J	U	25
A5875	Mn SD0053 Rep 3	A5875_11306_DF_013	EPA1613B	Heptachlorodibenzofuran (Total)	85.2	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 3	A5875_11306_DF_013	EPA1613B	Hexachlorodibenzofuran (Total)	37.7	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 3	A5875_11306_DF_013	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	16.8	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 3	A5875_11306_DF_013	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	2.89	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 3	A5875_11306_DF_013	EPA1613B	Tetrachlorodibenzodioxin (Total)	5.31	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 3	A5875_11306_DF_013	EPA1613B	Tetrachlorodibenzofuran (Total)	6.93	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 1	A5875_11306_DF_014	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzofuran	0.151	pg/g	EMPC J	U	25
A5875	Nc SD0053 Rep 1	A5875_11306_DF_014	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.255	pg/g	J B	U	7
A5875	Nc SD0053 Rep 1	A5875_11306_DF_014	EPA1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.14	pg/g	EMPC J	U	25
A5875	Nc SD0053 Rep 1	A5875_11306_DF_014	EPA1613B	Hexachlorodibenzofuran (Total)	16.7	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 1	A5875_11306_DF_014	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	5.9	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 1	A5875_11306_DF_014	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.93	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 1	A5875_11306_DF_014	EPA1613B	Tetrachlorodibenzofuran (Total)	5.38	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 2	A5875_11306_DF_015	EPA1613B	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.105	pg/g	EMPC J	U	25
A5875	Nc SD0053 Rep 2	A5875_11306_DF_015	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.26	pg/g	J B	U	7
A5875	Nc SD0053 Rep 2	A5875_11306_DF_015	EPA1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.125	pg/g	EMPC J	U	25
A5875	Nc SD0053 Rep 2	A5875_11306_DF_015	EPA1613B	Heptachlorodibenzofuran (Total)	9.28	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 2	A5875_11306_DF_015	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	6.09	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 2	A5875_11306_DF_015	EPA1613B	Pentachlorodibenzofuran (Total)	8.43	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 2	A5875_11306_DF_015	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.46	pg/g	EMPC	J	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5875	Nc SD0053 Rep 2	A5875_11306_DF_015	EPA1613B	Tetrachlorodibenzodioxin (Total)	4.01	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 2	A5875_11306_DF_015	EPA1613B	Tetrachlorodibenzofuran (Total)	5.39	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 3	A5875_11306_DF_016	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzofuran	0.346	pg/g	EMPC J	U	25
A5875	Nc SD0053 Rep 3	A5875_11306_DF_016	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.33	pg/g	J B	U	7
A5875	Nc SD0053 Rep 3	A5875_11306_DF_016	EPA1613B	2,3,4,7,8-Pentachlorodibenzofuran	0.223	pg/g	EMPC J	U	25
A5875	Nc SD0053 Rep 3	A5875_11306_DF_016	EPA1613B	2,3,7,8-Tetrachlorodibenzofuran	0.215	pg/g	EMPC J	U	25
A5875	Nc SD0053 Rep 3	A5875_11306_DF_016	EPA1613B	Hexachlorodibenzofuran (Total)	18.5	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 3	A5875_11306_DF_016	EPA1613B	Pentachlorodibenzofuran (Total)	9.22	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 3	A5875_11306_DF_016	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.2	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 3	A5875_11306_DF_016	EPA1613B	Tetrachlorodibenzodioxin (Total)	3.95	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 3	A5875_11306_DF_016	EPA1613B	Tetrachlorodibenzofuran (Total)	5.19	pg/g	EMPC	J	25
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	1,2,3,4,6,7,8-Heptachlorodibenzofuran	6.3	pg/g		J	9
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	15.4	pg/g		J	9
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.144	pg/g	EMPC J	U	25
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzofuran	0.345	pg/g	J	J	9
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzofuran	0.296	pg/g	J	J	9
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.41	pg/g		J	9
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.537	pg/g	EMPC J B	U	25
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.298	pg/g	EMPC J	U	25
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	2,3,4,6,7,8-Hexachlorodibenzofuran	0.476	pg/g	J	J	9
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	2,3,7,8-Tetrachlorodibenzofuran	0.378	pg/g	EMPC J	U	25
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.36	pg/g	EMPC J	U	25
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	Heptachlorodibenzofuran (Total)	14.6	pg/g	EMPC	J	25
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	13	pg/g	EMPC	J	25
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	Octachlorodibenzo-p-dioxin	75	pg/g		J	9
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	Pentachlorodibenzofuran (Total)	8.51	pg/g	EMPC	J	25
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	3.97	pg/g	EMPC	J	25
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	Tetrachlorodibenzodioxin (Total)	4.27	pg/g	EMPC	J	25
A5875	Mn SD0054	A5875_11306_DF_017	EPA1613B	Tetrachlorodibenzofuran (Total)	5.64	pg/g	EMPC	J	25
A5875	Nc SD0054	A5875_11306_DF_018	EPA1613B	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0896	pg/g	EMPC J	U	25
A5875	Nc SD0054	A5875_11306_DF_018	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzofuran	0.156	pg/g	EMPC J	U	25

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A5875	Nc SD0054	A5875_11306_DF_018	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.296	pg/g	J B	U	7
A5875	Nc SD0054	A5875_11306_DF_018	EPA1613B	1,2,3,7,8-Pentachlorodibenzofuran	0.105	pg/g	EMPC J	U	25
A5875	Nc SD0054	A5875_11306_DF_018	EPA1613B	2,3,4,6,7,8-Hexachlorodibenzofuran	0.208	pg/g	EMPC J	U	25
A5875	Nc SD0054	A5875_11306_DF_018	EPA1613B	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.174	pg/g	EMPC J	U	25
A5875	Nc SD0054	A5875_11306_DF_018	EPA1613B	Heptachlorodibenzofuran (Total)	4.3	pg/g	EMPC	J	25
A5875	Nc SD0054	A5875_11306_DF_018	EPA1613B	Hexachlorodibenzofuran (Total)	7.91	pg/g	EMPC	J	25
A5875	Nc SD0054	A5875_11306_DF_018	EPA1613B	Pentachlorodibenzofuran (Total)	8.01	pg/g	EMPC	J	25
A5875	Nc SD0054	A5875_11306_DF_018	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	2.47	pg/g	EMPC	J	25
A5875	Nc SD0054	A5875_11306_DF_018	EPA1613B	Tetrachlorodibenzodioxin (Total)	3.15	pg/g	EMPC	J	25
A5875	Nc SD0054	A5875_11306_DF_018	EPA1613B	Tetrachlorodibenzofuran (Total)	4.87	pg/g	EMPC	J	25
A5875	Mn SD0055	A5875_11306_DF_019	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0544	pg/g	EMPC J	U	25
A5875	Mn SD0055	A5875_11306_DF_019	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.109	pg/g	EMPC J B	U	25
A5875	Mn SD0055	A5875_11306_DF_019	EPA1613B	Hexachlorodibenzofuran (Total)	0.673	pg/g	EMPC	J	25
A5875	Mn SD0055	A5875_11306_DF_019	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	1.43	pg/g	EMPC	J	25
A5875	Mn SD0055	A5875_11306_DF_019	EPA1613B	Pentachlorodibenzofuran (Total)	0.428	pg/g	EMPC	J	25
A5875	Mn SD0055	A5875_11306_DF_019	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	0.237	pg/g	EMPC	J	25
A5875	Mn SD0055	A5875_11306_DF_019	EPA1613B	Tetrachlorodibenzodioxin (Total)	0.317	pg/g	EMPC	J	25
A5875	Mn SD0055	A5875_11306_DF_019	EPA1613B	Tetrachlorodibenzofuran (Total)	0.336	pg/g	EMPC	J	25
A5875	Nc SD0055	A5875_11306_DF_020	EPA1613B	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.781	pg/g	EMPC J	U	25
A5875	Nc SD0055	A5875_11306_DF_020	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.104	pg/g	J B	U	7
A5875	Nc SD0055	A5875_11306_DF_020	EPA1613B	Heptachlorodibenzo-p-dioxin (Total)	2.51	pg/g	EMPC	J	25
A5875	Nc SD0055	A5875_11306_DF_020	EPA1613B	Hexachlorodibenzofuran (Total)	0.555	pg/g	EMPC	J	25
A5875	Nc SD0055	A5875_11306_DF_020	EPA1613B	Pentachlorodibenzofuran (Total)	0.467	pg/g	EMPC	J	25
A5876	Mn SD0053-AC	A5876_11309_DF_001	EPA1613B	1,2,3,7,8-Pentachlorodibenzofuran	0.172	pg/g	EMPC J	U	25
A5876	Mn SD0053-AC	A5876_11309_DF_001	EPA1613B	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.198	pg/g	EMPC J	U	25
A5876	Mn SD0053-AC	A5876_11309_DF_001	EPA1613B	Heptachlorodibenzofuran (Total)	54.7	pg/g	EMPC	J	25
A5876	Mn SD0053-AC	A5876_11309_DF_001	EPA1613B	Hexachlorodibenzofuran (Total)	28.1	pg/g	EMPC	J	25
A5876	Mn SD0053-AC	A5876_11309_DF_001	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	12.5	pg/g	EMPC	J	25
A5876	Mn SD0053-AC	A5876_11309_DF_001	EPA1613B	Pentachlorodibenzofuran (Total)	9.75	pg/g	EMPC	J	25
A5876	Mn SD0053-AC	A5876_11309_DF_001	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	2.1	pg/g	EMPC	J	25
A5876	Mn SD0053-AC	A5876_11309_DF_001	EPA1613B	Tetrachlorodibenzodioxin (Total)	3.1	pg/g	EMPC	J	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5876	Mn SD0053-AC	A5876_11309_DF_001	EPA1613B	Tetrachlorodibenzofuran (Total)	4.8	pg/g	EMPC	J	25
A5876	Nc SD0053-AC	A5876_11309_DF_002	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.246	pg/g	J B	U	7
A5876	Nc SD0053-AC	A5876_11309_DF_002	EPA1613B	2,3,7,8-Tetrachlorodibenzofuran	0.103	pg/g	EMPC J	U	25
A5876	Nc SD0053-AC	A5876_11309_DF_002	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	4.8	pg/g	EMPC	J	25
A5876	Nc SD0053-AC	A5876_11309_DF_002	EPA1613B	Pentachlorodibenzofuran (Total)	6.13	pg/g	EMPC	J	25
A5876	Nc SD0053-AC	A5876_11309_DF_002	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.14	pg/g	EMPC	J	25
A5876	Nc SD0053-AC	A5876_11309_DF_002	EPA1613B	Tetrachlorodibenzofuran (Total)	2.96	pg/g	EMPC	J	25
A5876	Mn SD0054-AC	A5876_11309_DF_003	EPA1613B	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.133	pg/g	EMPC J	U	25
A5876	Mn SD0054-AC	A5876_11309_DF_003	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.455	pg/g	EMPC J B	U	25
A5876	Mn SD0054-AC	A5876_11309_DF_003	EPA1613B	1,2,3,7,8-Pentachlorodibenzofuran	0.107	pg/g	EMPC J	U	25
A5876	Mn SD0054-AC	A5876_11309_DF_003	EPA1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.268	pg/g	EMPC J	U	25
A5876	Mn SD0054-AC	A5876_11309_DF_003	EPA1613B	2,3,4,7,8-Pentachlorodibenzofuran	0.234	pg/g	EMPC J	U	25
A5876	Mn SD0054-AC	A5876_11309_DF_003	EPA1613B	Heptachlorodibenzofuran (Total)	12.3	pg/g	EMPC	J	25
A5876	Mn SD0054-AC	A5876_11309_DF_003	EPA1613B	Hexachlorodibenzo-p-dioxin (Total)	8.97	pg/g	EMPC	J	25
A5876	Mn SD0054-AC	A5876_11309_DF_003	EPA1613B	Pentachlorodibenzofuran (Total)	5.74	pg/g	EMPC	J	25
A5876	Mn SD0054-AC	A5876_11309_DF_003	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	2.6	pg/g	EMPC	J	25
A5876	Mn SD0054-AC	A5876_11309_DF_003	EPA1613B	Tetrachlorodibenzodioxin (Total)	2.19	pg/g	EMPC	J	25
A5876	Mn SD0054-AC	A5876_11309_DF_003	EPA1613B	Tetrachlorodibenzofuran (Total)	3.24	pg/g	EMPC	J	25
A5876	Nc SD0054-AC	A5876_11309_DF_004	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzofuran	0.13	pg/g	EMPC J	U	25
A5876	Nc SD0054-AC	A5876_11309_DF_004	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.269	pg/g	J B	U	7
A5876	Nc SD0054-AC	A5876_11309_DF_004	EPA1613B	1,2,3,7,8-Pentachlorodibenzofuran	0.0937	pg/g	EMPC J	U	25
A5876	Nc SD0054-AC	A5876_11309_DF_004	EPA1613B	Hexachlorodibenzofuran (Total)	6.73	pg/g	EMPC	J	25
A5876	Nc SD0054-AC	A5876_11309_DF_004	EPA1613B	Pentachlorodibenzofuran (Total)	6.15	pg/g	EMPC	J	25
A5876	Nc SD0054-AC	A5876_11309_DF_004	EPA1613B	Pentachlorodibenzo-p-dioxin (Total)	1.72	pg/g	EMPC	J	25
A5876	Nc SD0054-AC	A5876_11309_DF_004	EPA1613B	Tetrachlorodibenzofuran (Total)	3.06	pg/g	EMPC	J	25
A5878	SD0054 D/F	A5878_11298_DF_002	EPA1613B	Octachlorodibenzofuran	0.0115	pg/uL	EMPC J	U	25
A5878	SD0018 D/F	A5878_11298_DF_003	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzofuran	0.00394	pg/uL	EMPC J	U	25
A5878	SD0053 AC D/F	A5878_11298_DF_004	EPA1613B	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.00844	pg/uL	EMPC J	U	25
A5878	SD0051 D/F	A5878_11298_DF_005	EPA1613B	Octachlorodibenzofuran	0.00896	pg/uL	EMPC J	U	25
A5878	SD0028 D/F	A5878_11298_DF_007	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.00761	pg/uL	EMPC J	U	25
A5878	SD0028 D/F	A5878_11298_DF_007	EPA1613B	Octachlorodibenzo-p-dioxin	0.0307	pg/uL	EMPC J	U	25

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A5878	SD0053-1 D/F	A5878_11298_DF_008	EPA1613B	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.0301	pg/uL	EMPC	U	25
A5878	SD0054-AC D/F	A5878_11298_DF_009	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.0369	pg/uL	EMPC J	U	25
A5878	SD0026 D/F	A5878_11298_DF_010	EPA1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.00929	pg/uL	EMPC J	U	25
A5878	SD004-2 D/F	A5878_11298_DF_011	EPA1613B	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.0599	pg/uL	EMPC J	U	25
A5878	SD004-2 D/F	A5878_11298_DF_011	EPA1613B	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.0158	pg/uL	EMPC J	U	25
A5878	SD0055 D/F	A5878_11298_DF_012	EPA1613B	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.00857	pg/uL	EMPC J	U	25
A5878	SD0055 D/F	A5878_11298_DF_012	EPA1613B	Octachlorodibenzo-p-dioxin	0.0138	pg/uL	EMPC J	U	25
A5878	SD0053-2 D/F	A5878_11298_DF_013	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.0457	pg/uL	EMPC J	U	25
A5878	SD004-1 D/F	A5878_11298_DF_015	EPA1613B	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.00833	pg/uL	EMPC J	U	25
A5878	SD004-1 D/F	A5878_11298_DF_015	EPA1613B	Octachlorodibenzo-p-dioxin	0.157	pg/uL	EMPC J	U	25
A5878	SD009 D/F	A5878_11298_DF_016	EPA1613B	Octachlorodibenzofuran	0.0453	pg/uL	EMPC J	U	25
A5878	SD0015 D/F	A5878_11298_DF_017	EPA1613B	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0419	pg/uL	EMPC J	U	25
A5878	SD0013 D/F	A5878_11298_DF_018	EPA1613B	Octachlorodibenzofuran	0.00958	pg/uL	EMPC J	U	25
A5878	SD004-3 D/F	A5878_11298_DF_019	EPA1613B	Octachlorodibenzofuran	0.00661	pg/uL	EMPC J	U	25
A5878	SD0011 D/F	A5878_11298_DF_020	EPA1613B	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.08	pg/uL	EMPC J	U	25
A5878	SD0011 D/F	A5878_11298_DF_020	EPA1613B	Octachlorodibenzofuran	0.0114	pg/uL	EMPC J	U	25
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	17	pg/g	EMPC	U	25
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	5.91	pg/g	EMPC	U	25
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	4.52	pg/g	B EMPC	U	25
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	2,2',3,3',4,5'-Hexachlorobiphenyl	44	pg/g		J	13H
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	2,2',3,3',4,6'-Hexachlorobiphenyl	261	pg/g		J	13H
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	10.9	pg/g	EMPC	U	25
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	2,2',3,3',5,6-Hexachlorobiphenyl	38.5	pg/g		J	13H
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	2,2',3,3',6,6'-Hexachlorobiphenyl	81.6	pg/g		J	13H
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	2,2',3,4,4',5-Hexachlorobiphenyl	30.8	pg/g		J	13H
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	2,2',3,4',5,5'-Hexachlorobiphenyl	82	pg/g		J	13H
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	2,2',3,4,5,5'-Hexachlorobiphenyl	124	pg/g		J	13H
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	2,2',3,4,5',6-Hexachlorobiphenyl	33.3	pg/g		J	13H
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	2,2',3,6,6'-Pentachlorobiphenyl	6.17	pg/g	EMPC	U	25
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	2,2',4,5,6'-Pentachlorobiphenyl	15.6	pg/g	EMPC	U	25
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	2,3,3',4,4',6-Hexachlorobiphenyl	77.6	pg/g		J	13H

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A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	2,3,3',4',5',6-Hexachlorobiphenyl	47.1	pg/g		J	13H
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	2,3,4,4',5-Pentachlorobiphenyl	17	pg/g	EMPC	U	25
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	3,3',4,5'-Tetrachlorobiphenyl	7.11	pg/g	EMPC	U	25
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	3,3'-Dichlorobiphenyl	13.2	pg/g	B	U	7
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	3,4,4'-Trichlorobiphenyl	32.2	pg/g	EMPC	U	25
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	3,4',5-Trichlorobiphenyl	4.32	pg/g	EMPC	U	25
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	Coelution of PCB 128 and 166	112	pg/g	C	J	13H
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	Coelution of PCB 129, 138, and 163	741	pg/g	C	J	13H
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	Coelution of PCB 135 and 151	173	pg/g	C	J	13H
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	Coelution of PCB 139 and 140	13.7	pg/g	C	J	13H
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	Coelution of PCB 147 and 149	521	pg/g	C	J	13H
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	Coelution of PCB 153 and 168	540	pg/g	C	J	13H
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	Octachlorobiphenyl homologs	153	pg/g	EMPC	J	25
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	Pentachlorobiphenyl homologs	6120	pg/g	EMPC	J	25
A5876	Mn SD0053-AC	11309_PCB_001-RJ-D10	EPA1668A	Trichlorobiphenyl homologs	934	pg/g	EMPC	J	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	2,2',3,3',4,4',5,6-Octachlorobiphenyl	6.96	pg/g	EMPC	U	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	2,2',3,3',4,5',6'-Heptachlorobiphenyl	26.7	pg/g	EMPC	U	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	6.86	pg/g	EMPC	U	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	2,2',3,4,5,5',6-Heptachlorobiphenyl	2.76	pg/g	EMPC	U	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	2,2',3,4',5,5'-Hexachlorobiphenyl	54	pg/g	EMPC	U	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	2,2',3,4,5',6-Hexachlorobiphenyl	14.3	pg/g	EMPC	U	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	2,2',3,5-Tetrachlorobiphenyl	12	pg/g	EMPC	U	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	2,2',3,6'-Tetrachlorobiphenyl	9.59	pg/g	EMPC	U	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	2,2',4,6'-Tetrachlorobiphenyl	4.96	pg/g	EMPC	U	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	2,3,3',4,4',5,6-Heptachlorobiphenyl	7.2	pg/g	EMPC	U	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	2,3,3',4,4',6-Hexachlorobiphenyl	33.4	pg/g	EMPC	U	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	2,3,3',4',5',6-Hexachlorobiphenyl	23.4	pg/g	EMPC	U	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	2,3',4,4',5'-Pentachlorobiphenyl	6.89	pg/g	EMPC	U	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	2,3,4,4',5-Pentachlorobiphenyl	8.77	pg/g	EMPC	U	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	2,3,4',5-Tetrachlorobiphenyl	8.59	pg/g	EMPC	U	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	2,3,4'-Trichlorobiphenyl	28.7	pg/g	EMPC	U	25

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A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	3,3',4,5'-Tetrachlorobiphenyl	6.22	pg/g	EMPC	U	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	3,3'-Dichlorobiphenyl	8.79	pg/g	B	U	7
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	Coelution of PCB 171 and 173	13	pg/g	EMPC C	U	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	Heptachlorobiphenyl homologs	373	pg/g	EMPC	J	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	Hexachlorobiphenyl homologs	1560	pg/g	EMPC	J	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	Octachlorobiphenyl homologs	83.6	pg/g	EMPC	J	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	Pentachlorobiphenyl homologs	3540	pg/g	EMPC	J	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	Tetrachlorobiphenyl homologs	2530	pg/g	EMPC	J	25
A5876	Nc SD0053-AC	11309_PCB_002-RJ-D10	EPA1668A	Trichlorobiphenyl homologs	374	pg/g	EMPC	J	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	20.8	pg/g	EMPC	U	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	2,2',3,3',4,4',5,6-Octachlorobiphenyl	9.68	pg/g	EMPC	U	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	8.26	pg/g	EMPC	U	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	2,2',3,3',4-Pentachlorobiphenyl	65.3	pg/g	EMPC	U	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	2,2',3,3',5-Pentachlorobiphenyl	15.5	pg/g	EMPC	U	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	2,2',3,4,4',5-Hexachlorobiphenyl	21.1	pg/g	EMPC	U	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	2,2',3,4-Tetrachlorobiphenyl	19.8	pg/g	EMPC	U	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	2,2',3,6,6'-Pentachlorobiphenyl	2.77	pg/g	EMPC	U	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	2,2',4,6'-Tetrachlorobiphenyl	14.6	pg/g	EMPC	U	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	2,3,3',4',5'-Pentachlorobiphenyl	6.91	pg/g	EMPC	U	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	2,3',4,4',5'-Pentachlorobiphenyl	5.49	pg/g	EMPC	U	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	2,3',4-Trichlorobiphenyl	4.55	pg/g	EMPC	U	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	3,3',4,5'-Tetrachlorobiphenyl	5.11	pg/g	EMPC	U	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	3,3'-Dichlorobiphenyl	25.2	pg/g		U	7
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	3,4,4'-Trichlorobiphenyl	13.7	pg/g	EMPC	U	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	Hexachlorobiphenyl homologs	2630	pg/g	EMPC	J	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	Octachlorobiphenyl homologs	181	pg/g	EMPC	J	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	Pentachlorobiphenyl homologs	3500	pg/g	EMPC	J	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	Tetrachlorobiphenyl homologs	1820	pg/g	EMPC	J	25
A5876	Mn SD0054-AC	11309_PCB_003-RJ-D10	EPA1668A	Trichlorobiphenyl homologs	376	pg/g	EMPC	J	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	10.3	pg/g	EMPC	U	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	2,2',3,3',4,6,6'-Heptachlorobiphenyl	6.13	pg/g	EMPC	U	25

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A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	2,2',3,3',4,6-Hexachlorobiphenyl	5.76	pg/g	EMPC	U	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	2,2',3,3',5,5',6-Heptachlorobiphenyl	16.8	pg/g	EMPC	U	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	2,2',3,4,5,5',6-Heptachlorobiphenyl	5.84	pg/g	EMPC	U	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	2,2',3,6-Tetrachlorobiphenyl	5.57	pg/g	EMPC	U	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	2,2',4,4',5,6'-Hexachlorobiphenyl	6.71	pg/g	EMPC	U	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	2,2',4-Trichlorobiphenyl	7.1	pg/g	EMPC	U	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	2,3,3',4,4',6-Hexachlorobiphenyl	38.2	pg/g	EMPC	U	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	2,3',4,4',5,5'-Hexachlorobiphenyl	10.1	pg/g	EMPC	U	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	3,3'-Dichlorobiphenyl	11.7	pg/g	B	U	7
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	Coelution of PCB 020 and 028	31.7	pg/g	EMPC C	U	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	Coelution of PCB 059, 062, and 075	5.17	pg/g	EMPC C	U	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	Coelution of PCB 139 and 140	8.22	pg/g	EMPC C	U	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	Coelution of PCB 198 and 199	26.5	pg/g	EMPC C	U	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	Heptachlorobiphenyl homologs	462	pg/g	EMPC	J	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	Hexachlorobiphenyl homologs	1820	pg/g	EMPC	J	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	Octachlorobiphenyl homologs	75.1	pg/g	EMPC	J	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	Tetrachlorobiphenyl homologs	1010	pg/g	EMPC	J	25
A5876	Nc SD0054-AC	11309_PCB_004-RJ-D10	EPA1668A	Trichlorobiphenyl homologs	125	pg/g	EMPC	J	25
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	6.87	pg/g	EMPC	U	25
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,3',4,4',5-Heptachlorobiphenyl	64.9	pg/g		J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	3.94	pg/g		J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,3',4,5,5'-Heptachlorobiphenyl	13.9	pg/g		J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,3',4,5',6'-Heptachlorobiphenyl	62.5	pg/g		J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,3',4,5',6-Heptachlorobiphenyl	5.55	pg/g		J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,3',4,5,6'-Heptachlorobiphenyl	95.1	pg/g		J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,3',4,6,6'-Heptachlorobiphenyl	11	pg/g		J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,3',5,5',6-Heptachlorobiphenyl	21.2	pg/g		J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,3',5,6,6'-Heptachlorobiphenyl	41.9	pg/g		J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,4,4',5',6-Heptachlorobiphenyl	54.6	pg/g		J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,4,4',5,6'-Heptachlorobiphenyl	0.623	pg/g	J	J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,4,4',5,6-Heptachlorobiphenyl	0.481	pg/g	J EMPC	U	25

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A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,4,4',6,6'-Heptachlorobiphenyl	0.151	pg/g	J	J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,4',5,5',6-Heptachlorobiphenyl	146	pg/g		J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,4,5,5',6-Heptachlorobiphenyl	9.64	pg/g		J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,4',5,6'-Hexachlorobiphenyl	0.681	pg/g	J EMPC	U	25
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',3,4,6,6'-Hexachlorobiphenyl	0.11	pg/g	J EMPC	U	25
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2',6,6'-Tetrachlorobiphenyl	0.247	pg/g	J EMPC	U	25
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,2'-Dichlorobiphenyl	1.15	pg/g	B	U	7
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,3,3',4,4',5,5'-Heptachlorobiphenyl	1.94	pg/g		J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,3,3',4,4',5',6-Heptachlorobiphenyl	2.51	pg/g		J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,3,3',4,4',5,6-Heptachlorobiphenyl	9.66	pg/g		J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,3,3',5,5'-Pentachlorobiphenyl	0.206	pg/g	J EMPC	U	25
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,3'-Dichlorobiphenyl	1.93	pg/g	B	U	7
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,3-Dichlorobiphenyl	0.337	pg/g	J B	U	7
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,4-Dichlorobiphenyl	0.6	pg/g	J B EMPC	U	25
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2,5-Dichlorobiphenyl	1.15	pg/g	B	U	7
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	2-Chlorobiphenyl	0.93	pg/g	J B	U	7
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	3,3',5-Trichlorobiphenyl	0.403	pg/g	J EMPC	U	25
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	3,3'-Dichlorobiphenyl	17.2	pg/g	B	U	7
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	3,4,5-Trichlorobiphenyl	0.271	pg/g	J EMPC	U	25
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	3-Chlorobiphenyl	0.769	pg/g	J B	U	7
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	4,4'-Dichlorobiphenyl	3.06	pg/g	B	U	7
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	4-Chlorobiphenyl	0.968	pg/g	J B	U	7
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	Coelution of PCB 012 and 013	0.863	pg/g	J B C	U	7
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	Coelution of PCB 171 and 173	28.6	pg/g	C	J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	Coelution of PCB 180 and 193	145	pg/g	C	J	13H
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	Dichlorobiphenyl homologs	38.5	pg/g	EMPC	J	25
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	Heptachlorobiphenyl homologs	716	pg/g	EMPC	J	25
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	Nonachlorobiphenyl homologs	10.8	pg/g	EMPC	J	25
A5874	Nc SD0011	302_PCB_014-CU-RJ-D2	EPA1668A	Trichlorobiphenyl homologs	307	pg/g	EMPC	J	25
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,2',3,3',4,4',5-Heptachlorobiphenyl	82.5	pg/g		J	13H
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,2',3,3',4,5,5'-Heptachlorobiphenyl	16.3	pg/g		J	13H

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A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,2',3,3',4,5',6'-Heptachlorobiphenyl	64	pg/g		J	13H
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,2',3,3',4,5',6-Heptachlorobiphenyl	4.81	pg/g		J	13H
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,2',3,3',4,5,6'-Heptachlorobiphenyl	106	pg/g		J	13H
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,2',3,3',4,6,6'-Heptachlorobiphenyl	13.5	pg/g		J	13H
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,2',3,3',5,5',6-Heptachlorobiphenyl	25.9	pg/g		J	13H
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,2',3,3',5,6,6'-Heptachlorobiphenyl	49.4	pg/g		J	13H
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,2',3,4,4',5',6-Heptachlorobiphenyl	62.9	pg/g		J	13H
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,2',3,4',5,5',6-Heptachlorobiphenyl	155	pg/g		J	13H
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,2',3,4,5,5',6-Heptachlorobiphenyl	11.5	pg/g	EMPC	U	25
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,2',6,6'-Tetrachlorobiphenyl	1.24	pg/g	EMPC	U	25
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,3,3',4,4',5',6-Heptachlorobiphenyl	4.22	pg/g	EMPC	U	25
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,3,3',4,4',5,6-Heptachlorobiphenyl	17.6	pg/g		J	13H
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,3,3',4',5,5'-Hexachlorobiphenyl	2.32	pg/g	EMPC	U	25
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,3',4,5'-Tetrachlorobiphenyl	2.56	pg/g	EMPC	U	25
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,3'-Dichlorobiphenyl	17.2	pg/g	EMPC	U	25
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	2,4-Dichlorobiphenyl	8.54	pg/g	EMPC	U	25
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	3-Chlorobiphenyl	3.47	pg/g	EMPC	U	25
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	Coelution of PCB 171 and 173	34.4	pg/g	C	J	13H
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	Coelution of PCB 180 and 193	192	pg/g	C	J	13H
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	Dichlorobiphenyl homologs	211	pg/g	EMPC	J	25
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	Heptachlorobiphenyl homologs	840	pg/g	EMPC	J	25
A5875	Nc SD0025	75_11306_PCB_002-D10	EPA1668A	Monochlorobiphenyl homologs	85.2	pg/g	EMPC	J	25
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	14.9	pg/g	EMPC	U	25
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	14.5	pg/g	EMPC	U	25
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,2',3,3',4,4',5-Heptachlorobiphenyl	85.5	pg/g		J	13H
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,2',3,3',4,5,5'-Heptachlorobiphenyl	18.1	pg/g		J	13H
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	5.31	pg/g	EMPC	U	25
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,2',3,3',4,5',6'-Heptachlorobiphenyl	71.7	pg/g		J	13H
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,2',3,3',4,5',6-Heptachlorobiphenyl	5.12	pg/g	EMPC	U	25
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,2',3,3',4,5,6'-Heptachlorobiphenyl	116	pg/g		J	13H
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,2',3,3',4,6,6'-Heptachlorobiphenyl	14.3	pg/g		J	13H

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,2',3,3',5,5',6-Heptachlorobiphenyl	34	pg/g		J	13H
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,2',3,3',5,5'-Hexachlorobiphenyl	16	pg/g	EMPC	U	25
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,2',3,3',5,6,6'-Heptachlorobiphenyl	50.6	pg/g		J	13H
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl	16.4	pg/g	EMPC	U	25
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,2',3,4,4',5',6-Heptachlorobiphenyl	73.1	pg/g		J	13H
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,2',3,4',5,5',6-Heptachlorobiphenyl	165	pg/g		J	13H
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,2',3,4,6'-Pentachlorobiphenyl	5.1	pg/g	EMPC	U	25
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,2',3,6,6'-Pentachlorobiphenyl	2.74	pg/g	EMPC	U	25
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,3,3',4,4',5,6-Heptachlorobiphenyl	16.7	pg/g		J	13H
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,3',4,5-Tetrachlorobiphenyl	7.57	pg/g	EMPC	U	25
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,3',5,5'-Tetrachlorobiphenyl	6.34	pg/g	EMPC	U	25
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	2,3',6-Trichlorobiphenyl	2.48	pg/g	EMPC	U	25
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	Coelution of PCB 171 and 173	34	pg/g	C	J	13H
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	Coelution of PCB 180 and 193	207	pg/g	C	J	13H
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	Heptachlorobiphenyl homologs	892	pg/g	EMPC	J	25
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	Hexachlorobiphenyl homologs	3890	pg/g	EMPC	J	25
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	Octachlorobiphenyl homologs	121	pg/g	EMPC	J	25
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	Pentachlorobiphenyl homologs	6420	pg/g	EMPC	J	25
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	Tetrachlorobiphenyl homologs	2720	pg/g	EMPC	J	25
A5875	Nc SD0026	75_11306_PCB_004-D10	EPA1668A	Trichlorobiphenyl homologs	319	pg/g	EMPC	J	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	4.89	pg/g		J	13H
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,2',3,3',4,4',5-Heptachlorobiphenyl	35.8	pg/g		J	13H
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,2',3,3',4,5,5'-Heptachlorobiphenyl	7.75	pg/g		J	13H
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	2.02	pg/g	EMPC	U	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,2',3,3',4,5',6'-Heptachlorobiphenyl	27.9	pg/g	EMPC	U	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,2',3,3',4,5,6'-Heptachlorobiphenyl	38.8	pg/g		J	13H
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,2',3,3',4,6,6'-Heptachlorobiphenyl	4.7	pg/g	EMPC	U	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,2',3,3',5,5',6-Heptachlorobiphenyl	16.1	pg/g		J	13H
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,2',3,3',5,6,6'-Heptachlorobiphenyl	23.2	pg/g		J	13H
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl	6.91	pg/g	EMPC	U	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,2',3,4,4',5',6-Heptachlorobiphenyl	30.1	pg/g		J	13H

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,2',3,4',5,5',6-Heptachlorobiphenyl	81.2	pg/g		J	13H
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,2',3,4,5',6-Hexachlorobiphenyl	12.4	pg/g	EMPC	U	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,2',3-Trichlorobiphenyl	10.9	pg/g	EMPC	U	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,2',4,4',5,6'-Hexachlorobiphenyl	5.67	pg/g	EMPC	U	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,2',4,6'-Tetrachlorobiphenyl	2.05	pg/g	EMPC	U	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,3,3',4,4',5,6-Heptachlorobiphenyl	5.59	pg/g	EMPC	U	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,3,4',5,6-Pentachlorobiphenyl	4.23	pg/g	EMPC	U	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	2,4',6-Trichlorobiphenyl	6.65	pg/g	EMPC	U	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	Coelution of PCB 107 and 124	4.83	pg/g	EMPC C	U	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	Coelution of PCB 139 and 140	3.21	pg/g	EMPC C	U	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	Coelution of PCB 171 and 173	14.4	pg/g	C	J	13H
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	Coelution of PCB 180 and 193	79.5	pg/g	C	J	13H
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	Coelution of PCB 198 and 199	19.6	pg/g	EMPC C	U	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	Heptachlorobiphenyl homologs	365	pg/g	EMPC	J	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	Hexachlorobiphenyl homologs	1090	pg/g	EMPC	J	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	Octachlorobiphenyl homologs	43.2	pg/g	EMPC	J	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	Pentachlorobiphenyl homologs	1070	pg/g	EMPC	J	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	Tetrachlorobiphenyl homologs	530	pg/g	EMPC	J	25
A5875	Nc SD0028	75_11306_PCB_006-D10	EPA1668A	Trichlorobiphenyl homologs	121	pg/g	EMPC	J	25
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	6.42	pg/g		J	13H
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	10.9	pg/g	EMPC	U	25
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,2',3,3',4,4',5-Heptachlorobiphenyl	47.6	pg/g		J	13H
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,2',3,3',4,5,5'-Heptachlorobiphenyl	11.5	pg/g		J	13H
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,2',3,3',4,5',6'-Heptachlorobiphenyl	36.8	pg/g		J	13H
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,2',3,3',4,5',6-Heptachlorobiphenyl	3.25	pg/g	EMPC	U	25
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,2',3,3',4,5,6'-Heptachlorobiphenyl	55.7	pg/g		J	13H
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,2',3,3',4,6,6'-Heptachlorobiphenyl	7.29	pg/g	EMPC	U	25
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,2',3,3',4,6-Hexachlorobiphenyl	5.06	pg/g	EMPC	U	25
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,2',3,3',5,5',6-Heptachlorobiphenyl	20.5	pg/g		J	13H
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,2',3,3',5,6,6'-Heptachlorobiphenyl	29.1	pg/g		J	13H
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,2',3,4,4',5',6-Heptachlorobiphenyl	38.6	pg/g		J	13H

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,2',3,4',5,5',6-Heptachlorobiphenyl	97.2	pg/g		J	13H
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,2',3,6,6'-Pentachlorobiphenyl	1.27	pg/g	EMPC	U	25
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,2',4,5,6'-Pentachlorobiphenyl	10.3	pg/g	EMPC	U	25
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,2',6-Trichlorobiphenyl	2.68	pg/g	EMPC	U	25
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,3,3',4,4',5,6-Heptachlorobiphenyl	9.56	pg/g		J	13H
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	2,3,3',4',5'-Pentachlorobiphenyl	5.22	pg/g	EMPC	U	25
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	Coelution of PCB 139 and 140	5.59	pg/g	EMPC C	U	25
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	Coelution of PCB 171 and 173	16	pg/g	C	J	13H
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	Coelution of PCB 180 and 193	106	pg/g	C	J	13H
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	Heptachlorobiphenyl homologs	479	pg/g	EMPC	J	25
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	Hexachlorobiphenyl homologs	1640	pg/g	EMPC	J	25
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	Nonachlorobiphenyl homologs	10.9	pg/g	EMPC	J	25
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	Pentachlorobiphenyl homologs	2770	pg/g	EMPC	J	25
A5875	Nc SD0051	75_11306_PCB_008-D10	EPA1668A	Trichlorobiphenyl homologs	365	pg/g	EMPC	J	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	1.37	pg/g	B EMPC	U	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	0.752	pg/g	J B EMPC	U	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	2,2',3,3',4,6,6'-Heptachlorobiphenyl	0.467	pg/g	J EMPC	U	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	2,2',3,3',5,5'-Hexachlorobiphenyl	0.853	pg/g	J EMPC	U	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	2,2',3,3',5,6-Hexachlorobiphenyl	0.766	pg/g	J EMPC	U	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl	1.01	pg/g	B EMPC	U	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	2,2',3,4,4',5-Hexachlorobiphenyl	0.582	pg/g	J EMPC	U	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	2,2',3,4',6-Pentachlorobiphenyl	2.09	pg/g	EMPC	U	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	2,2',3-Trichlorobiphenyl	1.23	pg/g	EMPC	U	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	2,2',4,4',5,6'-Hexachlorobiphenyl	0.649	pg/g	J EMPC	U	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	2,2',4,5-Tetrachlorobiphenyl	1.67	pg/g	EMPC	U	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	2,3,3',4',5',6-Hexachlorobiphenyl	0.86	pg/g	J B EMPC	U	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	2,3,3',4,6-Pentachlorobiphenyl	2.3	pg/g	EMPC	U	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	2,3',4,4',5,5'-Hexachlorobiphenyl	0.724	pg/g	J EMPC	U	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	2,3,4',5-Tetrachlorobiphenyl	0.553	pg/g	J EMPC	U	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	3,3',4,4'-Tetrachlorobiphenyl	1.32	pg/g	EMPC	U	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	Coelution of PCB 107 and 124	0.643	pg/g	J EMPC C	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	Coelution of PCB 171 and 173	1.35	pg/g	J B EMPC	U	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	Heptachlorobiphenyl homologs	39.8	pg/g	EMPC	J	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	Hexachlorobiphenyl homologs	125	pg/g	EMPC	J	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	Octachlorobiphenyl homologs	8.85	pg/g	EMPC	J	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	Pentachlorobiphenyl homologs	159	pg/g	EMPC	J	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	Tetrachlorobiphenyl homologs	103	pg/g	EMPC	J	25
A5874	Mn Pretest	874_11302_PCB_001-D2	EPA1668A	Trichlorobiphenyl homologs	36.2	pg/g	EMPC	J	25
A5874	Nc Pretest	874_11302_PCB_002-D2	EPA1668A	2,2',3,4',5,6,6'-Heptachlorobiphenyl	0.32	pg/g	J EMPC	U	25
A5874	Nc Pretest	874_11302_PCB_002-D2	EPA1668A	2,2',3,4',5,6'-Hexachlorobiphenyl	0.44	pg/g	J EMPC	U	25
A5874	Nc Pretest	874_11302_PCB_002-D2	EPA1668A	2,2',3,4-Tetrachlorobiphenyl	0.694	pg/g	J EMPC	U	25
A5874	Nc Pretest	874_11302_PCB_002-D2	EPA1668A	2,2',4-Trichlorobiphenyl	1.29	pg/g	B EMPC	U	25
A5874	Nc Pretest	874_11302_PCB_002-D2	EPA1668A	2,3,3',4,5,5'-Hexachlorobiphenyl	0.358	pg/g	J EMPC	U	25
A5874	Nc Pretest	874_11302_PCB_002-D2	EPA1668A	2,3',4,4',5'-Pentachlorobiphenyl	0.389	pg/g	J EMPC	U	25
A5874	Nc Pretest	874_11302_PCB_002-D2	EPA1668A	Coelution of PCB 198 and 199	8.68	pg/g	EMPC C	U	25
A5874	Nc Pretest	874_11302_PCB_002-D2	EPA1668A	Hexachlorobiphenyl homologs	280	pg/g	EMPC	J	25
A5874	Nc Pretest	874_11302_PCB_002-D2	EPA1668A	Octachlorobiphenyl homologs	34.6	pg/g	EMPC	J	25
A5874	Nc Pretest	874_11302_PCB_002-D2	EPA1668A	Trichlorobiphenyl homologs	26.5	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 1	874_11302_PCB_003-D2	EPA1668A	2,2',3,4,4',5,6'-Heptachlorobiphenyl	0.508	pg/g	J EMPC	U	25
A5874	Mn SD0004 Rep 1	874_11302_PCB_003-D2	EPA1668A	2,2',3,4',6,6'-Hexachlorobiphenyl	0.456	pg/g	J EMPC	U	25
A5874	Mn SD0004 Rep 1	874_11302_PCB_003-D2	EPA1668A	2,2',3,5,6,6'-Hexachlorobiphenyl	0.329	pg/g	J EMPC	U	25
A5874	Mn SD0004 Rep 1	874_11302_PCB_003-D2	EPA1668A	2,2',3,5,6'-Pentachlorobiphenyl	1.82	pg/g	EMPC	U	25
A5874	Mn SD0004 Rep 1	874_11302_PCB_003-D2	EPA1668A	2,3,3',4',5,5'-Hexachlorobiphenyl	1.35	pg/g	EMPC	U	25
A5874	Mn SD0004 Rep 1	874_11302_PCB_003-D2	EPA1668A	2,5-Dichlorobiphenyl	1.5	pg/g	B EMPC	U	25
A5874	Mn SD0004 Rep 1	874_11302_PCB_003-D2	EPA1668A	3,4',5-Trichlorobiphenyl	1.65	pg/g	EMPC	U	25
A5874	Mn SD0004 Rep 1	874_11302_PCB_003-D2	EPA1668A	3-Chlorobiphenyl	0.524	pg/g	J B EMPC	U	25
A5874	Mn SD0004 Rep 1	874_11302_PCB_003-D2	EPA1668A	Dichlorobiphenyl homologs	69	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 1	874_11302_PCB_003-D2	EPA1668A	Monochlorobiphenyl homologs	4.25	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 1	874_11302_PCB_003-D2	EPA1668A	Trichlorobiphenyl homologs	629	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 2	874_11302_PCB_004-D2	EPA1668A	2,2',3,4',6,6'-Hexachlorobiphenyl	0.463	pg/g	J EMPC	U	25
A5874	Mn SD0004 Rep 2	874_11302_PCB_004-D2	EPA1668A	2,4-Dichlorobiphenyl	1.39	pg/g	EMPC	U	25
A5874	Mn SD0004 Rep 2	874_11302_PCB_004-D2	EPA1668A	3,3',4,4',5-Pentachlorobiphenyl	0.665	pg/g	J EMPC	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5874	Mn SD0004 Rep 2	874_11302_PCB_004-D2	EPA1668A	Dichlorobiphenyl homologs	75	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 2	874_11302_PCB_004-D2	EPA1668A	Pentachlorobiphenyl homologs	4340	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 3	874_11302_PCB_005-D2	EPA1668A	2,2',3,4,4',5,6-Heptachlorobiphenyl	0.697	pg/g	J EMPC	U	25
A5874	Mn SD0004 Rep 3	874_11302_PCB_005-D2	EPA1668A	2,2',3,4',6,6'-Hexachlorobiphenyl	0.573	pg/g	J EMPC	U	25
A5874	Mn SD0004 Rep 3	874_11302_PCB_005-D2	EPA1668A	2,3,3',4',5,5'-Hexachlorobiphenyl	1.39	pg/g	EMPC	U	25
A5874	Mn SD0004 Rep 3	874_11302_PCB_005-D2	EPA1668A	3,3',4,4',5-Pentachlorobiphenyl	0.992	pg/g	J EMPC	U	25
A5874	Mn SD0004 Rep 3	874_11302_PCB_005-D2	EPA1668A	Coelution of PCB 012 and 013	1.45	pg/g	J EMPC C	U	25
A5874	Mn SD0004 Rep 3	874_11302_PCB_005-D2	EPA1668A	Dichlorobiphenyl homologs	81.3	pg/g	EMPC	J	25
A5874	Mn SD0004 Rep 3	874_11302_PCB_005-D2	EPA1668A	Heptachlorobiphenyl homologs	711	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	4.23	pg/g	EMPC	U	25
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,2',3,3',4,4',5-Heptachlorobiphenyl	45.1	pg/g		J	13H
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,2',3,3',4,4',6,6'-Octachlorobiphenyl	0.993	pg/g	EMPC	U	25
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,2',3,3',4,5,5'-Heptachlorobiphenyl	10.6	pg/g		J	13H
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,2',3,3',4,5',6'-Heptachlorobiphenyl	38.9	pg/g		J	13H
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,2',3,3',4,5',6-Heptachlorobiphenyl	3.63	pg/g		J	13H
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,2',3,3',4,5,6'-Heptachlorobiphenyl	59.1	pg/g		J	13H
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,2',3,3',4,6,6'-Heptachlorobiphenyl	7.54	pg/g		J	13H
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,2',3,3',5,5',6-Heptachlorobiphenyl	15.9	pg/g		J	13H
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,2',3,3',5,6,6'-Heptachlorobiphenyl	27.3	pg/g		J	13H
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,2',3,4,4',5',6-Heptachlorobiphenyl	39.8	pg/g		J	13H
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,2',3,4,4',5,6'-Heptachlorobiphenyl	0.575	pg/g	J	J	13H
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,2',3,4',5,5',6-Heptachlorobiphenyl	99.9	pg/g		J	13H
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,2',3,4,5,5',6-Heptachlorobiphenyl	3.77	pg/g		J	13H
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,2',3,5,6,6'-Hexachlorobiphenyl	0.287	pg/g	J EMPC	U	25
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,2',6,6'-Tetrachlorobiphenyl	0.241	pg/g	J EMPC	U	25
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,3,3',4,4',5,5'-Heptachlorobiphenyl	1.28	pg/g		J	13H
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,3,3',4,4',5',6-Heptachlorobiphenyl	2.26	pg/g		J	13H
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,3,3',4,4',5,6-Heptachlorobiphenyl	7.34	pg/g		J	13H
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	2,3,3',4',5,5'-Hexachlorobiphenyl	1.12	pg/g	EMPC	U	25
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	3,3',4,4',5-Pentachlorobiphenyl	0.422	pg/g	J EMPC	U	25
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	Coelution of PCB 171 and 173	18.4	pg/g	C	J	13H

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A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	Coelution of PCB 180 and 193	104	pg/g	C	J	13H
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	Hexachlorobiphenyl homologs	1640	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 1	874_11302_PCB_006-D2	EPA1668A	Octachlorobiphenyl homologs	80.3	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	1.05	pg/g	EMPC	U	25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,3',4,4',6,6'-Octachlorobiphenyl	0.684	pg/g	J EMPC	U	25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,3',4,5',6-Heptachlorobiphenyl	2.78	pg/g	EMPC	U	25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,3',4,5'-Hexachlorobiphenyl	23.5	pg/g		U	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,3',4,6'-Hexachlorobiphenyl	93.1	pg/g		J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,3',4,6-Hexachlorobiphenyl	5.29	pg/g		J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,3',5,5'-Hexachlorobiphenyl	0.117	pg/g	U	UJ	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,3',5,6-Hexachlorobiphenyl	22	pg/g		J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,3',6,6'-Hexachlorobiphenyl	34.5	pg/g		J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,4,4',5,6-Heptachlorobiphenyl	0.331	pg/g	J EMPC	U	25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,4,4',5-Hexachlorobiphenyl	11.8	pg/g		J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,4',5,5'-Hexachlorobiphenyl	58.7	pg/g		J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,4,5,5'-Hexachlorobiphenyl	52	pg/g		J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,4',5,6'-Hexachlorobiphenyl	0.592	pg/g	J EMPC	UJ	13L,25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,4,5',6-Hexachlorobiphenyl	16.2	pg/g		J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,4,5,6'-Hexachlorobiphenyl	1.2	pg/g		J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,4,5,6-Hexachlorobiphenyl	0.123	pg/g	U	UJ	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,4',6,6'-Hexachlorobiphenyl	0.368	pg/g	J EMPC	UJ	13L,25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,4,6,6'-Hexachlorobiphenyl	0.0774	pg/g	U	UJ	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',3,5,6,6'-Hexachlorobiphenyl	0.235	pg/g	J EMPC	UJ	13L,25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,2',4,4',5,6'-Hexachlorobiphenyl	5.41	pg/g		J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,3,3',4,4',5,5',6-Octachlorobiphenyl	0.557	pg/g	J EMPC	U	25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,3,3',4,4',6-Hexachlorobiphenyl	32.2	pg/g		J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,3,3',4',5,5'-Hexachlorobiphenyl	1.08	pg/g		J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,3,3',4,5,5'-Hexachlorobiphenyl	2.28	pg/g		J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,3,3',4',5',6-Hexachlorobiphenyl	21.9	pg/g		J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,3,3',4,5',6-Hexachlorobiphenyl	0.0844	pg/g	U	UJ	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,3,3',4,5,6-Hexachlorobiphenyl	0.0929	pg/g	U	UJ	13L

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,3,3',5,5',6-Hexachlorobiphenyl	0.0917	pg/g	U	UJ	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,3',4,5,5'-Pentachlorobiphenyl	0.843	pg/g	J EMPC	U	25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,4-Dichlorobiphenyl	0.555	pg/g	J EMPC	U	25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	2,5-Dichlorobiphenyl	1.15	pg/g	B EMPC	U	25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	3,3',4,4',5,5'-Hexachlorobiphenyl	1.37	pg/g	U	UJ	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	3-Chlorobiphenyl	0.404	pg/g	J B EMPC	U	25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	Coelution of PCB 093 and 100	2.81	pg/g	EMPC C	U	25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	Coelution of PCB 128 and 166	48.2	pg/g	C	J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	Coelution of PCB 129, 138, and 163	335	pg/g	C	J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	Coelution of PCB 135 and 151	106	pg/g	C	J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	Coelution of PCB 139 and 140	5.98	pg/g	C	J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	Coelution of PCB 147 and 149	243	pg/g	C	J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	Coelution of PCB 153 and 168	285	pg/g	C	J	13L
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	Dichlorobiphenyl homologs	33.4	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	Heptachlorobiphenyl homologs	419	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	Monochlorobiphenyl homologs	2.06	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	Nonachlorobiphenyl homologs	10.7	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 2	874_11302_PCB_007-D2	EPA1668A	Octachlorobiphenyl homologs	67.4	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	2.31	pg/g	EMPC	U	25
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,3',4,5'-Hexachlorobiphenyl	28.5	pg/g		U	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,3',4,6'-Hexachlorobiphenyl	105	pg/g		J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,3',4,6-Hexachlorobiphenyl	5.79	pg/g		J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,3',5,5'-Hexachlorobiphenyl	6.87	pg/g		J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,3',5,6-Hexachlorobiphenyl	25.4	pg/g		J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,3',6,6'-Hexachlorobiphenyl	38.2	pg/g		J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,4,4',5,6-Heptachlorobiphenyl	0.427	pg/g	J EMPC	U	25
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,4,4',5-Hexachlorobiphenyl	14.3	pg/g		J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,4',5,5'-Hexachlorobiphenyl	70.3	pg/g		J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,4,5,5'-Hexachlorobiphenyl	62.3	pg/g		J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,4',5,6'-Hexachlorobiphenyl	0.637	pg/g	J	J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,4,5',6-Hexachlorobiphenyl	19.2	pg/g		J	13L

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A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,4,5,6'-Hexachlorobiphenyl	1.32	pg/g		J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,4,5,6-Hexachlorobiphenyl	0.17	pg/g	U	UJ	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,4',6,6'-Hexachlorobiphenyl	0.397	pg/g	J	J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,4,6,6'-Hexachlorobiphenyl	0.102	pg/g	U	UJ	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',3,5,6,6'-Hexachlorobiphenyl	0.337	pg/g	J	J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2',4,4',5,6'-Hexachlorobiphenyl	6.43	pg/g		J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,2'-Dichlorobiphenyl	0.98	pg/g	J B EMPC	U	25
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,3,3',4,4',6-Hexachlorobiphenyl	38	pg/g		J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,3,3',4',5,5'-Hexachlorobiphenyl	1.3	pg/g		J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,3,3',4,5,5'-Hexachlorobiphenyl	2.93	pg/g		J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,3,3',4',5',6-Hexachlorobiphenyl	26	pg/g		J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,3,3',4,5',6-Hexachlorobiphenyl	0.116	pg/g	U	UJ	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,3,3',4,5,6-Hexachlorobiphenyl	0.128	pg/g	U	UJ	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	2,3,3',5,5',6-Hexachlorobiphenyl	0.126	pg/g	U	UJ	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	3,3',4,4',5,5'-Hexachlorobiphenyl	1.06	pg/g	U	UJ	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	Coelution of PCB 128 and 166	56.3	pg/g	C	J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	Coelution of PCB 129, 138, and 163	391	pg/g	C	J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	Coelution of PCB 135 and 151	127	pg/g	C	J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	Coelution of PCB 139 and 140	6.6	pg/g	C	J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	Coelution of PCB 147 and 149	283	pg/g	C	J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	Coelution of PCB 153 and 168	337	pg/g	C	J	13L
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	Dichlorobiphenyl homologs	33.7	pg/g	EMPC	J	25
A5874	Nc SD0004 Rep 3	874_11302_PCB_008-D2	EPA1668A	Octachlorobiphenyl homologs	84.8	pg/g	EMPC	J	25
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',3,3',4,5'-Hexachlorobiphenyl	34	pg/g		U	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',3,3',4,6'-Hexachlorobiphenyl	214	pg/g		J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',3,3',4,6-Hexachlorobiphenyl	6.45	pg/g		J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',3,3',5,5'-Hexachlorobiphenyl	7.16	pg/g		J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',3,3',5,6-Hexachlorobiphenyl	26.2	pg/g		J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',3,3',6,6'-Hexachlorobiphenyl	57.7	pg/g		J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',3,4,4',5-Hexachlorobiphenyl	20.6	pg/g		J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',3,4',5,5'-Hexachlorobiphenyl	74.6	pg/g		J	13L

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',3,4,5,5'-Hexachlorobiphenyl	92.3	pg/g		J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',3,4',5,6'-Hexachlorobiphenyl	0.54	pg/g	J	J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',3,4,5',6-Hexachlorobiphenyl	27.2	pg/g		J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',3,4,5,6'-Hexachlorobiphenyl	1.58	pg/g		J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',3,4,5,6-Hexachlorobiphenyl	0.138	pg/g	U	UJ	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',3,4',6,6'-Hexachlorobiphenyl	0.628	pg/g	J	J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',3,4,6,6'-Hexachlorobiphenyl	0.0847	pg/g	U	UJ	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',3,5,6,6'-Hexachlorobiphenyl	0.464	pg/g	J	J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',4,4',5,6'-Hexachlorobiphenyl	8.08	pg/g		J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,2',6,6'-Tetrachlorobiphenyl	0.452	pg/g	J EMPC	U	25
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,3,3',4,4',6-Hexachlorobiphenyl	65.2	pg/g		J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,3,3',4',5,5'-Hexachlorobiphenyl	1.19	pg/g		J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,3,3',4,5,5'-Hexachlorobiphenyl	4.72	pg/g		J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,3,3',4',5',6-Hexachlorobiphenyl	39.3	pg/g		J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,3,3',4,5',6-Hexachlorobiphenyl	0.0946	pg/g	U	UJ	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,3,3',4,5,6-Hexachlorobiphenyl	0.104	pg/g	U	UJ	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	2,3,3',5,5',6-Hexachlorobiphenyl	0.103	pg/g	U	UJ	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	3,3',4,4',5,5'-Hexachlorobiphenyl	1.22	pg/g	U	UJ	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	3,3',4,4',5-Pentachlorobiphenyl	1.16	pg/g	EMPC	U	25
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	Coelution of PCB 128 and 166	89.8	pg/g	C	J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	Coelution of PCB 129, 138, and 163	594	pg/g	C	J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	Coelution of PCB 135 and 151	165	pg/g	C	J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	Coelution of PCB 139 and 140	9.89	pg/g	C	J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	Coelution of PCB 147 and 149	458	pg/g	C	J	13L
A5874	Mn SD0009	874_11302_PCB_009-D2	EPA1668A	Coelution of PCB 153 and 168	537	pg/g	C	J	13L
A5874	Nc SD0009	874_11302_PCB_010-D2	EPA1668A	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	7.24	pg/g	EMPC	U	25
A5874	Nc SD0009	874_11302_PCB_010-D2	EPA1668A	2,2',3,4',6,6'-Hexachlorobiphenyl	0.445	pg/g	J EMPC	U	25
A5874	Nc SD0009	874_11302_PCB_010-D2	EPA1668A	2,2',3,5,6,6'-Hexachlorobiphenyl	0.422	pg/g	J EMPC	U	25
A5874	Nc SD0009	874_11302_PCB_010-D2	EPA1668A	2,2',3,5,6'-Pentachlorobiphenyl	2.6	pg/g	EMPC	U	25
A5874	Nc SD0009	874_11302_PCB_010-D2	EPA1668A	2,3,3',4,4',5,5'-Heptachlorobiphenyl	1.19	pg/g	EMPC	U	25
A5874	Nc SD0009	874_11302_PCB_010-D2	EPA1668A	2,3,3',5'-Tetrachlorobiphenyl	0.479	pg/g	J EMPC	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5874	Nc SD0009	874_11302_PCB_010-D2	EPA1668A	2,3,6-Trichlorobiphenyl	1.02	pg/g	EMPC	U	25
A5874	Nc SD0009	874_11302_PCB_010-D2	EPA1668A	3,3',4,4',5-Pentachlorobiphenyl	0.769	pg/g	J EMPC	U	25
A5874	Nc SD0009	874_11302_PCB_010-D2	EPA1668A	3,4,4',5-Tetrachlorobiphenyl	0.834	pg/g	J EMPC	U	25
A5874	Nc SD0009	874_11302_PCB_010-D2	EPA1668A	4-Chlorobiphenyl	1.18	pg/g	B EMPC	U	25
A5874	Nc SD0009	874_11302_PCB_010-D2	EPA1668A	Heptachlorobiphenyl homologs	584	pg/g	EMPC	J	25
A5874	Nc SD0009	874_11302_PCB_010-D2	EPA1668A	Monochlorobiphenyl homologs	6.09	pg/g	EMPC	J	25
A5874	Nc SD0009	874_11302_PCB_010-D2	EPA1668A	Octachlorobiphenyl homologs	85.6	pg/g	EMPC	J	25
A5874	Nc SD0009	874_11302_PCB_010-D2	EPA1668A	Trichlorobiphenyl homologs	617	pg/g	EMPC	J	25
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,2',3,3',4,5'-Hexachlorobiphenyl	51.3	pg/g		U	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,2',3,3',4,6'-Hexachlorobiphenyl	334	pg/g		J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,2',3,3',4,6-Hexachlorobiphenyl	10.2	pg/g		J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,2',3,3',5,5'-Hexachlorobiphenyl	9.93	pg/g		J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,2',3,3',5,6-Hexachlorobiphenyl	42.2	pg/g		J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,2',3,3',6,6'-Hexachlorobiphenyl	97.2	pg/g		J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,2',3,4,4',5-Hexachlorobiphenyl	32.7	pg/g		J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,2',3,4',5,5'-Hexachlorobiphenyl	103	pg/g		J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,2',3,4,5,5'-Hexachlorobiphenyl	166	pg/g		J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,2',3,4',5,6'-Hexachlorobiphenyl	0.51	pg/g	J EMPC	UJ	13L,25
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,2',3,4,5',6-Hexachlorobiphenyl	46.6	pg/g		J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,2',3,4,5,6'-Hexachlorobiphenyl	0.166	pg/g	U	UJ	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,2',3,4,5,6-Hexachlorobiphenyl	0.191	pg/g	U	UJ	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,2',3,4',6,6'-Hexachlorobiphenyl	0.645	pg/g	J EMPC	UJ	13L,25
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,2',3,4,6,6'-Hexachlorobiphenyl	0.312	pg/g	J EMPC	UJ	13L,25
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,2',3,5,6,6'-Hexachlorobiphenyl	0.745	pg/g	J	J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,2',4,4',5,6'-Hexachlorobiphenyl	7.01	pg/g		J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,3,3',4,4',5,5',6-Octachlorobiphenyl	2.03	pg/g	EMPC	U	25
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,3,3',4,4',6-Hexachlorobiphenyl	93.4	pg/g		J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,3,3',4',5,5'-Hexachlorobiphenyl	1.67	pg/g		J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,3,3',4,5,5'-Hexachlorobiphenyl	7.37	pg/g		J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,3,3',4',5',6-Hexachlorobiphenyl	53	pg/g		J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,3,3',4,5',6-Hexachlorobiphenyl	0.131	pg/g	U	UJ	13L

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,3,3',4,5,6-Hexachlorobiphenyl	0.144	pg/g	U	UJ	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	2,3,3',5,5',6-Hexachlorobiphenyl	0.142	pg/g	U	UJ	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	3,3',4,4',5,5'-Hexachlorobiphenyl	2.24	pg/g	U	UJ	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	3,4,5-Trichlorobiphenyl	0.54	pg/g	J EMPC	U	25
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	Coelution of PCB 093 and 100	6.42	pg/g	EMPC C	U	25
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	Coelution of PCB 128 and 166	129	pg/g	C	J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	Coelution of PCB 129, 138, and 163	893	pg/g	C	J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	Coelution of PCB 135 and 151	259	pg/g	C	J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	Coelution of PCB 139 and 140	14.5	pg/g	C	J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	Coelution of PCB 147 and 149	698	pg/g	C	J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	Coelution of PCB 153 and 168	735	pg/g	C	J	13L
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	Hexachlorobiphenyl homologs	3900	pg/g	EMPC	J	25
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	Octachlorobiphenyl homologs	198	pg/g	EMPC	J	25
A5874	Mn SD0010	874_11302_PCB_011-D2	EPA1668A	Pentachlorobiphenyl homologs	7700	pg/g	EMPC	J	25
A5874	Nc SD0010	874_11302_PCB_012-D2	EPA1668A	2,3,3',4,4'-Pentachlorobiphenyl	228	pg/g		J	8L,9
A5874	Nc SD0010	874_11302_PCB_012-D2	EPA1668A	2,3',4,4',5-Pentachlorobiphenyl	543	pg/g		J	8L,9
A5874	Nc SD0010	874_11302_PCB_012-D2	EPA1668A	3,3',5-Trichlorobiphenyl	0.415	pg/g	J EMPC	U	25
A5874	Nc SD0010	874_11302_PCB_012-D2	EPA1668A	3-Chlorobiphenyl	0.444	pg/g	J B EMPC	U	25
A5874	Nc SD0010	874_11302_PCB_012-D2	EPA1668A	4-Chlorobiphenyl	0.398	pg/g	J B EMPC	U	25
A5874	Nc SD0010	874_11302_PCB_012-D2	EPA1668A	Coelution of PCB 012 and 013	1.33	pg/g	J EMPC C	U	25
A5874	Nc SD0010	874_11302_PCB_012-D2	EPA1668A	Dichlorobiphenyl homologs	53.8	pg/g	EMPC	J	25
A5874	Nc SD0010	874_11302_PCB_012-D2	EPA1668A	Monochlorobiphenyl homologs	1.25	pg/g	EMPC	J	25
A5874	Mn SD0011	874_11302_PCB_013-D2	EPA1668A	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	2.03	pg/g	EMPC	U	25
A5874	Mn SD0011	874_11302_PCB_013-D2	EPA1668A	2,2',3,4,4',5,6'-Heptachlorobiphenyl	0.795	pg/g	J EMPC	U	25
A5874	Mn SD0011	874_11302_PCB_013-D2	EPA1668A	2,2',3,4,4',5,6-Heptachlorobiphenyl	0.76	pg/g	J EMPC	U	25
A5874	Mn SD0011	874_11302_PCB_013-D2	EPA1668A	2,2',3,4,5,6'-Hexachlorobiphenyl	1.17	pg/g	EMPC	U	25
A5874	Mn SD0011	874_11302_PCB_013-D2	EPA1668A	2,2',3,4,6,6'-Hexachlorobiphenyl	0.275	pg/g	J EMPC	U	25
A5874	Mn SD0011	874_11302_PCB_013-D2	EPA1668A	2,3,3',5-Tetrachlorobiphenyl	0.95	pg/g	J EMPC	U	25
A5874	Mn SD0011	874_11302_PCB_013-D2	EPA1668A	Nonachlorobiphenyl homologs	20.9	pg/g	EMPC	J	25
A5874	Mn SD0013	874_11302_PCB_015-D2	EPA1668A	2,2',3,4,4',5,6-Heptachlorobiphenyl	1.45	pg/g	EMPC	U	25
A5874	Mn SD0013	874_11302_PCB_015-D2	EPA1668A	2,2',3,4,6,6'-Hexachlorobiphenyl	0.325	pg/g	J EMPC	U	25

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A5874	Mn SD0013	874_11302_PCB_015-D2	EPA1668A	2,2',3,5,6,6'-Hexachlorobiphenyl	0.787	pg/g	J EMPC	U	25
A5874	Mn SD0013	874_11302_PCB_015-D2	EPA1668A	2,2',6,6'-Tetrachlorobiphenyl	1.31	pg/g	EMPC	U	25
A5874	Mn SD0013	874_11302_PCB_015-D2	EPA1668A	2,3,3',5-Tetrachlorobiphenyl	1.58	pg/g	EMPC	U	25
A5874	Mn SD0013	874_11302_PCB_015-D2	EPA1668A	2,4-Dichlorobiphenyl	1.02	pg/g	B EMPC	U	25
A5874	Mn SD0013	874_11302_PCB_015-D2	EPA1668A	2,5-Dichlorobiphenyl	0.918	pg/g	J B EMPC	U	25
A5874	Mn SD0013	874_11302_PCB_015-D2	EPA1668A	2-Chlorobiphenyl	0.82	pg/g	J B EMPC	U	25
A5874	Mn SD0013	874_11302_PCB_015-D2	EPA1668A	3,3',4,4',5-Pentachlorobiphenyl	0.787	pg/g	J EMPC	U	25
A5874	Mn SD0013	874_11302_PCB_015-D2	EPA1668A	3,3',5-Trichlorobiphenyl	0.585	pg/g	J EMPC	U	25
A5874	Mn SD0013	874_11302_PCB_015-D2	EPA1668A	Dichlorobiphenyl homologs	55.3	pg/g	EMPC	J	25
A5874	Mn SD0013	874_11302_PCB_015-D2	EPA1668A	Monochlorobiphenyl homologs	2.35	pg/g	EMPC	J	25
A5874	Mn SD0013	874_11302_PCB_015-D2	EPA1668A	Tetrachlorobiphenyl homologs	5160	pg/g	EMPC	J	25
A5874	Mn SD0013	874_11302_PCB_015-D2	EPA1668A	Trichlorobiphenyl homologs	630	pg/g	EMPC	J	25
A5874	Nc SD0013	874_11302_PCB_016-D2	EPA1668A	2,2',3,3',4,4',6,6'-Octachlorobiphenyl	1.47	pg/g	EMPC	U	25
A5874	Nc SD0013	874_11302_PCB_016-D2	EPA1668A	2,2',3,4',6,6'-Hexachlorobiphenyl	0.791	pg/g	J EMPC	U	25
A5874	Nc SD0013	874_11302_PCB_016-D2	EPA1668A	2,2',6,6'-Tetrachlorobiphenyl	0.564	pg/g	J EMPC	U	25
A5874	Nc SD0013	874_11302_PCB_016-D2	EPA1668A	2,3,3',4,4',5,5',6-Octachlorobiphenyl	1.49	pg/g	EMPC	U	25
A5874	Nc SD0013	874_11302_PCB_016-D2	EPA1668A	2,3,3',4',5,5'-Hexachlorobiphenyl	1.43	pg/g	EMPC	U	25
A5874	Nc SD0013	874_11302_PCB_016-D2	EPA1668A	2,3,3',5'-Tetrachlorobiphenyl	0.696	pg/g	J EMPC	U	25
A5874	Nc SD0013	874_11302_PCB_016-D2	EPA1668A	2,3,3',5-Tetrachlorobiphenyl	0.807	pg/g	J EMPC	U	25
A5874	Nc SD0013	874_11302_PCB_016-D2	EPA1668A	3-Chlorobiphenyl	0.574	pg/g	J B EMPC	U	25
A5874	Nc SD0013	874_11302_PCB_016-D2	EPA1668A	Monochlorobiphenyl homologs	1.59	pg/g	EMPC	J	25
A5874	Nc SD0013	874_11302_PCB_016-D2	EPA1668A	Octachlorobiphenyl homologs	158	pg/g	EMPC	J	25
A5874	Mn SD0015	874_11302_PCB_017-D2	EPA1668A	2,2',3,4,4',5,6-Heptachlorobiphenyl	0.888	pg/g	J EMPC	U	25
A5874	Mn SD0015	874_11302_PCB_017-D2	EPA1668A	2,2',3,4',5,6'-Hexachlorobiphenyl	0.684	pg/g	J EMPC	U	25
A5874	Mn SD0015	874_11302_PCB_017-D2	EPA1668A	2,2',3,4',6,6'-Hexachlorobiphenyl	0.795	pg/g	J EMPC	U	25
A5874	Mn SD0015	874_11302_PCB_017-D2	EPA1668A	2,2',3,4,6,6'-Hexachlorobiphenyl	0.287	pg/g	J EMPC	U	25
A5874	Mn SD0015	874_11302_PCB_017-D2	EPA1668A	2,2',3,5,6,6'-Hexachlorobiphenyl	0.571	pg/g	J EMPC	U	25
A5874	Mn SD0015	874_11302_PCB_017-D2	EPA1668A	2,5-Dichlorobiphenyl	0.733	pg/g	J B EMPC	U	25
A5874	Mn SD0015	874_11302_PCB_017-D2	EPA1668A	3-Chlorobiphenyl	0.51	pg/g	J B EMPC	U	25
A5874	Mn SD0015	874_11302_PCB_017-D2	EPA1668A	Dichlorobiphenyl homologs	41.3	pg/g	EMPC	J	25
A5874	Mn SD0015	874_11302_PCB_017-D2	EPA1668A	Heptachlorobiphenyl homologs	1240	pg/g	EMPC	J	25

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A5874	Mn SD0015	874_11302_PCB_017-D2	EPA1668A	Monochlorobiphenyl homologs	2.52	pg/g	EMPC	J	25
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	16.4	pg/g		J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,3',4,4',5,6-Octachlorobiphenyl	1.5	pg/g	U	UJ	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,3',4,4',5-Heptachlorobiphenyl	93.6	pg/g		J	13H
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,3',4,5,5'-Heptachlorobiphenyl	22.3	pg/g		J	13H
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,3',4,5',6'-Heptachlorobiphenyl	85	pg/g		J	13H
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,3',4,5',6-Heptachlorobiphenyl	7.21	pg/g		J	13H
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,3',4,5,6'-Heptachlorobiphenyl	145	pg/g		J	13H
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,3',4,6,6'-Heptachlorobiphenyl	17.4	pg/g		J	13H
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,3',5,5',6-Heptachlorobiphenyl	34.2	pg/g		J	13H
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,3',5,6,6'-Heptachlorobiphenyl	66.5	pg/g		J	13H
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,3',5-Pentachlorobiphenyl	39.9	pg/g		J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,3',6,6'-Hexachlorobiphenyl	69.2	pg/g		J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl	18.7	pg/g		J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,4,4',5',6-Heptachlorobiphenyl	85.6	pg/g		J	13H
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,4,4',5,6'-Heptachlorobiphenyl	0.906	pg/g	J EMPC	U	25
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,4',5,5',6-Heptachlorobiphenyl	211	pg/g		J	13H
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,4,5,5',6-Heptachlorobiphenyl	11.2	pg/g		J	13H
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,4,5,6'-Hexachlorobiphenyl	2.14	pg/g		J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,4',6,6'-Hexachlorobiphenyl	0.751	pg/g	J	J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,4',6'-Pentachlorobiphenyl	1.92	pg/g	EMPC	U	25
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,4',6-Pentachlorobiphenyl	82.3	pg/g		J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,4,6-Pentachlorobiphenyl	0.775	pg/g	U	UJ	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,5,5'-Pentachlorobiphenyl	154	pg/g		J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',3,5-Tetrachlorobiphenyl	24.5	pg/g		J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',4,5,6'-Pentachlorobiphenyl	24.1	pg/g		J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,2',6,6'-Tetrachlorobiphenyl	0.724	pg/g	J	J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,3,3',4,4',5,5',6-Octachlorobiphenyl	1.58	pg/g	EMPC	U	25
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,3,3',4,4',5,5'-Heptachlorobiphenyl	2.76	pg/g		J	9,13H
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,3,3',4,4',5',6-Heptachlorobiphenyl	4.25	pg/g		J	9,13H
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,3,3',4,4',5,6-Heptachlorobiphenyl	15.4	pg/g		J	13H

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A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,3,3',4,5,5',6-Heptachlorobiphenyl	0.307	pg/g	U	UJ	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,3,3',4',5,5'-Hexachlorobiphenyl	1.52	pg/g		J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,3,3',4,5,5'-Hexachlorobiphenyl	6.03	pg/g		J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,3,3',5'-Tetrachlorobiphenyl	0.866	pg/g	J EMPC	U	25
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,3,4,4',5-Pentachlorobiphenyl	7.95	pg/g		J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,3',4-Trichlorobiphenyl	4.33	pg/g		J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,3,4'-Trichlorobiphenyl	23.1	pg/g		J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2,4',5-Trichlorobiphenyl	69	pg/g		J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	2-Chlorobiphenyl	0.485	pg/g	J B EMPC	U	25
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	3,4,4'-Trichlorobiphenyl	8.17	pg/g		J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	3,4',5-Trichlorobiphenyl	2.44	pg/g		J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	3-Chlorobiphenyl	0.513	pg/g	J B EMPC	U	25
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	Coelution of PCB 020 and 028	63.4	pg/g	C	J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	Coelution of PCB 021 and 033	36.1	pg/g	C	J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	Coelution of PCB 026 and 029	9.07	pg/g	C	J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	Coelution of PCB 171 and 173	40.1	pg/g	C	J	13H
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	Coelution of PCB 180 and 193	202	pg/g	C	J	9,13H
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	Coelution of PCB 198 and 199	48.6	pg/g	C	J	9
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	Monochlorobiphenyl homologs	1.54	pg/g	EMPC	J	25
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	Octachlorobiphenyl homologs	147	pg/g	EMPC	J	25
A5874	Nc SD0015	874_11302_PCB_018-D2	EPA1668A	Tetrachlorobiphenyl homologs	3680	pg/g	EMPC	J	25
A5874	Mn SD0018	874_11302_PCB_019-D2	EPA1668A	2,3,6-Trichlorobiphenyl	0.695	pg/g	J EMPC	U	25
A5874	Mn SD0018	874_11302_PCB_019-D2	EPA1668A	2,3-Dichlorobiphenyl	0.712	pg/g	J B EMPC	U	25
A5874	Mn SD0018	874_11302_PCB_019-D2	EPA1668A	Coelution of PCB 012 and 013	1.38	pg/g	J B EMPC	U	25
A5874	Mn SD0018	874_11302_PCB_019-D2	EPA1668A	Dichlorobiphenyl homologs	85.9	pg/g	EMPC	J	25
A5874	Nc SD0018	874_11302_PCB_020-D2	EPA1668A	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	1.66	pg/g	EMPC	U	25
A5874	Nc SD0018	874_11302_PCB_020-D2	EPA1668A	2,2',3,5,6,6'-Hexachlorobiphenyl	0.651	pg/g	J EMPC	U	25
A5874	Nc SD0018	874_11302_PCB_020-D2	EPA1668A	2,3-Dichlorobiphenyl	0.581	pg/g	J B EMPC	U	25
A5874	Nc SD0018	874_11302_PCB_020-D2	EPA1668A	3,4,5-Trichlorobiphenyl	0.672	pg/g	J EMPC	U	25
A5874	Nc SD0018	874_11302_PCB_020-D2	EPA1668A	Dichlorobiphenyl homologs	33.7	pg/g	EMPC	J	25
A5874	Nc SD0018	874_11302_PCB_020-D2	EPA1668A	Nonachlorobiphenyl homologs	16.2	pg/g	EMPC	J	25

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A5875	Mn SD0025	875_11306_PCB_001-D2	EPA1668A	2,2',3,4',5,6,6'-Heptachlorobiphenyl	0.411	pg/g	J EMPC	U	25
A5875	Mn SD0025	875_11306_PCB_001-D2	EPA1668A	2,2',3,4',5,6'-Hexachlorobiphenyl	1.1	pg/g	EMPC	U	25
A5875	Mn SD0025	875_11306_PCB_001-D2	EPA1668A	2,2',3,4',6,6'-Hexachlorobiphenyl	1.64	pg/g	EMPC	U	25
A5875	Mn SD0025	875_11306_PCB_001-D2	EPA1668A	2,2',3,5,6,6'-Hexachlorobiphenyl	1.24	pg/g	EMPC	U	25
A5875	Mn SD0025	875_11306_PCB_001-D2	EPA1668A	Hexachlorobiphenyl homologs	7160	pg/g	EMPC	J	25
A5875	Mn SD0026	875_11306_PCB_003-D2	EPA1668A	2,2',3,4',5,6'-Hexachlorobiphenyl	1.64	pg/g	EMPC	U	25
A5875	Mn SD0026	875_11306_PCB_003-D2	EPA1668A	2,2',6,6'-Tetrachlorobiphenyl	0.679	pg/g	J EMPC	U	25
A5875	Mn SD0026	875_11306_PCB_003-D2	EPA1668A	2,2',6-Trichlorobiphenyl	2.49	pg/g	EMPC	U	25
A5875	Mn SD0026	875_11306_PCB_003-D2	EPA1668A	2-Chlorobiphenyl	1.79	pg/g	EMPC	U	25
A5875	Mn SD0026	875_11306_PCB_003-D2	EPA1668A	3,4',5-Trichlorobiphenyl	2.29	pg/g	EMPC	U	25
A5875	Mn SD0026	875_11306_PCB_003-D2	EPA1668A	Monochlorobiphenyl homologs	1.79	pg/g	EMPC	J	25
A5875	Mn SD0026	875_11306_PCB_003-D2	EPA1668A	Trichlorobiphenyl homologs	581	pg/g	EMPC	J	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	7.48	pg/g	EMPC	U	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	2,2',3,3',4,4',5,6-Octachlorobiphenyl	11.5	pg/g	EMPC	U	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	2,2',3,3',4,5',6-Heptachlorobiphenyl	4.07	pg/g	EMPC	U	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	2,2',3,3',5,6-Hexachlorobiphenyl	8.03	pg/g	EMPC	U	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl	8.91	pg/g	EMPC	U	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	2,2',3,6,6'-Pentachlorobiphenyl	0.8	pg/g	J EMPC	U	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	2,2',3,6'-Tetrachlorobiphenyl	1.93	pg/g	EMPC	U	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	2,3,3',4,4',5',6-Heptachlorobiphenyl	2.18	pg/g	EMPC	U	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	2,3,3',4,5,5'-Hexachlorobiphenyl	2.93	pg/g	EMPC	U	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	2,3,3',4',5'-Pentachlorobiphenyl	1.45	pg/g	EMPC	U	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	2,3',5,5'-Tetrachlorobiphenyl	0.989	pg/g	J EMPC	U	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	3,3',4,4'-Tetrachlorobiphenyl	4.02	pg/g	EMPC	U	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	3,4,4'-Trichlorobiphenyl	5.03	pg/g	EMPC	U	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	Heptachlorobiphenyl homologs	589	pg/g	EMPC	J	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	Hexachlorobiphenyl homologs	1350	pg/g	EMPC	J	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	Nonachlorobiphenyl homologs	11.4	pg/g	EMPC	J	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	Octachlorobiphenyl homologs	88.4	pg/g	EMPC	J	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	Pentachlorobiphenyl homologs	1470	pg/g	EMPC	J	25
A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	Tetrachlorobiphenyl homologs	656	pg/g	EMPC	J	25

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A5875	Mn SD0028	875_11306_PCB_005-D2	EPA1668A	Trichlorobiphenyl homologs	166	pg/g	EMPC	J	25
A5875	Mn SD0051	875_11306_PCB_007-D2	EPA1668A	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	2.72	pg/g	EMPC	U	25
A5875	Mn SD0051	875_11306_PCB_007-D2	EPA1668A	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	4.93	pg/g	EMPC	U	25
A5875	Mn SD0051	875_11306_PCB_007-D2	EPA1668A	2,2',3,3',4,6-Hexachlorobiphenyl	5.56	pg/g	EMPC	U	25
A5875	Mn SD0051	875_11306_PCB_007-D2	EPA1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl	15.5	pg/g	EMPC	U	25
A5875	Mn SD0051	875_11306_PCB_007-D2	EPA1668A	2,2',3,6,6'-Pentachlorobiphenyl	2.87	pg/g	EMPC	U	25
A5875	Mn SD0051	875_11306_PCB_007-D2	EPA1668A	2,3,3',4-Tetrachlorobiphenyl	2.7	pg/g	EMPC	U	25
A5875	Mn SD0051	875_11306_PCB_007-D2	EPA1668A	2-Chlorobiphenyl	0.841	pg/g	J EMPC	U	25
A5875	Mn SD0051	875_11306_PCB_007-D2	EPA1668A	3,3',4-Trichlorobiphenyl	3.14	pg/g	EMPC	U	25
A5875	Mn SD0051	875_11306_PCB_007-D2	EPA1668A	3,4,4',5-Tetrachlorobiphenyl	1.47	pg/g	EMPC	U	25
A5875	Mn SD0051	875_11306_PCB_007-D2	EPA1668A	Hexachlorobiphenyl homologs	1950	pg/g	EMPC	J	25
A5875	Mn SD0051	875_11306_PCB_007-D2	EPA1668A	Monochlorobiphenyl homologs	0.841	pg/g	EMPC	J	25
A5875	Mn SD0051	875_11306_PCB_007-D2	EPA1668A	Octachlorobiphenyl homologs	130	pg/g	EMPC	J	25
A5875	Mn SD0051	875_11306_PCB_007-D2	EPA1668A	Pentachlorobiphenyl homologs	3250	pg/g	EMPC	J	25
A5875	Mn SD0051	875_11306_PCB_007-D2	EPA1668A	Tetrachlorobiphenyl homologs	1740	pg/g	EMPC	J	25
A5875	Mn SD0051	875_11306_PCB_007-D2	EPA1668A	Trichlorobiphenyl homologs	537	pg/g	EMPC	J	25
A5875	Mn SD0052	875_11306_PCB_009-D2	EPA1668A	2,2',3,3',4,4',6,6'-Octachlorobiphenyl	0.956	pg/g	J EMPC	U	25
A5875	Mn SD0052	875_11306_PCB_009-D2	EPA1668A	2,2',3,3',4,5,5'-Heptachlorobiphenyl	11.5	pg/g	EMPC	U	25
A5875	Mn SD0052	875_11306_PCB_009-D2	EPA1668A	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	2.89	pg/g	EMPC	U	25
A5875	Mn SD0052	875_11306_PCB_009-D2	EPA1668A	2,3,3',4,4',5,5'-Heptachlorobiphenyl	1.53	pg/g	EMPC	U	25
A5875	Mn SD0052	875_11306_PCB_009-D2	EPA1668A	2,3,3',4',5,5'-Hexachlorobiphenyl	1.34	pg/g	EMPC	U	25
A5875	Mn SD0052	875_11306_PCB_009-D2	EPA1668A	2,3',5,5'-Tetrachlorobiphenyl	2.15	pg/g	EMPC	U	25
A5875	Mn SD0052	875_11306_PCB_009-D2	EPA1668A	Heptachlorobiphenyl homologs	577	pg/g	EMPC	J	25
A5875	Mn SD0052	875_11306_PCB_009-D2	EPA1668A	Octachlorobiphenyl homologs	103	pg/g	EMPC	J	25
A5875	Mn SD0052	875_11306_PCB_009-D2	EPA1668A	Tetrachlorobiphenyl homologs	3260	pg/g	EMPC	J	25
A5875	Nc SD0052	875_11306_PCB_010-D2	EPA1668A	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	4.88	pg/g	EMPC	U	25
A5875	Nc SD0052	875_11306_PCB_010-D2	EPA1668A	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	3.32	pg/g	EMPC	U	25
A5875	Nc SD0052	875_11306_PCB_010-D2	EPA1668A	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	1.54	pg/g	EMPC	U	25
A5875	Nc SD0052	875_11306_PCB_010-D2	EPA1668A	2,2',3,3',4,5',6-Heptachlorobiphenyl	2.9	pg/g	EMPC	U	25
A5875	Nc SD0052	875_11306_PCB_010-D2	EPA1668A	2,2',3,6'-Tetrachlorobiphenyl	5.26	pg/g	EMPC	U	25
A5875	Nc SD0052	875_11306_PCB_010-D2	EPA1668A	2,2',4,4',5,6'-Hexachlorobiphenyl	3.5	pg/g	EMPC	U	25

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A5875	Nc SD0052	875_11306_PCB_010-D2	EPA1668A	2,3,3',4',5,5'-Hexachlorobiphenyl	1.53	pg/g	EMPC	U	25
A5875	Nc SD0052	875_11306_PCB_010-D2	EPA1668A	2,3,3',4,5,5'-Hexachlorobiphenyl	2.35	pg/g	EMPC	U	25
A5875	Nc SD0052	875_11306_PCB_010-D2	EPA1668A	2,3,3',4-Tetrachlorobiphenyl	2.48	pg/g	EMPC	U	25
A5875	Nc SD0052	875_11306_PCB_010-D2	EPA1668A	2,3',4,5-Tetrachlorobiphenyl	5.51	pg/g	EMPC	U	25
A5875	Nc SD0052	875_11306_PCB_010-D2	EPA1668A	Heptachlorobiphenyl homologs	376	pg/g	EMPC	J	25
A5875	Nc SD0052	875_11306_PCB_010-D2	EPA1668A	Hexachlorobiphenyl homologs	1390	pg/g	EMPC	J	25
A5875	Nc SD0052	875_11306_PCB_010-D2	EPA1668A	Octachlorobiphenyl homologs	34.4	pg/g	EMPC	J	25
A5875	Nc SD0052	875_11306_PCB_010-D2	EPA1668A	Tetrachlorobiphenyl homologs	1540	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 1	875_11306_PCB_011-D2	EPA1668A	2,2',3,3',4,4',6,6'-Octachlorobiphenyl	1.09	pg/g	EMPC	U	25
A5875	Mn SD0053 Rep 1	875_11306_PCB_011-D2	EPA1668A	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	6.13	pg/g	EMPC	U	25
A5875	Mn SD0053 Rep 1	875_11306_PCB_011-D2	EPA1668A	2,2',3,3',5,5'-Hexachlorobiphenyl	6.71	pg/g	EMPC	U	25
A5875	Mn SD0053 Rep 1	875_11306_PCB_011-D2	EPA1668A	2,2',4,4',5,6'-Hexachlorobiphenyl	4.39	pg/g	EMPC	U	25
A5875	Mn SD0053 Rep 1	875_11306_PCB_011-D2	EPA1668A	2,2',6,6'-Tetrachlorobiphenyl	1.16	pg/g	EMPC	U	25
A5875	Mn SD0053 Rep 1	875_11306_PCB_011-D2	EPA1668A	2,3,3',4,4',5',6-Heptachlorobiphenyl	3.17	pg/g	EMPC	U	25
A5875	Mn SD0053 Rep 1	875_11306_PCB_011-D2	EPA1668A	2,3',4,5'-Tetrachlorobiphenyl	1.38	pg/g	EMPC	U	25
A5875	Mn SD0053 Rep 1	875_11306_PCB_011-D2	EPA1668A	3,3',4,4',5-Pentachlorobiphenyl	1.31	pg/g	EMPC	U	25
A5875	Mn SD0053 Rep 1	875_11306_PCB_011-D2	EPA1668A	Heptachlorobiphenyl homologs	755	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 1	875_11306_PCB_011-D2	EPA1668A	Hexachlorobiphenyl homologs	3210	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 1	875_11306_PCB_011-D2	EPA1668A	Octachlorobiphenyl homologs	161	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 2	875_11306_PCB_012-D2	EPA1668A	2,2',3,5,6'-Pentachlorobiphenyl	3.76	pg/g	EMPC	U	25
A5875	Mn SD0053 Rep 2	875_11306_PCB_012-D2	EPA1668A	2,2',6,6'-Tetrachlorobiphenyl	0.689	pg/g	J EMPC	U	25
A5875	Mn SD0053 Rep 2	875_11306_PCB_012-D2	EPA1668A	2,3,3',4,4',5,5'-Heptachlorobiphenyl	1.35	pg/g	EMPC	U	25
A5875	Mn SD0053 Rep 2	875_11306_PCB_012-D2	EPA1668A	2,3,3',5-Tetrachlorobiphenyl	1.26	pg/g	EMPC	U	25
A5875	Mn SD0053 Rep 2	875_11306_PCB_012-D2	EPA1668A	Heptachlorobiphenyl homologs	910	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 3	875_11306_PCB_013-D2	EPA1668A	2,2',3,3',4,4',5,6-Octachlorobiphenyl	18.6	pg/g	EMPC	U	25
A5875	Mn SD0053 Rep 3	875_11306_PCB_013-D2	EPA1668A	2,2',3,3',4,4',6,6'-Octachlorobiphenyl	1.53	pg/g	EMPC	U	25
A5875	Mn SD0053 Rep 3	875_11306_PCB_013-D2	EPA1668A	2,2',4,4',5,6'-Hexachlorobiphenyl	4.72	pg/g	EMPC	U	25
A5875	Mn SD0053 Rep 3	875_11306_PCB_013-D2	EPA1668A	2,2',6,6'-Tetrachlorobiphenyl	0.983	pg/g	EMPC	U	25
A5875	Mn SD0053 Rep 3	875_11306_PCB_013-D2	EPA1668A	2,3,3',4',5,5'-Hexachlorobiphenyl	1.92	pg/g	EMPC	U	25
A5875	Mn SD0053 Rep 3	875_11306_PCB_013-D2	EPA1668A	3,3',4,5'-Tetrachlorobiphenyl	10.8	pg/g	EMPC	U	25
A5875	Mn SD0053 Rep 3	875_11306_PCB_013-D2	EPA1668A	3,4',5-Trichlorobiphenyl	5.56	pg/g	EMPC	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5875	Mn SD0053 Rep 3	875_11306_PCB_013-D2	EPA1668A	Hexachlorobiphenyl homologs	3710	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 3	875_11306_PCB_013-D2	EPA1668A	Octachlorobiphenyl homologs	177	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 3	875_11306_PCB_013-D2	EPA1668A	Tetrachlorobiphenyl homologs	6530	pg/g	EMPC	J	25
A5875	Mn SD0053 Rep 3	875_11306_PCB_013-D2	EPA1668A	Trichlorobiphenyl homologs	1750	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 1	875_11306_PCB_014-D2	EPA1668A	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	6.49	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 1	875_11306_PCB_014-D2	EPA1668A	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	10.6	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 1	875_11306_PCB_014-D2	EPA1668A	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	3.41	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 1	875_11306_PCB_014-D2	EPA1668A	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	2.27	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 1	875_11306_PCB_014-D2	EPA1668A	2,2',4,4',5,6'-Hexachlorobiphenyl	3.46	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 1	875_11306_PCB_014-D2	EPA1668A	2,3,3',4',5'-Pentachlorobiphenyl	7.51	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 1	875_11306_PCB_014-D2	EPA1668A	3,4',5-Trichlorobiphenyl	3.02	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 1	875_11306_PCB_014-D2	EPA1668A	Nonachlorobiphenyl homologs	6.49	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 1	875_11306_PCB_014-D2	EPA1668A	Octachlorobiphenyl homologs	70.8	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 1	875_11306_PCB_014-D2	EPA1668A	Pentachlorobiphenyl homologs	5500	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 1	875_11306_PCB_014-D2	EPA1668A	Trichlorobiphenyl homologs	1120	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 2	875_11306_PCB_015-D2	EPA1668A	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	3.62	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 2	875_11306_PCB_015-D2	EPA1668A	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	7.56	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 2	875_11306_PCB_015-D2	EPA1668A	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	11.9	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 2	875_11306_PCB_015-D2	EPA1668A	2,2',3,3',4,4',6,6'-Octachlorobiphenyl	0.615	pg/g	J EMPC	U	25
A5875	Nc SD0053 Rep 2	875_11306_PCB_015-D2	EPA1668A	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	2.29	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 2	875_11306_PCB_015-D2	EPA1668A	2,2',3,3',5,5',6-Heptachlorobiphenyl	15.1	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 2	875_11306_PCB_015-D2	EPA1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl	7.38	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 2	875_11306_PCB_015-D2	EPA1668A	2,3,3',4,4',5',6-Heptachlorobiphenyl	1.53	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 2	875_11306_PCB_015-D2	EPA1668A	2,3,3',4',5,5'-Hexachlorobiphenyl	1.02	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 2	875_11306_PCB_015-D2	EPA1668A	Heptachlorobiphenyl homologs	547	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 2	875_11306_PCB_015-D2	EPA1668A	Nonachlorobiphenyl homologs	11.6	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 2	875_11306_PCB_015-D2	EPA1668A	Octachlorobiphenyl homologs	70.3	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 3	875_11306_PCB_016-D2	EPA1668A	2,2',3,3',4,5,5'-Heptachlorobiphenyl	8.78	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 3	875_11306_PCB_016-D2	EPA1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl	8.33	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 3	875_11306_PCB_016-D2	EPA1668A	2,2',3,4,6'-Pentachlorobiphenyl	7.08	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 3	875_11306_PCB_016-D2	EPA1668A	2,2',4,5',6-Pentachlorobiphenyl	3.46	pg/g	EMPC	U	25

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A5875	Nc SD0053 Rep 3	875_11306_PCB_016-D2	EPA1668A	2,3,3',4,4',5',6-Heptachlorobiphenyl	1.46	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 3	875_11306_PCB_016-D2	EPA1668A	2,3'-Dichlorobiphenyl	3.83	pg/g	EMPC	U	25
A5875	Nc SD0053 Rep 3	875_11306_PCB_016-D2	EPA1668A	Coelution of PCB 171 and 173	15.8	pg/g	EMPC C	U	25
A5875	Nc SD0053 Rep 3	875_11306_PCB_016-D2	EPA1668A	Dichlorobiphenyl homologs	55.7	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 3	875_11306_PCB_016-D2	EPA1668A	Heptachlorobiphenyl homologs	479	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 3	875_11306_PCB_016-D2	EPA1668A	Octachlorobiphenyl homologs	78.4	pg/g	EMPC	J	25
A5875	Nc SD0053 Rep 3	875_11306_PCB_016-D2	EPA1668A	Pentachlorobiphenyl homologs	5420	pg/g	EMPC	J	25
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	6.52	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	50.9	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	2.52	pg/g	U	UJ	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',4,4',5,6-Octachlorobiphenyl	34.1	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',4,4',5-Heptachlorobiphenyl	112	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',4,4',6,6'-Octachlorobiphenyl	2.62	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	7.93	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',4,5,5'-Heptachlorobiphenyl	24.9	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	11.8	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	9.06	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',4,5',6'-Heptachlorobiphenyl	88.3	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',4,5',6-Heptachlorobiphenyl	7.45	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',4,5,6'-Heptachlorobiphenyl	156	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',4,5'-Hexachlorobiphenyl	65.8	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',4,6,6'-Heptachlorobiphenyl	19.9	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',4,6'-Hexachlorobiphenyl	361	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',4,6-Hexachlorobiphenyl	13.3	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	21.2	pg/g	EMPC	UJ	9,25
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',5,5',6-Heptachlorobiphenyl	32.8	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',5,5'-Hexachlorobiphenyl	13.9	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,3',5,6,6'-Heptachlorobiphenyl	62.4	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,4,4',5',6-Heptachlorobiphenyl	99.7	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,4,4',5-Hexachlorobiphenyl	39.8	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,4',5,5',6-Heptachlorobiphenyl	233	pg/g		J	9

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A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,4,5,5',6-Heptachlorobiphenyl	14.4	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,4',5,5'-Hexachlorobiphenyl	134	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,4,5,5'-Hexachlorobiphenyl	154	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,4,6'-Pentachlorobiphenyl	6.37	pg/g	EMPC	UJ	9,25
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,4'-Tetrachlorobiphenyl	89.8	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,4-Tetrachlorobiphenyl	31.1	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,5-Tetrachlorobiphenyl	10.3	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,6'-Tetrachlorobiphenyl	7.76	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',3,6-Tetrachlorobiphenyl	21	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',4,4',5,6'-Hexachlorobiphenyl	11.7	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',4,4',5-Pentachlorobiphenyl	598	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',4,5',6-Pentachlorobiphenyl	7.14	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',4,5-Tetrachlorobiphenyl	75.3	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',4,6'-Tetrachlorobiphenyl	9.74	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2',5,5'-Tetrachlorobiphenyl	560	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,2'-Dichlorobiphenyl	4.94	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3,3',4,4',5,5'-Heptachlorobiphenyl	3.04	pg/g	EMPC	U	25
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3,3',4,4',5',6-Heptachlorobiphenyl	5.86	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3,3',4,4',5,6-Heptachlorobiphenyl	20.6	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3,3',4,4',6-Hexachlorobiphenyl	113	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3,3',4,5,5'-Hexachlorobiphenyl	7.05	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3,3',4',5',6-Hexachlorobiphenyl	60	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3,3',4,6-Pentachlorobiphenyl	57.9	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3',4,4',5,5'-Hexachlorobiphenyl	29.6	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3',4,4',5'-Pentachlorobiphenyl	12.8	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3',4,4',5-Pentachlorobiphenyl	896	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3,4,4',5-Pentachlorobiphenyl	17	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3',4,4'-Tetrachlorobiphenyl	282	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3',4,5'-Tetrachlorobiphenyl	2.05	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3',4,5-Tetrachlorobiphenyl	15.2	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3,4',5-Tetrachlorobiphenyl	13.4	pg/g		J	9

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3,4',6-Tetrachlorobiphenyl	178	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3',4-Trichlorobiphenyl	7.56	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3',5,5'-Tetrachlorobiphenyl	3.44	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,3'-Dichlorobiphenyl	3.74	pg/g	EMPC	U	25
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,4',5-Trichlorobiphenyl	103	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	2,4'-Dichlorobiphenyl	21.2	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	3,3',4,4',5-Pentachlorobiphenyl	0.988	pg/g	EMPC	U	25
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	3,3',4,5'-Tetrachlorobiphenyl	8.93	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	3,3',5-Trichlorobiphenyl	2.17	pg/g		J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	3,4',5-Trichlorobiphenyl	2.34	pg/g	EMPC	U	25
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	4,4'-Dichlorobiphenyl	7.98	pg/g	EMPC	UJ	9,25
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Coelution of PCB 026 and 029	13.8	pg/g	C	J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Coelution of PCB 040 and 071	145	pg/g	C	J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Coelution of PCB 044, 047, and 065	193	pg/g	C	J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Coelution of PCB 046 and 069	250	pg/g	C	J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Coelution of PCB 059, 062, and 075	25.2	pg/g	C	J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Coelution of PCB 085 and 116	168	pg/g	C	J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Coelution of PCB 128 and 166	158	pg/g	C	J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Coelution of PCB 129, 138, and 163	1080	pg/g	C	J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Coelution of PCB 139 and 140	19.9	pg/g	C	J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Coelution of PCB 153 and 168	881	pg/g	C	J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Coelution of PCB 156 and 157	93.4	pg/g	C	J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Coelution of PCB 171 and 173	46	pg/g	C	J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Coelution of PCB 180 and 193	280	pg/g	C	J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Coelution of PCB 198 and 199	79.2	pg/g	C	J	9
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Dichlorobiphenyl homologs	97.4	pg/g	EMPC	J	25
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Heptachlorobiphenyl homologs	1210	pg/g	EMPC	J	25
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Octachlorobiphenyl homologs	266	pg/g	EMPC	J	25
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Pentachlorobiphenyl homologs	6240	pg/g	EMPC	J	25
A5875	Mn SD0054	875_11306_PCB_017-D2	EPA1668A	Trichlorobiphenyl homologs	590	pg/g	EMPC	J	25
A5875	Nc SD0054	875_11306_PCB_018-D2	EPA1668A	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	4.24	pg/g	EMPC	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5875	Nc SD0054	875_11306_PCB_018-D2	EPA1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl	8.25	pg/g	EMPC	U	25
A5875	Nc SD0054	875_11306_PCB_018-D2	EPA1668A	2,2',6-Trichlorobiphenyl	2.68	pg/g	EMPC	U	25
A5875	Nc SD0054	875_11306_PCB_018-D2	EPA1668A	2,3,3',4',5,5'-Hexachlorobiphenyl	1.26	pg/g	EMPC	U	25
A5875	Nc SD0054	875_11306_PCB_018-D2	EPA1668A	2,3,6-Trichlorobiphenyl	0.547	pg/g	J EMPC	U	25
A5875	Nc SD0054	875_11306_PCB_018-D2	EPA1668A	3,3',4-Trichlorobiphenyl	1.64	pg/g	EMPC	U	25
A5875	Nc SD0054	875_11306_PCB_018-D2	EPA1668A	3,4',5-Trichlorobiphenyl	1.69	pg/g	EMPC	U	25
A5875	Nc SD0054	875_11306_PCB_018-D2	EPA1668A	Octachlorobiphenyl homologs	94.8	pg/g	EMPC	J	25
A5875	Nc SD0054	875_11306_PCB_018-D2	EPA1668A	Trichlorobiphenyl homologs	381	pg/g	EMPC	J	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	10.2	pg/g	EMPC	U	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	2,2',3,3',4,4',6,6'-Octachlorobiphenyl	1	pg/g	EMPC	U	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	3.94	pg/g		J	13H
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	2,2',3,4,4',5-Hexachlorobiphenyl	4.38	pg/g	EMPC	U	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	2,2',3,4,5,5',6-Heptachlorobiphenyl	4.23	pg/g	EMPC	U	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	2,2',3,6,6'-Pentachlorobiphenyl	0.879	pg/g	J EMPC	U	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	2,2'-Dichlorobiphenyl	4.54	pg/g	EMPC	U	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	2,3,3',4,4',5,5'-Heptachlorobiphenyl	1.92	pg/g	EMPC	U	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	2,3,3',4,4',5',6-Heptachlorobiphenyl	1.49	pg/g	EMPC	U	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	2,3',4,4',5-Pentachlorobiphenyl	98.7	pg/g		J	9
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	2,3,4',5-Tetrachlorobiphenyl	1.86	pg/g	EMPC	U	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	2,3',6-Trichlorobiphenyl	1.92	pg/g	EMPC	U	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	3,4,4'-Trichlorobiphenyl	3.32	pg/g	EMPC	U	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	Coelution of PCB 107 and 124	3.59	pg/g	EMPC C	U	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	Dichlorobiphenyl homologs	39.1	pg/g	EMPC	J	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	Heptachlorobiphenyl homologs	535	pg/g	EMPC	J	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	Hexachlorobiphenyl homologs	1100	pg/g	EMPC	J	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	Nonachlorobiphenyl homologs	14.1	pg/g	EMPC	J	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	Octachlorobiphenyl homologs	122	pg/g	EMPC	J	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	Pentachlorobiphenyl homologs	830	pg/g	EMPC	J	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	Tetrachlorobiphenyl homologs	438	pg/g	EMPC	J	25
A5875	Mn SD0055	875_11306_PCB_019-D2	EPA1668A	Trichlorobiphenyl homologs	141	pg/g	EMPC	J	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	4.53	pg/g	EMPC	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	15.7	pg/g	EMPC	U	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	2,2',3,3',4,4',5,6-Octachlorobiphenyl	9.54	pg/g	EMPC	U	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	2,2',3,3',4,4',6,6'-Octachlorobiphenyl	1.06	pg/g	EMPC	U	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	2,2',3,3',4,6-Hexachlorobiphenyl	1.28	pg/g	EMPC	U	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	2,2',3,6'-Tetrachlorobiphenyl	1.22	pg/g	EMPC	U	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	2,2',4,5,6'-Pentachlorobiphenyl	3.12	pg/g	EMPC	U	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	2,2',4,6'-Tetrachlorobiphenyl	1.06	pg/g	EMPC	U	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	2,2',4-Trichlorobiphenyl	5.82	pg/g	EMPC	U	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	2,3,3',4'-Tetrachlorobiphenyl	5.84	pg/g	EMPC	U	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	2,3',4-Trichlorobiphenyl	1.34	pg/g	EMPC	U	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	2,4'-Dichlorobiphenyl	3.67	pg/g	EMPC	U	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	3,4,4'-Trichlorobiphenyl	1.28	pg/g	EMPC	U	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	Coelution of PCB 020 and 028	14.5	pg/g	EMPC C	U	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	Dichlorobiphenyl homologs	14.5	pg/g	EMPC	J	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	Hexachlorobiphenyl homologs	771	pg/g	EMPC	J	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	Octachlorobiphenyl homologs	76.7	pg/g	EMPC	J	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	Pentachlorobiphenyl homologs	552	pg/g	EMPC	J	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	Tetrachlorobiphenyl homologs	274	pg/g	EMPC	J	25
A5875	Nc SD0055	875_11306_PCB_020-D2	EPA1668A	Trichlorobiphenyl homologs	74.3	pg/g	EMPC	J	25
A5877	SD0025 PCB	A5877_11299_PCB_001	EPA1668A	2,2',3,3',5,5'-Hexachlorobiphenyl	0.0755	pg/uL	J EMPC	U	25
A5877	SD0025 PCB	A5877_11299_PCB_001	EPA1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl	0.174	pg/uL	EMPC	U	25
A5877	SD0025 PCB	A5877_11299_PCB_001	EPA1668A	2,2',4,5',6-Pentachlorobiphenyl	0.18	pg/uL	EMPC	U	25
A5877	SD0025 PCB	A5877_11299_PCB_001	EPA1668A	2,3,3',4',5'-Pentachlorobiphenyl	0.119	pg/uL	EMPC	U	25
A5877	SD0025 PCB	A5877_11299_PCB_001	EPA1668A	2,3',4,4',5'-Pentachlorobiphenyl	0.211	pg/uL	EMPC	U	25
A5877	SD0025 PCB	A5877_11299_PCB_001	EPA1668A	3,3'-Dichlorobiphenyl	0.237	pg/uL		U	6
A5877	SD0025 PCB	A5877_11299_PCB_001	EPA1668A	Hexachlorobiphenyl homologs	49.2	pg/uL	EMPC	J	25
A5877	SD0025 PCB	A5877_11299_PCB_001	EPA1668A	Octachlorobiphenyl homologs	1.05	pg/uL	EMPC	J	25
A5877	SD0025 PCB	A5877_11299_PCB_001	EPA1668A	Pentachlorobiphenyl homologs	119	pg/uL	EMPC	J	25
A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	2,2',3,3',4,4',5-Heptachlorobiphenyl	0.425	pg/uL	EMPC	U	25
A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	2,2',3,3',4,5,5'-Heptachlorobiphenyl	0.0888	pg/uL	EMPC	U	25
A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	0.0616	pg/uL	J EMPC	U	25

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A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	2,2',3,3',5,5'-Hexachlorobiphenyl	0.108	pg/uL	EMPC	U	25
A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl	0.121	pg/uL	EMPC	U	25
A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	2,2',3,4,4',5-Hexachlorobiphenyl	0.278	pg/uL	EMPC	U	25
A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	2,2',6-Trichlorobiphenyl	0.124	pg/uL	EMPC	U	25
A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	2,3',4,4',5'-Pentachlorobiphenyl	0.101	pg/uL	EMPC	U	25
A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	2,3',4,5-Tetrachlorobiphenyl	0.0734	pg/uL	J EMPC	U	25
A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	2,3,4',5-Tetrachlorobiphenyl	0.0671	pg/uL	J EMPC	U	25
A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	3,3'-Dichlorobiphenyl	0.32	pg/uL		U	6
A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	Coelution of PCB 059, 062, and 075	0.24	pg/uL	J EMPC C	U	25
A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	Heptachlorobiphenyl homologs	5.08	pg/uL	EMPC	J	25
A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	Hexachlorobiphenyl homologs	24.2	pg/uL	EMPC	J	25
A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	Octachlorobiphenyl homologs	0.764	pg/uL	EMPC	J	25
A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	Pentachlorobiphenyl homologs	41.6	pg/uL	EMPC	J	25
A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	Tetrachlorobiphenyl homologs	24.9	pg/uL	EMPC	J	25
A5877	SD0054 PCB	A5877_11299_PCB_002	EPA1668A	Trichlorobiphenyl homologs	8.11	pg/uL	EMPC	J	25
A5877	SD0018 PCB	A5877_11299_PCB_003	EPA1668A	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	0.073	pg/uL	J EMPC	U	25
A5877	SD0018 PCB	A5877_11299_PCB_003	EPA1668A	2,3,3',4,4',5',6-Heptachlorobiphenyl	0.0608	pg/uL	J EMPC	U	25
A5877	SD0018 PCB	A5877_11299_PCB_003	EPA1668A	2,3',4,5'-Tetrachlorobiphenyl	0.0655	pg/uL	J EMPC	U	25
A5877	SD0018 PCB	A5877_11299_PCB_003	EPA1668A	2,3',5,5'-Tetrachlorobiphenyl	0.0901	pg/uL	EMPC	U	25
A5877	SD0018 PCB	A5877_11299_PCB_003	EPA1668A	3,3',4,5'-Tetrachlorobiphenyl	0.0844	pg/uL	EMPC	U	25
A5877	SD0018 PCB	A5877_11299_PCB_003	EPA1668A	3,3'-Dichlorobiphenyl	0.106	pg/uL	EMPC	U	25
A5877	SD0018 PCB	A5877_11299_PCB_003	EPA1668A	3,4,4'-Trichlorobiphenyl	0.216	pg/uL	EMPC	U	25
A5877	SD0018 PCB	A5877_11299_PCB_003	EPA1668A	Dichlorobiphenyl homologs	0.943	pg/uL	EMPC	J	25
A5877	SD0018 PCB	A5877_11299_PCB_003	EPA1668A	Octachlorobiphenyl homologs	2.17	pg/uL	EMPC	J	25
A5877	SD0018 PCB	A5877_11299_PCB_003	EPA1668A	Tetrachlorobiphenyl homologs	63.7	pg/uL	EMPC	J	25
A5877	SD0018 PCB	A5877_11299_PCB_003	EPA1668A	Trichlorobiphenyl homologs	14.5	pg/uL	EMPC	J	25
A5877	SD0053-AC PCB	A5877_11299_PCB_004	EPA1668A	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	0.136	pg/uL	EMPC	U	25
A5877	SD0053-AC PCB	A5877_11299_PCB_004	EPA1668A	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	0.0438	pg/uL	J EMPC	U	25
A5877	SD0053-AC PCB	A5877_11299_PCB_004	EPA1668A	2,2',3,3',5,5',6-Heptachlorobiphenyl	0.12	pg/uL	EMPC	U	25
A5877	SD0053-AC PCB	A5877_11299_PCB_004	EPA1668A	2,2',3,3',5,6-Hexachlorobiphenyl	0.253	pg/uL	EMPC	U	25
A5877	SD0053-AC PCB	A5877_11299_PCB_004	EPA1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl	0.155	pg/uL	EMPC	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5877	SD0053-AC PCB	A5877_11299_PCB_004	EPA1668A	2,3',4-Trichlorobiphenyl	0.092	pg/uL	EMPC	U	25
A5877	SD0053-AC PCB	A5877_11299_PCB_004	EPA1668A	2,4'-Dichlorobiphenyl	0.125	pg/uL		U	6
A5877	SD0053-AC PCB	A5877_11299_PCB_004	EPA1668A	3,3'-Dichlorobiphenyl	0.0635	pg/uL	J	U	6
A5877	SD0053-AC PCB	A5877_11299_PCB_004	EPA1668A	Coelution of PCB 139 and 140	0.064	pg/uL	J EMPC C	U	25
A5877	SD0053-AC PCB	A5877_11299_PCB_004	EPA1668A	Heptachlorobiphenyl homologs	4.14	pg/uL	EMPC	J	25
A5877	SD0053-AC PCB	A5877_11299_PCB_004	EPA1668A	Hexachlorobiphenyl homologs	17.7	pg/uL	EMPC	J	25
A5877	SD0053-AC PCB	A5877_11299_PCB_004	EPA1668A	Octachlorobiphenyl homologs	0.98	pg/uL	EMPC	J	25
A5877	SD0053-AC PCB	A5877_11299_PCB_004	EPA1668A	Trichlorobiphenyl homologs	9.92	pg/uL	EMPC	J	25
A5877	SD0051 PCB	A5877_11299_PCB_005	EPA1668A	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	0.0987	pg/uL	EMPC	U	25
A5877	SD0051 PCB	A5877_11299_PCB_005	EPA1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl	0.144	pg/uL	EMPC	U	25
A5877	SD0051 PCB	A5877_11299_PCB_005	EPA1668A	2,3,3',4,4',5,6-Heptachlorobiphenyl	0.0519	pg/uL	J EMPC	U	25
A5877	SD0051 PCB	A5877_11299_PCB_005	EPA1668A	2,3,3',4,4',6-Hexachlorobiphenyl	0.35	pg/uL	EMPC	U	25
A5877	SD0051 PCB	A5877_11299_PCB_005	EPA1668A	2,3,4',5-Tetrachlorobiphenyl	0.0427	pg/uL	J EMPC	U	25
A5877	SD0051 PCB	A5877_11299_PCB_005	EPA1668A	3,3'-Dichlorobiphenyl	0.395	pg/uL		U	6
A5877	SD0051 PCB	A5877_11299_PCB_005	EPA1668A	Coelution of PCB 128 and 166	0.561	pg/uL	EMPC C	U	25
A5877	SD0051 PCB	A5877_11299_PCB_005	EPA1668A	Heptachlorobiphenyl homologs	4.07	pg/uL	EMPC	J	25
A5877	SD0051 PCB	A5877_11299_PCB_005	EPA1668A	Hexachlorobiphenyl homologs	15.7	pg/uL	EMPC	J	25
A5877	SD0051 PCB	A5877_11299_PCB_005	EPA1668A	Octachlorobiphenyl homologs	0.637	pg/uL	EMPC	J	25
A5877	SD0051 PCB	A5877_11299_PCB_005	EPA1668A	Tetrachlorobiphenyl homologs	17.2	pg/uL	EMPC	J	25
A5877	SD0010 PCB	A5877_11299_PCB_006	EPA1668A	2,2',3,3',4,6,6'-Heptachlorobiphenyl	0.146	pg/uL	EMPC	U	25
A5877	SD0010 PCB	A5877_11299_PCB_006	EPA1668A	2,2',4,4',5,6'-Hexachlorobiphenyl	0.0452	pg/uL	J EMPC	U	25
A5877	SD0010 PCB	A5877_11299_PCB_006	EPA1668A	2,3,3',4,4'-Pentachlorobiphenyl	2.56	pg/uL	EMPC	U	25
A5877	SD0010 PCB	A5877_11299_PCB_006	EPA1668A	2,3,3',4',5'-Pentachlorobiphenyl	0.0939	pg/uL	EMPC	U	25
A5877	SD0010 PCB	A5877_11299_PCB_006	EPA1668A	2,3,4,4',5-Pentachlorobiphenyl	0.167	pg/uL	EMPC	U	25
A5877	SD0010 PCB	A5877_11299_PCB_006	EPA1668A	2,3',4,5-Tetrachlorobiphenyl	0.126	pg/uL	EMPC	U	25
A5877	SD0010 PCB	A5877_11299_PCB_006	EPA1668A	3,3'-Dichlorobiphenyl	0.102	pg/uL		U	6
A5877	SD0010 PCB	A5877_11299_PCB_006	EPA1668A	Heptachlorobiphenyl homologs	7.67	pg/uL	EMPC	J	25
A5877	SD0010 PCB	A5877_11299_PCB_006	EPA1668A	Hexachlorobiphenyl homologs	29.9	pg/uL	EMPC	J	25
A5877	SD0010 PCB	A5877_11299_PCB_006	EPA1668A	Pentachlorobiphenyl homologs	58.6	pg/uL	EMPC	J	25
A5877	SD0010 PCB	A5877_11299_PCB_006	EPA1668A	Tetrachlorobiphenyl homologs	57.9	pg/uL	EMPC	J	25
A5877	SD0028 PCB	A5877_11299_PCB_007	EPA1668A	2,2',3,3',4,5'-Hexachlorobiphenyl	0.106	pg/uL	EMPC	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5877	SD0028 PCB	A5877_11299_PCB_007	EPA1668A	2,2',4,4',5,6'-Hexachlorobiphenyl	0.0372	pg/uL	J EMPC	U	25
A5877	SD0028 PCB	A5877_11299_PCB_007	EPA1668A	2,2'-Dichlorobiphenyl	0.181	pg/uL	EMPC	U	25
A5877	SD0028 PCB	A5877_11299_PCB_007	EPA1668A	2,3,4,4'-Tetrachlorobiphenyl	0.0891	pg/uL	EMPC	U	25
A5877	SD0028 PCB	A5877_11299_PCB_007	EPA1668A	2,3,4',5,6-Pentachlorobiphenyl	0.0394	pg/uL	J EMPC	U	25
A5877	SD0028 PCB	A5877_11299_PCB_007	EPA1668A	3,3'-Dichlorobiphenyl	0.111	pg/uL		U	6
A5877	SD0028 PCB	A5877_11299_PCB_007	EPA1668A	Coelution of PCB 059, 062, and 075	0.0542	pg/uL	J EMPC C	U	25
A5877	SD0028 PCB	A5877_11299_PCB_007	EPA1668A	Coelution of PCB 198 and 199	0.132	pg/uL	J EMPC C	U	25
A5877	SD0028 PCB	A5877_11299_PCB_007	EPA1668A	Dichlorobiphenyl homologs	0.711	pg/uL	EMPC	J	25
A5877	SD0028 PCB	A5877_11299_PCB_007	EPA1668A	Hexachlorobiphenyl homologs	8.25	pg/uL	EMPC	J	25
A5877	SD0028 PCB	A5877_11299_PCB_007	EPA1668A	Octachlorobiphenyl homologs	0.23	pg/uL	EMPC	J	25
A5877	SD0028 PCB	A5877_11299_PCB_007	EPA1668A	Pentachlorobiphenyl homologs	10.2	pg/uL	EMPC	J	25
A5877	SD0028 PCB	A5877_11299_PCB_007	EPA1668A	Tetrachlorobiphenyl homologs	5.91	pg/uL	EMPC	J	25
A5877	SD0053-1 PCB	A5877_11299_PCB_008	EPA1668A	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	0.0479	pg/uL	J EMPC	U	25
A5877	SD0053-1 PCB	A5877_11299_PCB_008	EPA1668A	2,2',3,5-Tetrachlorobiphenyl	0.27	pg/uL	EMPC	U	25
A5877	SD0053-1 PCB	A5877_11299_PCB_008	EPA1668A	2,2',3,6,6'-Pentachlorobiphenyl	0.124	pg/uL	EMPC	U	25
A5877	SD0053-1 PCB	A5877_11299_PCB_008	EPA1668A	2,3,3',4,4'-Pentachlorobiphenyl	3.54	pg/uL	EMPC	U	25
A5877	SD0053-1 PCB	A5877_11299_PCB_008	EPA1668A	2,3,4,4',5-Pentachlorobiphenyl	0.196	pg/uL	EMPC	U	25
A5877	SD0053-1 PCB	A5877_11299_PCB_008	EPA1668A	3,3'-Dichlorobiphenyl	0.0954	pg/uL		U	6
A5877	SD0053-1 PCB	A5877_11299_PCB_008	EPA1668A	Pentachlorobiphenyl homologs	71	pg/uL	EMPC	J	25
A5877	SD0053-1 PCB	A5877_11299_PCB_008	EPA1668A	Tetrachlorobiphenyl homologs	64.5	pg/uL	EMPC	J	25
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	0.0388	pg/uL	J EMPC	U	25
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	2,2',3,3',4,5'-Hexachlorobiphenyl	0.319	pg/uL	EMPC	U	25
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	0.0685	pg/uL	J EMPC	U	25
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	2,2',3,4,5,5',6-Heptachlorobiphenyl	0.0469	pg/uL	J EMPC	U	25
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	2,2',4,4',5,6'-Hexachlorobiphenyl	0.0623	pg/uL	J EMPC	U	25
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	2,3',4,4',5'-Pentachlorobiphenyl	0.0844	pg/uL	EMPC	U	25
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	2,3,4,4',5-Pentachlorobiphenyl	0.0966	pg/uL	EMPC	U	25
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	2,3',6-Trichlorobiphenyl	0.0268	pg/uL	J EMPC	U	25
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	2,4'-Dichlorobiphenyl	0.0565	pg/uL	J	U	6
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	3,3',4,5'-Tetrachlorobiphenyl	0.0397	pg/uL	J EMPC	U	25
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	3,3'-Dichlorobiphenyl	0.146	pg/uL		U	6

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	3,4,4'-Trichlorobiphenyl	0.0811	pg/uL	J EMPC	U	25
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	Coelution of PCB 198 and 199	0.272	pg/uL	EMPC C	U	25
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	Heptachlorobiphenyl homologs	5.8	pg/uL	EMPC	J	25
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	Hexachlorobiphenyl homologs	23.4	pg/uL	EMPC	J	25
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	Octachlorobiphenyl homologs	0.827	pg/uL	EMPC	J	25
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	Pentachlorobiphenyl homologs	39	pg/uL	EMPC	J	25
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	Tetrachlorobiphenyl homologs	18.2	pg/uL	EMPC	J	25
A5877	SD0054-AC PCB	A5877_11299_PCB_009	EPA1668A	Trichlorobiphenyl homologs	3.52	pg/uL	EMPC	J	25
A5877	SD0026 PCB	A5877_11299_PCB_010	EPA1668A	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	0.029	pg/uL	J EMPC	U	25
A5877	SD0026 PCB	A5877_11299_PCB_010	EPA1668A	2,2',3,3',4,5',6-Heptachlorobiphenyl	0.0415	pg/uL	J EMPC	U	25
A5877	SD0026 PCB	A5877_11299_PCB_010	EPA1668A	2,2',3,3',4,5'-Hexachlorobiphenyl	0.486	pg/uL	EMPC	U	25
A5877	SD0026 PCB	A5877_11299_PCB_010	EPA1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl	0.125	pg/uL	EMPC	U	25
A5877	SD0026 PCB	A5877_11299_PCB_010	EPA1668A	2,2',3,6,6'-Pentachlorobiphenyl	0.0664	pg/uL	EMPC	U	25
A5877	SD0026 PCB	A5877_11299_PCB_010	EPA1668A	3,3'-Dichlorobiphenyl	0.14	pg/uL	EMPC	U	25
A5877	SD0026 PCB	A5877_11299_PCB_010	EPA1668A	Dichlorobiphenyl homologs	0.549	pg/uL	EMPC	J	25
A5877	SD0026 PCB	A5877_11299_PCB_010	EPA1668A	Heptachlorobiphenyl homologs	7.13	pg/uL	EMPC	J	25
A5877	SD0026 PCB	A5877_11299_PCB_010	EPA1668A	Hexachlorobiphenyl homologs	35.9	pg/uL	EMPC	J	25
A5877	SD0026 PCB	A5877_11299_PCB_010	EPA1668A	Octachlorobiphenyl homologs	0.866	pg/uL	EMPC	J	25
A5877	SD0026 PCB	A5877_11299_PCB_010	EPA1668A	Pentachlorobiphenyl homologs	60.8	pg/uL	EMPC	J	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	0.0631	pg/uL	J EMPC	U	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	2,2',3,3',4,5'-Hexachlorobiphenyl	0.194	pg/uL	EMPC	U	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	2,2',3,3',4,6-Hexachlorobiphenyl	0.0589	pg/uL	J EMPC	U	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	2,2',3,3',5,5'-Hexachlorobiphenyl	0.0257	pg/uL	J EMPC	U	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	2,2',3,3',5,6-Hexachlorobiphenyl	0.234	pg/uL	EMPC	U	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	2,2',3,3',5-Pentachlorobiphenyl	0.23	pg/uL	EMPC	U	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	2,2',3,4,5,5',6-Heptachlorobiphenyl	0.0331	pg/uL	J EMPC	U	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	2,2',3,4,6'-Pentachlorobiphenyl	0.0464	pg/uL	J EMPC	U	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	2,2',3,5-Tetrachlorobiphenyl	0.147	pg/uL	EMPC	U	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	2,2',4,5',6-Pentachlorobiphenyl	0.049	pg/uL	J EMPC	U	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	2,3',4,4',5'-Pentachlorobiphenyl	0.0366	pg/uL	J EMPC	U	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	2,3,4,4',5-Pentachlorobiphenyl	0.0432	pg/uL	J EMPC	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	3,3'-Dichlorobiphenyl	0.172	pg/uL		U	6
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	Coelution of PCB 139 and 140	0.0701	pg/uL	J EMPC C	U	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	Coelution of PCB 171 and 173	0.138	pg/uL	J EMPC C	U	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	Heptachlorobiphenyl homologs	3.84	pg/uL	EMPC	J	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	Hexachlorobiphenyl homologs	15.9	pg/uL	EMPC	J	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	Octachlorobiphenyl homologs	0.468	pg/uL	EMPC	J	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	Pentachlorobiphenyl homologs	30.8	pg/uL	EMPC	J	25
A5877	SD004-2 PCB	A5877_11299_PCB_011	EPA1668A	Tetrachlorobiphenyl homologs	25.9	pg/uL	EMPC	J	25
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	0.0317	pg/uL	J EMPC	U	25
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	2,2',3,3',4,5',6'-Heptachlorobiphenyl	0.317	pg/uL	EMPC	U	25
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	2,2',3,3',4-Pentachlorobiphenyl	0.0859	pg/uL	EMPC	U	25
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	2,2',3,3',5-Pentachlorobiphenyl	0.0593	pg/uL	J EMPC	U	25
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl	0.0985	pg/uL	EMPC	U	25
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	2,2',3,4,4',5-Hexachlorobiphenyl	0.0287	pg/uL	J EMPC	U	25
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	2,2',3,4,5,5',6-Heptachlorobiphenyl	0.0356	pg/uL	J EMPC	U	25
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	2,2',3,4',6-Pentachlorobiphenyl	0.163	pg/uL	EMPC	U	25
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	2,2'-Dichlorobiphenyl	0.118	pg/uL	EMPC	U	25
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	2,3,3',4',5',6-Hexachlorobiphenyl	0.0709	pg/uL	J EMPC	U	25
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	2,3,4',5,6-Pentachlorobiphenyl	0.0205	pg/uL	J EMPC	U	25
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	2,4'-Dichlorobiphenyl	0.1	pg/uL		U	6
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	3,3'-Dichlorobiphenyl	0.0759	pg/uL	J	U	6
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	Coelution of PCB 198 and 199	0.212	pg/uL	EMPC C	U	25
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	Dichlorobiphenyl homologs	0.324	pg/uL	EMPC	J	25
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	Heptachlorobiphenyl homologs	3.69	pg/uL	EMPC	J	25
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	Hexachlorobiphenyl homologs	7.24	pg/uL	EMPC	J	25
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	Octachlorobiphenyl homologs	0.68	pg/uL	EMPC	J	25
A5877	SD0055 PCB	A5877_11299_PCB_012	EPA1668A	Pentachlorobiphenyl homologs	6.33	pg/uL	EMPC	J	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	0.118	pg/uL	EMPC	U	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	2,2',3,3',4,4',5,6-Octachlorobiphenyl	0.0829	pg/uL	J EMPC	U	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	2,2',3,3',4,4',6,6'-Octachlorobiphenyl	0.0144	pg/uL	J EMPC	U	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	0.0462	pg/uL	J EMPC	U	25

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	0.0475	pg/uL	J EMPC	U	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	0.0401	pg/uL	J EMPC	U	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	2,2',3,3',4,5',6-Heptachlorobiphenyl	0.0324	pg/uL	J EMPC	U	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	2,2',3,3',4,6-Hexachlorobiphenyl	0.0883	pg/uL	EMPC	U	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	0.0707	pg/uL	J EMPC	U	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	2,2',3,4,5,5',6-Heptachlorobiphenyl	0.0504	pg/uL	J EMPC	U	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	2,2',3,5,6'-Pentachlorobiphenyl	0.043	pg/uL	J EMPC	U	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	2,2',4,4',5,6'-Hexachlorobiphenyl	0.0302	pg/uL	J EMPC	U	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	2,2',6,6'-Tetrachlorobiphenyl	0.0149	pg/uL	J EMPC	U	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	2,3,3',4,4'-Pentachlorobiphenyl	3.13	pg/uL	EMPC	U	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	2,3,4,4',5-Pentachlorobiphenyl	0.172	pg/uL	EMPC	U	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	3,3'-Dichlorobiphenyl	0.0968	pg/uL		U	6
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	Coelution of PCB 139 and 140	0.0875	pg/uL	J EMPC C	U	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	Heptachlorobiphenyl homologs	5.57	pg/uL	EMPC	J	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	Hexachlorobiphenyl homologs	23.4	pg/uL	EMPC	J	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	Nonachlorobiphenyl homologs	0.164	pg/uL	EMPC	J	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	Octachlorobiphenyl homologs	1.25	pg/uL	EMPC	J	25
A5877	SD0053-2 PCB	A5877_11299_PCB_013	EPA1668A	Pentachlorobiphenyl homologs	63.7	pg/uL	EMPC	J	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	0.138	pg/uL	EMPC	U	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	0.149	pg/uL	EMPC	U	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl	0.032	pg/uL	J EMPC	U	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	2,2',3,3',4,5',6'-Heptachlorobiphenyl	0.303	pg/uL	EMPC	U	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	2,2',3,3',4,6,6'-Heptachlorobiphenyl	0.0719	pg/uL	J EMPC	U	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	2,2',3,3',5,5',6-Heptachlorobiphenyl	0.108	pg/uL	EMPC	U	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	2,2',3,3',5,5'-Hexachlorobiphenyl	0.033	pg/uL	J EMPC	U	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	2,2',3,4,5,5',6-Heptachlorobiphenyl	0.0691	pg/uL	J EMPC	U	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	2,3,3',4,4'-Pentachlorobiphenyl	2.59	pg/uL	EMPC	U	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	2,3,3',4',5'-Pentachlorobiphenyl	0.0753	pg/uL	J EMPC	U	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	2,3',4,4',5,5'-Hexachlorobiphenyl	0.0915	pg/uL	EMPC	U	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	2,3',4,4',5'-Pentachlorobiphenyl	0.0772	pg/uL	J EMPC	U	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	2,3,4,4',5-Pentachlorobiphenyl	0.123	pg/uL	EMPC	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	2,3',4,5-Tetrachlorobiphenyl	0.09	pg/uL	EMPC	U	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	3,3',4,5'-Tetrachlorobiphenyl	0.0464	pg/uL	J EMPC	U	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	3,3'-Dichlorobiphenyl	0.131	pg/uL		U	6
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	Heptachlorobiphenyl homologs	4.54	pg/uL	EMPC	J	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	Hexachlorobiphenyl homologs	19.1	pg/uL	EMPC	J	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	Nonachlorobiphenyl homologs	0.17	pg/uL	EMPC	J	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	Octachlorobiphenyl homologs	1.02	pg/uL	EMPC	J	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	Pentachlorobiphenyl homologs	54.4	pg/uL	EMPC	J	25
A5877	SD0053-3 PCB	A5877_11299_PCB_014	EPA1668A	Tetrachlorobiphenyl homologs	52.6	pg/uL	EMPC	J	25
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	0.0731	pg/uL	J EMPC	U	25
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	2,2',3,3',4,4',5,5'-Octachlorobiphenyl	0.102	pg/uL	EMPC	U	25
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	2,2',3,3',4,5'-Hexachlorobiphenyl	0.222	pg/uL	EMPC	U	25
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	2,2',3,3',4,6-Hexachlorobiphenyl	0.0616	pg/uL	J EMPC	U	25
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	2,2',3,4,4',5-Hexachlorobiphenyl	0.131	pg/uL	EMPC	U	25
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	2,2',3,4,5',6-Hexachlorobiphenyl	0.188	pg/uL	EMPC	U	25
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	2,3',4,4',5'-Pentachlorobiphenyl	0.0518	pg/uL	J EMPC	U	25
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	2,3,4,4',5-Pentachlorobiphenyl	0.0623	pg/uL	J EMPC	U	25
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	2,3',4,5-Tetrachlorobiphenyl	0.0548	pg/uL	J EMPC	U	25
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	2,3',6-Trichlorobiphenyl	0.104	pg/uL	EMPC	U	25
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	3,3'-Dichlorobiphenyl	0.149	pg/uL		U	6
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	3,4,4'-Trichlorobiphenyl	0.202	pg/uL	EMPC	U	25
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	Coelution of PCB 139 and 140	0.0649	pg/uL	J EMPC C	U	25
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	Hexachlorobiphenyl homologs	15.6	pg/uL	EMPC	J	25
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	Nonachlorobiphenyl homologs	0.0731	pg/uL	EMPC	J	25
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	Octachlorobiphenyl homologs	0.569	pg/uL	EMPC	J	25
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	Pentachlorobiphenyl homologs	29	pg/uL	EMPC	J	25
A5877	SD004-1 PCB	A5877_11299_PCB_015	EPA1668A	Trichlorobiphenyl homologs	8.53	pg/uL	EMPC	J	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	0.0264	pg/uL	J EMPC	U	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	0.0534	pg/uL	J EMPC	U	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	2,2',3,3',4,5,5'-Heptachlorobiphenyl	0.116	pg/uL	EMPC	U	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	2,2',3,3',4,6,6'-Heptachlorobiphenyl	0.138	pg/uL	EMPC	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	2,2',3,3',4,6-Hexachlorobiphenyl	0.126	pg/uL	EMPC	U	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	2,3,3',4',5'-Pentachlorobiphenyl	0.0891	pg/uL	EMPC	U	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	2,3',4,4',5,5'-Hexachlorobiphenyl	0.159	pg/uL	EMPC	U	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	2,3',4,4',5'-Pentachlorobiphenyl	0.11	pg/uL	EMPC	U	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	2,3',4-Trichlorobiphenyl	0.294	pg/uL	EMPC	U	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	2,3,6-Trichlorobiphenyl	0.0417	pg/uL	J EMPC	U	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	3,3'-Dichlorobiphenyl	0.202	pg/uL		U	6
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	4-Chlorobiphenyl	0.0522	pg/uL	J EMPC	U	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	Coelution of PCB 012 and 013	0.0586	pg/uL	J EMPC C	U	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	Dichlorobiphenyl homologs	4.65	pg/uL	EMPC	J	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	Heptachlorobiphenyl homologs	7.39	pg/uL	EMPC	J	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	Hexachlorobiphenyl homologs	29.2	pg/uL	EMPC	J	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	Monochlorobiphenyl homologs	0.401	pg/uL	EMPC	J	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	Nonachlorobiphenyl homologs	0.0534	pg/uL	EMPC	J	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	Pentachlorobiphenyl homologs	54.9	pg/uL	EMPC	J	25
A5877	SD009 PCB	A5877_11299_PCB_016	EPA1668A	Trichlorobiphenyl homologs	20.4	pg/uL	EMPC	J	25
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	0.0526	pg/uL	J EMPC	U	25
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	0.0537	pg/uL	J EMPC	U	25
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	2,2',3,3',5,5'-Hexachlorobiphenyl	0.0728	pg/uL	J EMPC	U	25
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl	0.252	pg/uL	EMPC	U	25
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	2,2',3,4,5',6-Hexachlorobiphenyl	0.313	pg/uL	EMPC	U	25
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	2,2',4,5',6-Pentachlorobiphenyl	0.0673	pg/uL	J EMPC	U	25
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	2,3,3',4,4',5,6-Heptachlorobiphenyl	0.193	pg/uL	EMPC	U	25
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	2,3,3',4-Tetrachlorobiphenyl	0.027	pg/uL	J EMPC	U	25
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	2,3',4,4',5'-Pentachlorobiphenyl	0.0882	pg/uL	EMPC	U	25
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	2,3,4,4',5-Pentachlorobiphenyl	0.101	pg/uL	EMPC	U	25
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	2,3',4,5-Tetrachlorobiphenyl	0.0658	pg/uL	J EMPC	U	25
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	2,3,4',5-Tetrachlorobiphenyl	0.109	pg/uL	EMPC	U	25
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	2,4'-Dichlorobiphenyl	0.136	pg/uL		U	6
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	3,3'-Dichlorobiphenyl	0.0801	pg/uL	J	U	6
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	Coelution of PCB 139 and 140	0.116	pg/uL	J EMPC C	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	Heptachlorobiphenyl homologs	10.9	pg/uL	EMPC	J	25
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	Hexachlorobiphenyl homologs	29	pg/uL	EMPC	J	25
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	Octachlorobiphenyl homologs	1.75	pg/uL	EMPC	J	25
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	Pentachlorobiphenyl homologs	39.1	pg/uL	EMPC	J	25
A5877	SD0015 PCB	A5877_11299_PCB_017	EPA1668A	Tetrachlorobiphenyl homologs	36	pg/uL	EMPC	J	25
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	0.168	pg/uL	EMPC	U	25
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	2,2',3,3',4,5',6-Heptachlorobiphenyl	0.0745	pg/uL	J EMPC	U	25
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	0.0916	pg/uL	EMPC	U	25
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	2,2',3,4,5,5',6-Heptachlorobiphenyl	0.0904	pg/uL	EMPC	U	25
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	2,2',3,4,6'-Pentachlorobiphenyl	0.0645	pg/uL	J EMPC	U	25
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	2,3,3',4,5,5'-Hexachlorobiphenyl	0.0626	pg/uL	J EMPC	U	25
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	2,3,4,4',5-Pentachlorobiphenyl	0.0757	pg/uL	J EMPC	U	25
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	2,3',4,5-Tetrachlorobiphenyl	0.0757	pg/uL	J EMPC	U	25
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	2,4'-Dichlorobiphenyl	0.136	pg/uL		U	6
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	3,3'-Dichlorobiphenyl	0.0926	pg/uL		U	6
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	3,4,4'-Trichlorobiphenyl	0.125	pg/uL	EMPC	U	25
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	3,4',5-Trichlorobiphenyl	0.0354	pg/uL	J EMPC	U	25
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	Coelution of PCB 107 and 124	0.136	pg/uL	J EMPC C	U	25
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	Heptachlorobiphenyl homologs	10.6	pg/uL	EMPC	J	25
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	Hexachlorobiphenyl homologs	32.8	pg/uL	EMPC	J	25
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	Octachlorobiphenyl homologs	1.66	pg/uL	EMPC	J	25
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	Pentachlorobiphenyl homologs	46.2	pg/uL	EMPC	J	25
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	Tetrachlorobiphenyl homologs	41.6	pg/uL	EMPC	J	25
A5877	SD0013 PCB	A5877_11299_PCB_018	EPA1668A	Trichlorobiphenyl homologs	8.87	pg/uL	EMPC	J	25
A5877	SD004-3 PCB	A5877_11299_PCB_019	EPA1668A	2,2',3,3',4,6-Hexachlorobiphenyl	0.0702	pg/uL	J EMPC	U	25
A5877	SD004-3 PCB	A5877_11299_PCB_019	EPA1668A	2,2',3,3',5,5',6-Heptachlorobiphenyl	0.146	pg/uL	EMPC	U	25
A5877	SD004-3 PCB	A5877_11299_PCB_019	EPA1668A	2,2',3,3',5-Pentachlorobiphenyl	0.269	pg/uL	EMPC	U	25
A5877	SD004-3 PCB	A5877_11299_PCB_019	EPA1668A	2,2',3,4,5,5',6-Heptachlorobiphenyl	0.0354	pg/uL	J EMPC	U	25
A5877	SD004-3 PCB	A5877_11299_PCB_019	EPA1668A	2,2',3,6,6'-Pentachlorobiphenyl	0.0512	pg/uL	J EMPC	U	25
A5877	SD004-3 PCB	A5877_11299_PCB_019	EPA1668A	2,2',4,4',5,6'-Hexachlorobiphenyl	0.0468	pg/uL	J EMPC	U	25
A5877	SD004-3 PCB	A5877_11299_PCB_019	EPA1668A	2,3',4,4',5'-Pentachlorobiphenyl	0.0608	pg/uL	J EMPC	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5877	SD004-3 PCB	A5877_11299_PCB_019	EPA1668A	2,3,4,4',5-Pentachlorobiphenyl	0.0677	pg/uL	J EMPC	U	25
A5877	SD004-3 PCB	A5877_11299_PCB_019	EPA1668A	2-Chlorobiphenyl	0.0501	pg/uL	J EMPC	U	25
A5877	SD004-3 PCB	A5877_11299_PCB_019	EPA1668A	3,3'-Dichlorobiphenyl	0.152	pg/uL	EMPC	U	25
A5877	SD004-3 PCB	A5877_11299_PCB_019	EPA1668A	Coelution of PCB 171 and 173	0.149	pg/uL	J EMPC C	U	25
A5877	SD004-3 PCB	A5877_11299_PCB_019	EPA1668A	Dichlorobiphenyl homologs	0.763	pg/uL	EMPC	J	25
A5877	SD004-3 PCB	A5877_11299_PCB_019	EPA1668A	Heptachlorobiphenyl homologs	4.21	pg/uL	EMPC	J	25
A5877	SD004-3 PCB	A5877_11299_PCB_019	EPA1668A	Hexachlorobiphenyl homologs	17.5	pg/uL	EMPC	J	25
A5877	SD004-3 PCB	A5877_11299_PCB_019	EPA1668A	Monochlorobiphenyl homologs	0.0501	pg/uL	EMPC	J	25
A5877	SD004-3 PCB	A5877_11299_PCB_019	EPA1668A	Pentachlorobiphenyl homologs	32.6	pg/uL	EMPC	J	25
A5877	SD0011 PCB	A5877_11299_PCB_020	EPA1668A	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	0.0629	pg/uL	J EMPC	U	25
A5877	SD0011 PCB	A5877_11299_PCB_020	EPA1668A	2,2',3,3',5,5',6,6'-Octachlorobiphenyl	0.0441	pg/uL	J EMPC	U	25
A5877	SD0011 PCB	A5877_11299_PCB_020	EPA1668A	2,2',3,3',5,5',6-Heptachlorobiphenyl	0.163	pg/uL	EMPC	U	25
A5877	SD0011 PCB	A5877_11299_PCB_020	EPA1668A	2,2',3,3',5,5'-Hexachlorobiphenyl	0.0426	pg/uL	J EMPC	U	25
A5877	SD0011 PCB	A5877_11299_PCB_020	EPA1668A	2,2',3,4,5,5',6-Heptachlorobiphenyl	0.0829	pg/uL	J EMPC	U	25
A5877	SD0011 PCB	A5877_11299_PCB_020	EPA1668A	2,2',3,4,6'-Pentachlorobiphenyl	0.0675	pg/uL	J EMPC	U	25
A5877	SD0011 PCB	A5877_11299_PCB_020	EPA1668A	2,3',4,5-Tetrachlorobiphenyl	0.0585	pg/uL	J EMPC	U	25
A5877	SD0011 PCB	A5877_11299_PCB_020	EPA1668A	3,3',4,4'-Tetrachlorobiphenyl	0.0681	pg/uL	J EMPC	U	25
A5877	SD0011 PCB	A5877_11299_PCB_020	EPA1668A	3,3'-Dichlorobiphenyl	0.119	pg/uL		U	6
A5877	SD0011 PCB	A5877_11299_PCB_020	EPA1668A	Coelution of PCB 107 and 124	0.132	pg/uL	J EMPC C	U	25
A5877	SD0011 PCB	A5877_11299_PCB_020	EPA1668A	Coelution of PCB 198 and 199	0.287	pg/uL	EMPC C	U	25
A5877	SD0011 PCB	A5877_11299_PCB_020	EPA1668A	Heptachlorobiphenyl homologs	6.08	pg/uL	EMPC	J	25
A5877	SD0011 PCB	A5877_11299_PCB_020	EPA1668A	Nonachlorobiphenyl homologs	0.0629	pg/uL	EMPC	J	25
A5877	SD0011 PCB	A5877_11299_PCB_020	EPA1668A	Octachlorobiphenyl homologs	0.863	pg/uL	EMPC	J	25
A5877	SD0011 PCB	A5877_11299_PCB_020	EPA1668A	Pentachlorobiphenyl homologs	35.8	pg/uL	EMPC	J	25
A5877	SD0011 PCB	A5877_11299_PCB_020	EPA1668A	Tetrachlorobiphenyl homologs	25.1	pg/uL	EMPC	J	25
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	0.0483	pg/uL	J EMPC	U	25
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	2,2',3,3',5,6,6'-Heptachlorobiphenyl	0.158	pg/uL	EMPC	U	25
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	2,2',3,3',5-Pentachlorobiphenyl	0.234	pg/uL	EMPC	U	25
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	2,2',3,4,5',6-Hexachlorobiphenyl	0.151	pg/uL	EMPC	U	25
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	2,2',3,5-Tetrachlorobiphenyl	0.0855	pg/uL	EMPC	U	25
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	2,2',3,6,6'-Pentachlorobiphenyl	0.026	pg/uL	J EMPC	U	25

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SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flags	Validation Qualifier	Validation Reason
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	2,2',6-Trichlorobiphenyl	0.151	pg/uL	EMPC	U	25
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	2,3,3',4,4',5,6-Heptachlorobiphenyl	0.0339	pg/uL	J EMPC	U	25
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	2,3',4,4',5,5'-Hexachlorobiphenyl	0.103	pg/uL	EMPC	U	25
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	2,3',4,4',5'-Pentachlorobiphenyl	0.0442	pg/uL	J EMPC	U	25
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	2,3',4,5-Tetrachlorobiphenyl	0.0786	pg/uL	J EMPC	U	25
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	3,3'-Dichlorobiphenyl	0.328	pg/uL		U	6
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	Coelution of PCB 139 and 140	0.0639	pg/uL	J EMPC C	U	25
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	Heptachlorobiphenyl homologs	2.94	pg/uL	EMPC	J	25
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	Hexachlorobiphenyl homologs	15.3	pg/uL	EMPC	J	25
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	Octachlorobiphenyl homologs	0.388	pg/uL	EMPC	J	25
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	Pentachlorobiphenyl homologs	26.8	pg/uL	EMPC	J	25
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	Tetrachlorobiphenyl homologs	22.8	pg/uL	EMPC	J	25
A5877	SD0052 PCB	A5877_11299_PCB_021	EPA1668A	Trichlorobiphenyl homologs	11.9	pg/uL	EMPC	J	25

Appendix G

Sediment and Tissue Data

This appendix is available upon request.

Contact Site Manager Connie Groven at (360) 407-6254

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APPENDIX H

BIOLOGICAL TESTING LABORATORY REPORTS AND DATA QA SUMMARIES

DATA QUALITY ASSURANCE REVIEW: WESTERN PORT ANGELES HARBOR

BIOACCUMULATION TESTS

This data validation report reviews bioaccumulation tests in Western Port Angeles Harbor using the clam *Macoma nasuta* and the polychaete *Nephtys caecoides*. Sediment bioaccumulation tests were conducted on 15 sediment samples. At two of the stations, additional sediment was collected for a second set of bioaccumulation tests following the addition granular activated carbon. Solid phase microextraction (SPME) fibers were placed in each test aquarium to obtain a measure of porewater concentrations of select chemicals. The bioaccumulation tests were conducted by NewFields, Port Gamble, Washington.

The following review is based on test protocols provided USEPA and Corps (1993) and ASTM (2006) and on Sediment Management Annual Review Meeting updates (Kendall and McMillan 2009).

BIOACCUMULATION TEST

The bioaccumulation tests were initiated on July 16, 2013 and conducted in a single batch. Mean percent survival was recorded at test termination, and tissue and SPME samples were submitted to an analytical laboratory for analysis.

SAMPLE COLLECTION, TRANSPORT, AND STORAGE

Samples were collected, transported, and stored in accordance with the procedures provided in the Western Port Angeles Harbor RI/FS sampling and analysis plan (SAP) (Integral et al. 2013). Samples were store in a cold room at 4°C at NewFields Laboratory until test initiation.

DATA COMPLETENESS AND FORMAT

Data documenting the environmental test conditions, negative control results, organism observations, and conditions influencing data quality were included in the NewFields data report.

DATA VALIDATION AND ASSESSMENT

All tests were conducted using randomly assigned identical test chambers and used the required amount of test sediment and overlying water. The procedures followed the accepted protocols and guidelines. Some minor deviations from the prescribed water quality parameters were observed:

- Dissolved oxygen measurements were <5 mg/L (outside the recommended limit) twice in Sample SD0054 (Days 1 and 3 of the exposure period).
- Temperature was >16°C 65 times during the exposure period. In addition, temperature measurements were >17°C four times during the exposure period. Desired temperature range is 14±2°C.
- pH was outside the recommended range of 8.0±1.0 once (Day 9) during the exposure period in Sample SD0052; pH = 4.5. The pH values in this test chamber were within the normal range prior to and after Day 9. The laboratory considered this to be a misreported instrument reading.

A detailed review of the QA results for the bioaccumulation test can be found in the attached checklist. There was no apparent effect from the above deviations on the outcome of the bioaccumulation test.

Replicate analysis, sample homogenization, and test organism counts were adequately performed to ensure test precision. The test results for mean percent survival are located in Table 2 of the NewFields data report.

CONCLUSION

The bioaccumulation exposure data from the Western Port Angeles Harbor RI/FS were complete with respect to the data requirements outlined in the SAP (Integral et al. 2013). Despite several minor water quality deviations, the data provided for the bioaccumulation tests are usable as reported.

REFERENCES

ASTM. 2006. Standard guide for determination of the bioaccumulation of sediment-associated contaminants by benthic invertebrates. E1688-00. Annual Book of Standards, Water and Environmental Technology, Vol. 11.06. American Society for Testing and Materials, West Conshohocken, PA.

Integral, Anchor QEA, Exponent, and Floyd|Snider. 2013. Sampling and analysis plan Western Port Angeles Harbor RI/FS. Prepared for Western Port Angeles Harbor Group, consisting of City of Port Angeles, Georgia-Pacific LLC, Merrill & Ring, Nippon Paper Industries USA Co., Ltd., and Port of Port Angeles. Integral Consulting Inc., Seattle, WA, Anchor QEA, LLC, Seattle, WA, Exponent, Bellevue, WA, and Floyd | Snider, Seattle, WA.

Kendall, D., and R. McMillan. 2009. DMMP clarification paper/SMS technical information memorandum. Clarifications to the DMMP bioaccumulation protocol. Prepared by U.S. Army Corps of Engineers, and Washington State Department of Ecology. U.S. Army Corps of Engineers, Seattle District, Seattle, WA.

USEPA and Corps. 1993. Bedded sediment bioaccumulation tests. EPA 600/R-63/183. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC, and U.S Army Corps of Engineers.

CHECKLIST FOR SEDIMENT BIOACCUMULATION TESTS

Project Name WPAH RI/FS
Project # C1102-0300
Laboratory New Fields
Lab # NA
Lab Project Manager Bill Gardiner
Batch Performed in 1 batch
Date Sampled June 27 - July 9, 2013
Date Received by Lab June 28 - July 10, 2013
Date Analysis Begun July 16, 2013
Reviewed by Jane Sexton
Test Organism *Macoma nasuta* and *Nephtys caecoides*

Problems noted (e.g., deviations form prescribed methods, analytical problems)

1. Under what conditions were the Macoma and Nephtys transported to the lab? **2**. FW setting on water quality probe often not switched to marine water. **3**. What does the "G" stand for on the test observation sheets? **4**. DO measurements were <5 mg/L (recommended limit) twice in Sample SD0054 (Days 1 and 3 of the exposure period). **5**. Temperature measurements were >16°C 65 times during the exposure period. In addition, temperature measurements were >17°C four times during the exposure period. Desired temperature range = 14±2°C. 6. pH measurement was outside the recommended range of 8.0±1.0 once during the exposure period in Sample SD0052; pH = 4.5.

COMPLETENESS AND HOLDING CONDITIONS

\# Samples Submitted 15 Site + 2 treatability samples
\# Samples Analyzed 15 Site + 2 treatability samples
Holding conditions acceptable? (Y/N)
PSEP: 4°C < 2 weeks No; 19 days
SMS: 4°C no headspace < 8 weeks Yes
If no, identify samples Previously agreed to follow SMS holding time requirements and keep holding time as close to 14 days as possible.

FORMAT

Standard Data Report (Y/N):

-- Survival in each exposure chamber and the mean and standard deviations for each treatment with *Macoma* Yes
-- Survival in each exposure chamber and the mean and standard deviations for each treatment with *Nephtys* Yes

Analytical Replicates

Number per Sample (*Macoma*) 30 clams per replicate; 1-3 replicates per sample (per SOW)
Any with < 5 replicates? No; replication was as specified in the SOW
Number per Sample (*Nephtys*) 70 worms per replicate; 1-3 replicates per sample
Any 1 No; replication was as specified in the SOW

Test Conditions (Y/N):

Sediment supplement (weekly) Yes
Fed during exposure period No
Surviving Test Organisms depurated 2 Yes
Pretest organisms depurated/analyzed Yes

Water Quality Variables Report (Y/N):

DO (daily) Yes
Salinity (daily) Yes
pH (daily) Yes
Temperature (daily) Yes

CHECKLIST FOR SEDIMENT BIOACCUMULATION TESTS (continued)

QA/QC SAMPLES

Negative Control

Control Sediment Collection Site	Discovery Bay, WA
Water Source	North Hood Canal sea water, 0.45 µm filtered
Current priority pollutant scan available?	No
Mean Control Mortality (%)	3%
Exceeds PSDDA QA Limit ?	No

WATER QUALITY

Samples with temperature < 13 or > 16 °C	None
Samples with salinity < 28 or > 32 ppt	None
Samples with pH < 7.0 or > 9.0	None
Samples with DO < 5 mg/L	None

BIOACCUMULATION TESTING FOR WESTERN PORT ANGELES HARBOR

PORT ANGELES, WASHINGTON

FINAL

SEPTEMBER 27, 2013

PREPARED FOR:

Western Port Angeles Harbor Group, consisting of:
City of Port Angeles
Georgia-Pacific LLC
Merrill & Ring
Nippon Paper Industries USA Co., Ltd.
Port of Port Angeles

PREPARED BY:

NewFields

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PORT GAMBLE, WA 98364

Introduction

NewFields conducted bioaccumulation tests with sediment samples collected from Port Angeles Harbor in support of the Western Port Angeles Harbor Remedial Investigation and Feasibility Study (RI/FS). A 45-day bioaccumulation study was conducted with *Macoma nasuta* and *Nepthys caecoides* to evaluate the potential for contaminants of interest to bioaccumulate into the tissues of aquatic organisms. Two modifications to the 45-day bioaccumulation test included the inclusion of solid phase membrane extraction (SPME) fibers into the testing aquaria to determine porewater concentrations of select contaminants and an altered number of replicates for the test treatments. A reduced number of replicates for test sediments was based on the needs of the FS. This report presents the results of the bioaccumulation exposures for the Western Port Angeles Harbor RI/FS. The analytical chemistry of the tissue residues was not part of NewFields scope of work.

Methods

Methods for sediment collection, storage and handling, and bioaccumulation exposures followed those outlined in the "*Western Port Angeles Harbor RI/FS Sampling and Analysis Plan*" (Integral 2013). Bioaccumulation testing methods followed those presented in the USEPA (1993) guidance, "*Guidance Manual: Bedded Sediment Bioaccumulation Tests"* and ASTM method E1688-00 (ASTM 2006), with modifications presented in the USACE-Seattle District document, "Dredged Material Evaluation and Disposal Procedures - Users Manual" (USACE-Seattle 2013).

Sample and Animal Receipt

Fifteen test sediments were collected for the bioaccumulation testing between June 27 and July 9, 2013; samples were delivered by courier to the NewFields laboratory in Port Gamble, WA. Sediment samples were stored in the dark with zero headspace in a walk-in cold room at 4 ± 2°C. The test sediment was not sieved prior to testing and all tests were conducted within the eight week holding time.

Clams (*Macoma nasuta*) were supplied by J & G Gunstone from Discovery Bay, WA, as well as native sediment which was used as the negative control for *M. nasuta* in bioaccumulation testing. The worms (*Nephtys caecoides*)*,* along with native sediment for use as a negative control, were obtained from Brezina and Associates in Dillon Beach, CA.

Bioaccumulation Tests

Bioaccumulation tests were performed using the bivalve clam *M. nasuta* and the polychaete worm *N. caecoides* during a 45-day test period under flow-through conditions. Tests were conducted in 10-gal glass aquaria, with five to six liters of sediment placed in each aquarium. With the exception of test treatments SD0004 and SD0053, one replicate test chamber was prepared for each test treatment. Three replicate test chambers were prepared for treatments SD0004 and SD0053 to evaluate variability in uptake among replicates. A negative control was also tested concurrent with the test treatments, using a 50:50 blend of native sediment supplied with the *Macoma* clams and *Nephtys* worms. Three replicate aquaria were prepared for the native control treatment.

In addition to the test and control treatments, two "treatability study" treatments were prepared with activated charcoal (AC). To prepare the treatability study samples, activated charcoal was added to a second set of test sediments SD0053 and SD0054 at a loading rate of 4% dry weight. The activated charcoal was stirred into the test sediment until the mixture appeared homogeneous and then allowed to equilibrate for approximately 60 hours prior to placement in test aquaria and 72 hours prior to test initiation. One replicate test chamber was prepared for each of the AC-amended treatments (test treatments SD0053-AC and SD0054-AC).

SPME fibers were placed in each test aquarium during sediment loading. Approximately half of the test sediment (approximately 2.5 liters) was placed in each test aquaria. Five separate bundles of SPME fibers, comprised of three approximately 5" long fibers tied together with a wire tie, were placed in each aquarium. Fibers were placed longitudinally within the aquarium and were equidistant from the aquarium sides and each other, such that they were equally spaced across the width of the aquarium. A shorter (approximately 3 cm-long) performance reference compound (PRC) fiber was placed perpendicular to the longer fibers at the head of each tank. Each tank received 1 PRC fiber and 5 bundles of the longer fiber (3 fibers per bundle) with the exception of the AC treatments which received six bundles. Once all fibers were in place, the remaining sediment was placed carefully over the top of the fibers. One QC sample was prepared by cutting one fiber (labeled for QC purposes) into 1 cm segments using a clean sterile scalpel. The 1-cm segments were placed into a vial containing 1 mL of hexane, the vial was labeled and placed into the freezer.

Once all test chambers were layered, seawater flow was initiated and the test system was allowed to equilibrate overnight. The chambers were maintained under flow-through conditions with clean seawater from North Hood Canal, Washington. Overhead light fixtures were set for a photoperiod of 16 hours of light and 8 hours of dark each day. Immediately prior to start of the test, an initial set of water quality parameters and flow rates were measured in each chamber. The water quality parameters included temperature, dissolved oxygen (DO), pH, and salinity. Acceptable test conditions and ranges for water quality parameters during the experiment were as follows:

Temperature: 14 ± 2 ºC
Dissolved Oxygen: > 5.0 mg/L
pH: 8.0 ± 1.0
Salinity: 30 ± 2 ppt
Flow rate: 47 ± 9 ml/30 sec.

The bioaccumulation exposures were initiated by randomly placing 30 *M. nasuta* and 70 *N. caecoides* into each replicate test chamber. During the testing period water quality measurements and flow rates were recorded daily for one replicate per treatment. Observations of test animal mortality, emergence and activity, or abnormal conditions were recorded daily for each test chamber. Animals were not fed during the 45-day test period. As required by the USACE-Seattle (2013) guidance, sediment in each chamber was supplemented with 175 mL of test sediment once per week.

On day 45, water quality observations were recorded for each test chamber and SPME fibers were collected. SPME fibers were collected by hand, rinsed free of any sediment, placed into xylene, and then frozen. The test exposure was then terminated by sieving the sediment from each test chamber, and removing and enumerating all surviving and dead test organisms. Surviving organisms of both *M. nasuta* and *N. caecoides* were then placed in clean aquaria and allowed to depurate for 24 hours under flow-through conditions. *M. nasuta* was depurated without sediment; *N. caecoides* was depurated in the presence of a thin layer of clean control sand (native control) in order to facilitate gut content transport. Following depuration, organism tissue from each replicate was placed in pre-cleaned glass jars and frozen for subsequent tissue analyses. The clams were scrubbed free of sediment and shucked prior to freezing; the resulting tissue was frozen for chemical analysis. In order to establish background tissue concentrations (pre-test), a sub-sample of test organisms was isolated prior to test initiation, allowed to depurate for 24 hours, and then frozen for chemical analysis. All frozen test and background samples were shipped via overnight courier to SGS in a cooler packed with blue ice.

Data Analysis and QA/QC

All water quality and survival data were entered into Excel spreadsheets. Water quality parameters were summarized by calculating the mean, minimum, and maximum values for each test treatment. Mean percentage survival was calculated for each treatment; for treatments with test replicates mean values and standard deviations were determined. All hand-entered data was reviewed for data entry errors, which were corrected prior to summary calculations. A minimum of 10% of all calculations and data sorting were reviewed for errors.

Results

The following section provides a summary of the bioaccumulation exposures, including a summary of test organism survival and water quality observations. Laboratory bench sheets are provided Appendix A.

Bioaccumulation Potential

Summaries of survival during the 45-day bioaccumulation exposures are presented in Table 1 (*M. nasuta*) and Table 2 (*N. caecoides*). A summary of water quality observations is presented in Table 3 (*M. nasuta & N. caecoides*). The test condition summary for the bioaccumulation test is presented in Table 4. Data for each test replicate are included in Appendix A; chain-of-custody forms are included in Appendix B.

The bioaccumulation test was validated by 97% mean percentage survival for both *M. nasuta* and *N. caecoides* in the control treatment. Survival in the test treatments ranged from 73% to 100% for *M. nasuta*. With the exception of treatment SD0026, survival for *N. caecoides* ranged from 83% to 100%; *N. caecoides* survival in test treatment SD0026 was 50%.

Water quality parameters were within the target range for the duration of the 45-day test (Table 3) with exceptions of dissolved oxygen and temperature. Dissolved oxygen in treatment SD0054 dropped to 4.4 and 4.7 mg/L on days 1 and 3, slightly below the recommended limit of >5.0 mg/L. Trickle-flow aeration and water flow were increased to the chamber and dissolved oxygen levels were within the recommended range for the remainder of the test. Temperatures were occasionally slightly above the recommended range of 14 ± 2°C during the test, but by no more than 1.5°C. Flow to the water bath and the water bath depth was increased to allow for more consistent temperature regulation. Both dissolved oxygen and temperature were within the tolerance range for the test species and were unlikely to have affected test organism health during the exposure. Seawater pH was within the target range, with the exception of one chamber (SD0052) on Day 9, with a value of 4.5. The pH values in this test chamber immediately prior to and after Day 9 were within the normal range, and none of the other test treatments had pH values outside of the test range. This value was considered to be a misreported instrument reading.

Discussion

There are no SMS criteria established for the bioaccumulation test; the purpose of the test is to provide tissue for analytical chemistry of tissue residues. With one exception, survival of *M. nasuta* and *N. caecoides* was >70%; *N. caecoides* survival in treatment SD0052 was 50%. Sufficient tissue was retrieved for chemical analysis from all treatments. As indicated previously, chemical analysis of tissues and comparison concentrations in tissues and SPME fiber is the subject of a separate report.

Table 1 45-day Bioaccumulation Test – *Macoma nasuta* survival.

Treatment	Replicate	Number Initiated	Number Surviving	Number Missing or Dead	Percentage Survival	Mean Percentage Survival	SD
Control	1	30	28	2	93	97	3
	2	30	29	1	97		
	3	30	30	0	100		
SD0004	1	30	24	6	80	84	11
	2	30	23	7	77		
	3	30	29	1	97		
SD0009	1	30	24	6	80		
SD0010	1	30	25	5	83		
SD0011	1	30	29	1	97		
SD0013	1	30	27	3	90		
SD0015	1	30	28	2	93		
SD0018	1	30	29	1	97		
SD0025	1	30	27	3	90		
SD0026	1	30	30	0	100		
SD0028	1	30	27	3	90		
SD0051	1	30	23	7	77		
SD0052	1	30	28	2	93		
SD0053	9	30	24	6	80	83	3
	15	30	25	5	83		
	16	30	26	4	87		
SD0053-AC (T)	1	30	24	6	80		
SD0054	1	30	26	4	87		
SD0054-AC (T)	1	30	22	8	73		
SD0055	1	30	29	1	97		

T: Treatability test; test sediment amended with activated charcoal.

Table 2. 45-day Bioaccumulation Test – *Nephtys caecoides* survival.

Treatment	Replicate	Number Initiated	Number Surviving	Number Missing or Dead	Percentage Survival	Mean Percentage Survival	SD
Control	1	70	69	1	99	97	2
	2	70	66	4	94		
	3	70	68	2	97		
SD0004	1	70	64	6	91	89	3
	2	70	60	10	86		
	3	70	63	7	90		
SD0009	1	70	69	1	99		
SD0010	1	70	61	9	87		
SD0011	1	70	61	9	87		
SD0013	1	70	67	3	96		
SD0015	1	70	66	4	94		
SD0018	1	70	69	1	99		
SD0025	1	70	60	10	86		
SD0026	1	70	35	35	50		
SD0028	1	70	68	2	97		
SD0051	1	70	61	9	87		
SD0052	1	70	61	9	87		
SD0053	1	70	64	6	91	93	6
	2	70	62	8	89		
	3	70	70	0	100		
SD0053-AC (T)	1	70	58	12	83		
SD0054	1	70	68	2	97		
SD0054-AC (T)	1	70	66	4	94		
SD0055	1	70	65	5	93		

T: Treatability test; test sediment amended with activated charcoal.

Table 3. Water Quality Summary for the 45-day Bioaccumulation Test with *Macoma nasuta* and *Nephtys caecoides,*

Treatment	Dissolved Oxygen (mg/L)			Temperature (°C)			Salinity (ppt)			pH (pH units)			Flow (mL/30 sec)		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Control	7.3	6.0	8.5	15.2	14.2	16.9	31	29	31	7.8	7.5	8.3	46	38	56
SD0004	7.0	5.0	7.9	15.3	13.9	16.9	31	30	31	7.7	7.3	8.4	46	38	58
SD0009	6.7	5.5	8.1	15.2	14.1	16.6	31	29	31	7.7	7.4	8.2	46	38	56
SD0010	7.1	6.3	8.1	15.1	14.1	17.1	31	29	31	7.7	7.5	8.2	45	38	56
SD0011	7.5	7.1	8.4	15.0	13.9	16.7	31	30	31	7.8	7.5	8.4	46	38	56
SD0013	7.3	6.5	8.4	15.1	13.8	16.5	31	30	31	7.8	7.5	8.5	45	38	56
SD0015	7.0	6.1	8.3	15.1	14.1	16.6	31	29	31	7.8	7.4	8.5	45	38	58
SD0018	7.0	6.0	8.0	15.2	14.2	17.1	31	29	31	7.7	7.5	8.4	47	38	55
SD0025	7.1	5.3	7.8	15.7	14.5	17.5	30	29	31	7.7	7.3	8.2	48	38	70
SD0026	7.0	5.4	7.9	15.2	14.2	16.4	31	30	31	7.7	7.4	8.2	47	38	58
SD0028	7.1	6.3	8.1	15.1	14.1	17.3	31	30	31	7.8	7.4	8.4	46	38	56
SD0051	6.9	5.5	8.2	15.1	14.1	16.5	31	29	31	7.7	7.4	8.0	45	38	56
SD0052	7.2	5.1	8.4	15.0	14.0	16.4	31	29	32	7.7	4.5	8.3	46	38	56
SD0053	7.2	6.2	7.9	15.2	14.2	16.6	31	29	31	7.8	7.1	8.2	44	38	56
SD0053-AC	7.1	6.1	8.6	15.0	13.8	16.1	30	29	31	7.7	7.0	8.4	47	38	56
SD0054	6.7	4.4	7.8	15.3	14.3	16.3	30	29	31	7.7	7.3	8.4	45	38	56
SD0054-AC	6.7	5.5	7.9	15.1	14.2	16.5	31	30	31	7.7	7.4	8.2	45	38	56
SD0055	6.8	6.0	7.8	15.4	14.2	16.7	30	29	31	7.8	7.3	8.2	47	38	56

Table 4. Test Condition Summary for the 45-day Bioaccumulation Test with *Macoma nasuta* and *Nephtys caecoides*

Test Conditions 45-day Bioaccumulation Study		
Sample Identification	Control, SD0004, SD0009, SD0010, SD0011, SD0013, SD0015, SD0018, SD0025, SD0026, SD0028, SD0051, SD0052, SD0053, SD0054, SD0055, SD0053-AC, SD0054-AC	
Date sampled	June 27 – July 9, 2013	
Date received at NewFields	June 28 – July 10, 2013	
Approximate volume received	5 gallons per treatment	
Sample storage conditions	4°C, dark, minimal head space	
Weeks of holding	< 3 weeks	
Source of control sediment	Discovery Bay, WA and Dillon Beach, CA	
Test Species	***Macoma nasuta***	***Nephtys caecoides***
Supplier	J&G Gunstone, WA	Brezina and Associates, CA
Date acquired	July 12, 2013	July 12 & 15, 2013
Acclimation/holding time	4 days	1 - 4 days
Age class	Adults	Adults
Test Procedures	USEPA (1993); USACE-Seattle (2013)	
Test location	NewFields Northwest Laboratory, Port Gamble, WA	
Test type/duration	45-day static with flow through	
Test dates	16 July – 30 August 2013	
Control water	North Hood Canal, sand filtered to ~20µm	
Test temperature	Recommended: 14 ± 2 °C	Achieved: 13.8 – 17.5 °C
Test Salinity	Recommended: 30 ± 2 ppt	Achieved: 29 – 32 ppt
Test dissolved oxygen	Recommended: > 5.0 mg/L	Achieved: 4.4 – 8.6 mg/L
Test pH	Recommended: 8 ± 1	Achieved: 7.0* – 8.5
Test photoperiod	16 hours light: 8 hours dark	
Test chamber	Glass Aquaria (30.5 x 15.2 x 20.3 cm)	
Replicates/treatment	1 replicate; 3 replicates for Control, SD0004 and SD0053	
Organisms/replicate	*M. nasuta* = 30, *N. caecoides* = 70	
Exposure Volume	4L sediment per treatment; 175 mL addition per week	
Feeding	None	
Water renewal	Flow-through 38-56 ml/30 sec.	
Deviations from Test Protocol	Temperature, dissolved oxygen and pH; Misreported value of pH= 4.5 for one chamber on one day	

References

American Society for Testing and Materials (ASTM). 2006. E1688-00 Standard Guide for Determination of the Bioaccumulation of Sediment-Associated Contaminants by Benthic Invertebrates. Annual Book of Standards, Water and Environmental Technology, Vol. 11.06, West Conshohocken, PA. Barton, J, 2002. DMMP/SMS Clarification Paper: Ammonia and Amphipod Toxicity Testing. Presented at the 14th Annual Sediment Management Annual Review Meeting for USACE Seattle, Washington.

United States Environmental Protection Agency and United States Army Corps of Engineers (USEPA/USACE). 1991. Evaluation of Dredged Material Proposed for Ocean Disposal: Testing Manual. EPA 503/8-91/001. EPA Office of Water, Washington, DC.

USEPA/USACE. 1993. Bedded Sediment Bioaccumulation Tests. EPA 600/R-93/183. EPA Office of Research and Development, Washington, DC.

USEPA/USACE. 1998. Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S: - Testing Manual. EPA 823-B-98-004. EPA Office of Water, Washington, DC.

USACE-Seattle. 2013. Dredged Material Evaluation and Disposal Procedures. Users Manual. Dredged Material Management Office. United States Corps of Engineers, Seattle District. Seattle, Washington.

DATA QUALITY ASSURANCE REVIEW: WESTERN PORT ANGELES HARBOR

SEDIMENT BIOASSAYS

This data validation report reviews the toxicity tests performed in Western Port Angeles Harbor using the amphipod *Eohaustorius estuarius*, the juvenile polychaete *Neanthes arenaceodentata*, and the larval bioassay using the mussel *Mytilus galloprovincialis* (with the resuspension protocol; Kendall et al. 2012). Sediment toxicity tests were conducted at two kinds of stations: full suite bioassay stations (where all three bioassays were performed), and larval bioassay only stations. Full-suite bioassays were conducted on 20 sediment samples collected from Western Port Angeles Harbor. The larval bioassay was conducted on 27 sediment samples collected from additional locations from Western Port Angeles Harbor. The full-suite bioassays were also performed on three reference sediment samples that were collected at Carr Inlet. All bioassays were performed by NewFields, Port Gamble, Washington.

The following review is based on test protocols provided in the Puget Sound Estuary Program Protocols (USEPA 1997) and on Sediment Management Annual Review Meeting updates (Kendall et al. 2012; Kendall and McMillan 1999; Kendall, no date).

BIOASSAYS

The amphipod and juvenile polychaete tests were conducted in single batches. The amphipod test was initiated on July 19, 2013, and the juvenile polychaete test was initiated on July 12, 2013. The larval bioassay was run in two batches that were initiated on July 1, 2013, and July 17, 2013, respectively. The measurement endpoints included mean percent survival and mortality of the amphipods, mean mortality and mean individual growth rate per day for the juvenile polychaete, and mean normal survival for the larval test.

SAMPLE COLLECTION, TRANSPORT, AND STORAGE

Samples were collected, transported, and stored in accordance with the procedures provided in the Western Port Angeles Harbor RI/FS sampling and analysis plan (SAP) (Integral et al. 2013). Samples were stored in a cold room at 4°C at NewFields Laboratory until test initiation.

DATA COMPLETENESS AND FORMAT

Data documenting the environmental test conditions, positive and negative control results, organism observations, and conditions influencing data quality were included in the NewFields data report.

DATA VALIDATION AND ASSESSMENT

All tests were conducted using randomly assigned identical test chambers and used the required amount of test sediment and overlying water. The procedures in all three tests followed the accepted protocols and guidelines. Some minor deviations from the test protocols and water quality parameters are noted in the following sections. These deviations do not influence data quality.

Amphipod Test

A detailed review of the QA results for the amphipod test can be found in the attached checklist. There were minor deviations from the established protocols:

- Amphipods that did not bury within 1 hour were replaced by NewFields. USEPA (1997) states that the laboratory should wait only 15 minutes to assess if *E. estuarius* is burying itself in the sediment. Additional time is often taken to ensure all the test organisms have reburied.
- Reference Area CR-02, Replicate 3 had eight surviving organisms at the end of the test. The laboratory substituted the survivorship information from the remaining water quality beaker (20 amphipods) for Replicate 3. This substitution was not mentioned in the data report, and no observational data are available for the water quality surrogate beaker that was used.
- Interstitial salinity and porewater ammonia and sulfides data were not collected at test termination for Reference Sample CR-02 because not enough porewater was collected by the laboratory.
- Porewater sulfide data was also not collected at test termination for control, CARR-20 and CR-12; no explanation provided in the data report.
- The test was performed at 28±1 ppt. However, USEPA (1997) states that the ambient interstitial salinity of the test sediment should be matched to the overlying water used for the bioassay. Information was not provided in the data report on whether or not this assessment was performed to determine the correct test salinity.

There were no deviations from the water quality guidelines for the test. There was no apparent effect from the above deviations on the outcome of the bioassay.

The mean percent survival among amphipods in the control and reference samples met the PSEP and SMS criteria for test acceptability (90 and 75 percent, respectively). The mean survival in the control was 96 percent. The mean survival across the reference area samples was 92 percent (86–96 percent).

Test Precision

Replicate analysis, sample homogenization, and amphipod counts were adequately performed to ensure test precision. The test results for mean percent survival and mortality are located in Table 2 of the NewFields data report. Standard deviation for the test samples ranged from 2.2 to 11.7 percent. The standard deviation in the reference area samples ranged from 2.2 to 4.5 percent. The standard deviation in the control was 6.5 percent.

Positive Controls

A reference toxicant using ammonium chloride was conducted concurrently with the amphipod test. The LC_{50} of 142 mg/L total ammonia was within the acceptable range for the laboratory (17.5–266 mg/L total ammonia).

Juvenile Polychaete Test

A detailed review of the QA results for the juvenile polychaete test can be found in the attached checklist. There were minor deviations from the established protocols:

- There were six worms in Sample SD0006, Replicate 4.
- A worm was lost from Sample SD0018, Replicate 2 during transit to the balance; five worms were removed from the test chamber, but only four worms were in the weigh boat prior to weighing.
- Porewater ammonia and sulfides were not measured at test initiation in the control and two reference sediments (CR-12 and CARR-20); not enough pore water was collected by the laboratory.

There were no deviations from the water quality guidelines for the test. There was no apparent effect from the above deviations on the outcome of the bioassay.

The mean percent survival among juvenile polychaetes in the control met the PSEP and SMS criteria for test acceptability (90 percent survival and mean individual growth rate of >0.72 mg/individual/day with a minimum growth rate of >0.38 mg/individual/day). The mean survival in the control was 100 percent and the mean individual growth rate was 0.51 mg/individual/day. The mean survival across the reference area samples was also

100 percent, which is greater than the 80 percent survival required to meet PSEP and SMS criteria. Per PSEP and SMS criteria, the performance standard for growth in the reference samples is related to the control sample (mg/individual/day in the reference divided by the mg/individual/day in the control is >80 percent). The growth ratio in the reference area samples varied from 81 to 123 percent.

Test Precision

Replicate analysis, sample homogenization, and amphipod counts were adequately performed to ensure test precision. The test results for mean percent mortality and mean individual growth (mg/individual/day) are located in Table 6 of the NewFields data report. Standard deviation for mean individual growth for the test samples ranged from 0.029 to 0.136 percent. The standard deviation for mean individual growth in the reference area samples ranged from 0.039 to 0.101 percent. The standard deviation for mean individual growth in the control was 0.092 percent.

Positive Controls

A reference toxicant using ammonium chloride was conducted concurrently with the juvenile polychaete test. The LC_{50} of 142 mg/L total ammonia was within the acceptable range for the laboratory (46.5–264 mg/L total ammonia).

Larval Test

A detailed review of the QA results for the larval test can be found in the attached checklist. There were minor deviations from the established protocols:

- The data report states that the water bath temperature (for spawning) was "increased [from 16°C to 20°C] over a period of 15 minutes…" USEPA (1997) states that the conditioning temperature should not be increased by more than 2°C per day.
- The data report does not provide additional information on the brood stock that was used to produce the gametes that were tested and the spawning conditions (i.e., name of water body where organisms were collected, collection date, manner in which the mussels were collected [pulled or cut away from the substrate], and elapsed time between mussel collection and receipt at the laboratory).

There were a few deviations from the water quality guidelines for the test:

- No final ammonia or sulfide measurements were provided for Batch 2.

- pH was 6.7 (0.3 pH units lower than the recommended range) in Sample SD0001 at test initiation.
- Temperature was 18°C (1°C higher than range stated in test protocol) in Sample SD0009 at test initiation.
- Dissolved oxygen was <5 mg/L on Day 2 for CARR-20 and 23 of the site samples in Batch 1 and for CR-02 and 12 site samples in Batch 2. The majority of the dissolved oxygen deviations occurred on Day 3 (i.e., at test termination). The decrease in dissolved oxygen levels was probably due to resuspension of the test sediments. Because development of the mussel larvae was complete prior to resuspension, it is unlikely that the suppressed dissolved oxygen on Day 3 affected normal development. Also, because there was high larval recovery in the samples where lower dissolved oxygen concentrations were recorded, normal survivorship does not appear to be related to the low dissolved oxygen concentrations observed at test termination.

There was no apparent effect from the above deviations on the outcome of the bioassay. The mean percent normal survival among the mussel larvae in the control and reference samples met the PSEP and SMS criteria for test acceptability (70 and 65 percent, respectively). The mean normal survival in the control was 99 percent. The mean survival across the reference area samples was 80 percent (77–82 percent).

Test Precision

Replicate analysis, sample homogenization and larval counts were adequately performed to ensure test precision. The test results for mean percent normal survival are located in Table 10 of the NewFields data report. Standard deviation for the test samples ranged from 2.2 to 13.4 percent. The standard deviation in the reference area samples ranged from 6.1 to 10.1 percent. The standard deviation in the control was 2.2 percent.

Positive Controls

A reference toxicant using ammonium chloride was conducted concurrently with both batches of the larval test. The LC_{50} of 2.9 mg/L total ammonia was within the acceptable range for the laboratory (0.96–9.57 mg/L total ammonia).

CONCLUSION

The data from the Western Port Angeles Harbor RI/FS were complete with respect to the data requirements outlined in the SAP (Integral et al. 2013). Despite several minor deviations from the established protocols in all of the tests and minor water quality deviations in the larval test, the data provided for the bioassays are usable as reported.

REFERENCES

Integral, Anchor QEA, Exponent, and Floyd|Snider. 2013. Sampling and analysis plan Western Port Angeles Harbor RI/FS. Prepared for Western Port Angeles Harbor Group, consisting of City of Port Angeles, Georgia-Pacific LLC, Merrill & Ring, Nippon Paper Industries USA Co., Ltd., and Port of Port Angeles. Integral Consulting Inc., Seattle, WA, Anchor QEA, LLC, Seattle, WA, Exponent, Bellevue, WA, and Floyd | Snider, Seattle, WA.

Kendall, D., R. McMillan, B. Gardiner, B. Hester, and J.D. Word. 2012. DMMP/SMS clarification paper. Bioassay endpoint refinements: bivalve larval and *Neanthes* growth bioassays. Prepared by U.S. Army Corps of Engineers, Washington State Department of Ecology, and NewFields, LLC. U.S. Army Corps of Engineers, Seattle District, Seattle, WA.

Kendall, D., and R. McMillan. DMMP clarification paper. SMS Draft technical memorandum. Clarification on the use of the amphipod, Eohaustorius estuarius, relative to grain size and salinity. Prepared by U.S. Army Corps of Engineers and Washington State Department of Ecology. U.S. Army Corps of Engineers, Seattle District, Seattle, WA.

Kendall, D. No date. PSDDA/SMS clarification paper. Neanthes 20-day growth bioassay – further clarification on negative control growth standard, initial size and feeding protocol. U.S. Army Corps of Engineers, Seattle District, Seattle, WA.

USEPA. 1997. Recommended guidelines for the conducting laboratory toxicity tests on Puget Sound sediments. U.S. Environmental Protection Agency, Region 10, Puget Sound Estuary Program, Seattle, WA.

CHECKLIST FOR AMPHIPOD MORTALITY BIOASSAY

Project Name	WPAH RI/FS	Project #	C1102-0300
Laboratory	New Fields	Lab #	NA
Lab Technician	Bill Gardiner	Batch	Performed in 1 batch
Date Sampled	June 25 - July 9, 2013	Date Received by Lab	June 25 - July 10, 2013
Date Analysis Begun	July 19, 2013	Reviewed by	Jane Sexton
Test Organism	*Eohaustorius estuarius*		

Problems noted (e.g., deviations form prescribed methods, analytical problems)

1. Test performed at 28±1 ppt. However, USEPA (1997) states that the ambient interstital salinity of the test sediment should be matched to the overlying water used for the bioassay. 2. Were amphipods added to the sacrificial water quality beakers per USEPA (1997)? 3. Amphipods that did not bury within 1 hour were replaced. USEPA (1997) states that the lab should wait only 15 minutes to assess if *E. estuarius* is burying itself in the sediment. 4. Amphipods are noted in the lab data sheets as "floating on the surface." Did the lab gently push the amphipods back down with a clean instrument (e.g., pipette, glass rod, etc)? 5. What does "A" mean on the lab data sheets? 6. Reference Area CR-02, Replicate 3 had 8 surviving organisms at the end of the test. The lab substituted the survivorship information from the remaining water quality beaker (20 amphipods) for Replicate 3. No mention in data report of this substitution and no observational data recorded for the water quality surrogate beaker. 7. Headings on lab data sheets contain incorrect target test parameters for DO and salinity and DO requirement in Table 5 does not match the main text. No water quality deviations from target test parameters. 8. Interstitial salinity and porewater ammonia and sulfides data not collected at test termination for Reference Sample CR-02; not enough porewater collected. 9. Porewater sulfide data was also not collected at test termination for control, CARR-20 and CR-12; no explanation provided. 10. Table 5 mentions a slight deviation in test temperature of 0.5°C; however, this temperature deviation was not recorded on the lab data sheets.

COMPLETENESS AND HOLDING CONDITIONS

# Samples Submitted	20 site + 3 reference	# Samples Analyzed	20 site + 3 reference
Holding conditions acceptable? (Y/N)		PSEP: 4°C < 2 weeks	No; 24 days
		SMS: 4°C no head space < 8 weeks	Yes

If no, identify samples Previously agreed to follow SMS holding time requirements and keep holding time as close to 14 days as possible.

FORMAT

Standard Data Report (Y/N):

-- Daily emergence for each chamber and the 10-day mean and standard deviation for each treatment	No
-- Failure of *E. estuarius* to rebury for each chamber and the mean and standard deviation for each treatment	No
-- 10-day mortality in each chamber and the mean and standard deviation for each treatment	Yes
-- Interstitial water salinity for control, reference, and test sediments	No (see above)
-- 96-hour LC50 values with reference toxicants	Yes

Analytical Replicates

Number per Sample	20 amphipods per replicate; 8 replicates per sample	Any with < 5 replicates?	Yes; all tests had extra replicates for water quality

Water Quality Variables Report (Y/N):

Ammonia (initial, Day 5, final)	Yes	Sulfides (initial, Day 5, final)	Yes
Salinity (daily)	Yes	DO (daily)	Yes
pH (daily)	Yes	Temperature (daily)	Yes

CHECKLIST FOR AMPHIPOD MORTALITY BIOASSAY (continued)

QA/QC SAMPLES

Negative Control

Control Sediment Collection Site	Yaquina Bay, Oregon
Water Source	North Hood Canal sea water, 0.45 μm filtered
Current priority pollutant scan available?	No
Any individual replicate mortality > PSEP QA limit of 20%?	No
Mean Control Mortality (%)	4%
Exceeds QA Limit of 10%?	No

Positive Control

Reference Toxicant	Ammonium chloride				
Exposure Concentrations	15	30	60	120	240
Percent mortality	3%	3%	3%	20%	100%
Organism Response (LC50)	142 mg/L total ammonia				
Lab Performance Standards for Reference Toxicant (95% Confidence Interval)	17.5 - 266 mg/L total ammonia				
Did the test LC50 fall within the lab standards?	Yes				

Reference Sediment

Collection Site	Carr Inlet (3 reference stations)
Grain Size (% fines)	CR-12 = 4%, CARR20 = 26%, CR-02 = 59%
Mean Mortality (%)	CR-12 = 4%, CARR20 = 7%, CR-02 = 2%
> PSDDA QA Limit of 20 over control?	No
Mean Mortality (%)	CR-12 = 4%, CARR20 = 7%, CR-02 = 2%
> SMS QA Limit of <25% mortality?	No

WATER QUALITY

Samples with pH < 7 or > 9	No
Samples with DO < 6 mg/L	No
Temperature:	
Eohaustorius estuarius (< 14 or > 16 °C)	No
Salinity:	
Eohaustorius estuarius (ambient interstitial)	Test performed at 28±1 ppt. No information on ambient interstitial salinity provided in data report.

CHECKLIST FOR 20-DAY *NEANTHES* BIOASSAY

Project Name WPAH RI/FS | Project # C1102-0300

Laboratory New Fields | Lab # NA

Lab Project Manager Bill Gardiner | Batch Performed in 1 batch

Date Sampled June 25 - July 9, 2013 | Date Received by Lab June 25 - July 10, 2013

Date Analysis Begun July 12, 2013 | Reviewed by Jane Sexton

Test Organism *Neanthes arenaceodentata*

Problems noted (e.g., deviations form prescribed methods, analytical problems)

1. Surviving worms were dried at 60°C rather than 50°C per USEPA (1997). 2. Were the worms rinsed prior to weighing? 3. Were observations made of the worms digestive tract for food/sediment prior to weighing? 4. Sample SD0006, Replicate 4 had 6 worms in it. 5. Sample SD0018, Replicate 2 lost a worm during transit; only 4 worms were in the weigh boat. 6. No acclimation period for test organisms prior to placing in test chambers (salinity a little outside of recommended 31 ppt vs. 28±2 ppt); test initiated on day of receipt. 7. Page 5 states that two reference sediments were tested; data is provided for all three reference areas, text should be revised. 8. Porewater ammonia and sulfides not measured at test initiation in control and two reference sediments (CR-12 and CARR-20); not enough pore water collected.

COMPLETENESS AND HOLDING CONDITIONS

\# Samples Submitted 20 site + 3 reference | # Samples Analyzed 20 site + 3 reference

Holding conditions acceptable? (Y/N) PSEP: 4°C < 2 weeks Yes; 14 days

SMS: 4°C no headspace < 8 weeks Yes

If no, identify samples Previously agreed to follow SMS holding time requirements and keep holding time as close to 14 days as possible.

FORMAT

Standard Data Report (Y/N):

-- Survival in each exposure chamber and the mean and standard deviations for each treatment	Yes
-- Initial total biomass (dry weight) for three groups of five worms	Yes
-- Final total biomass (dry weight) in each exposure chamber and the mean and standard deviation for each treatment	No
-- Average individual biomass (dry weight) in each exposure chamber and the mean and standard deviation for each treatment	Yes
-- Interstitial salinity values of control, reference, and test sediments (PSEP: both final and initial, PSDDA: initial only)	Yes
-- 96-hour LC50 values with reference toxicant (results for metallic compounds should be reported in terms of the metal ion rather than as the weight of the whole salt)	Yes
-- Average individual growth rate in each exposure chamber and the mean and standard deviation for each treatment	Yes

Analytical Replicates

Number per Sample	5 worms per replicate; 8 replicates per sample	Any with < 5 replicates?	Yes; all tests had extra replicates for water quality

Water Quality Variables Report (Y/N):

Ammonia (initial, Day 10, final)	Yes	Sulfides (initial, Day 10, final)	Yes
Feeding (every other day)	Yes	Water change (every third day)	Yes
DO (every third day)	Every day	Salinity (every third day)	Every day
pH (every third day)	Every day	Temperature (every third day)	Every day

CHECKLIST FOR 20-DAY *NEANTHES* BIOASSAY (continued)

QA/QC SAMPLES

Negative Control

Control Sediment Collection Site	Yaquina Bay, Oregon
Water Source	North Hood Canal sea water, 0.45 µm filtered
Current priority pollutant scan available?	No
Mean Control Mortality (%)	0%
Exceeds PSDDA QA Limit of 10%?	No
Mean individual growth in Control	0.513 mg/individual/day

Note: The target mean control growth rate is 0.72 mg/individual/day and cannot be less than 0.38 mg/individual/day.

Positive Control

Reference Toxicant	Ammonium chloride				
Exposure Concentrations	15	30	60	120	240
Percent mortality	0%	0%	0%	0%	100%
Organism Response (LC50)	141.9 mg/L				
Lab Performance Standards for Reference Toxicant (95% Confidence Interval)	Within control chart limits (±2 standard deviations from historical mean)				
Did the test LC50 fall within the lab standards?	Yes; 46.5 - 264 mg total ammonia				

Reference Sediment

Collection Site	Carr Inlet (3 reference stations)
Mean Mortality	0%, 0%, 0%
Exceeds PSDDA QA Limit of 20%?	No
Mean individual growth in Reference	81-124%
< 80% of control (PSDDA QA Limit)?	No

WATER QUALITY

Samples with temperature < 19 or > 21 °C	None
Samples with salinity < 26 or > 30 ppt	None
Samples with pH < 7.0 or > 9.0	None
Samples with DO < 6 mg/L	None

CHECKLIST FOR SEDIMENT LARVAL BIOASSAY (SOLID PHASE)

Project Name WPAH RI/FS
Project # C1102-0300
Laboratory New Fields
Lab # NA
Lab Technician Bill Gardiner
Batch Performed in 2 batches
Date Sampled June 25 - July 9, 2013
Date Received by Lab June 25 - July 10, 2013
Date Analysis Begun Batch 1: July 1, 2013
Batch 2: July 17, 2013
Reviewed by Jane Sexton
Test Organism *Mytilus galloprovincialis*

Problems noted (e.g., deviations form prescribed methods, analytical problems)

1. What was the salinity of the water during spawning? Should ultimately be 28±1 ppt. If the beginning salinity was less than 28±1 ppt, then the salinity needs to be increased at an increment not to exceed 5 ppt/day (USEPA 1997). 2. The data report states that the water bath temperature (for spawning) was "increased [from 16°C to 20°C] over a period of 15 minutes..." USEPA (1997) states that the conditioning temperature should not be increased by more than 2°C per day. This procedure should have taken 2 days rather than 15 minutes. 3. How was >90% fertilization (Page 5) determined prior to test initiation? 4. The data report states that the "Embryo solutions were rinsed free of excess sperm and then combined..." Were the embryos rinsed through a 0.25-mm Nitex screen (per USEPA 1997)? 5. What was the source of the negative control sediment? 6. The mussels were obtained from Taylor Shellfish in Shelton, WA. The data report needs to provide information to answer the following questions about the brood stock that was used to produce the test gametes: a) what water body were the mussels collected from and on what date were they collected? [Need to determine # of days between mussel collection and spawning (should be within 2-3 weeks).] b) when the mussels were collected were the bisal threads cut or was the mussel pulled away from the native substrate? c) were the mussels transported to NewFields within 24 hours of collection? [Note: the mussels were shipped "dry" and at 15°C.] [Note: gamete quality will deteriorate rapidly with excessive wait time.] [Per data report the mussels were used on the same day that they were received at NewFields possibly fed something (phytoplankton?) before "heat shocking" to induce spawning.] 7. Need clarification on DO measurements for Batch 2 on lab data sheets. 8. Is the DO requirement 5 mg/L or 6 mg/L?

COMPLETENESS AND HOLDING CONDITIONS

Samples Submitted 47 site + 3 reference
Samples Analyzed 47 site + 3 reference

Holding conditions acceptable? (Y/N)
PSEP: 4°C < 2 weeks Yes; Batch 1: 6 days No; Batch 2: 15 days
SMS: 4°C no head space < 8 weeks Yes for both batches

If no, identify samples Previously agreed to follow SMS holding time requirements and keep holding time as close to 14 days as possible.

FORMAT

Standard Data Report (Y/N):

-- Number larvae evaluated with initial count data	Yes; approx. 27,000
-- Individual replicate and mean and standard deviation data for percent mortality	No; SD not included
-- Individual replicate and mean and standard deviation data for percent abnormality	No; SD not included and reported as normality
-- Individual replicate and mean and standard deviation data for percent combined mortality and abnormality	No; SD not included and reported as normality
-- LC50 and EC50 values for reference toxicants	LC50 only

CHECKLIST FOR SEDIMENT LARVAL BIOASSAY (SOLID PHASE) (continued)

Analytical Replicates

Number per Sample: Approx. 27,000 developing embryos per replicate; 6 replicates per

Any with < 5 replicates? Yes; all tests had an extra replicate for water quality

Water Quality Variables Report (Y/N):

Ammonia (initial and final): Yes for Batch 1, but no final ammonia measurements for Batch 2

Sulfides (initial and final): Yes for Batch 1, but no final sulfide measurements for Batch 2

Salinity (daily): Yes

DO (daily): Yes, except for SD0020 on Day 2

pH (daily): Yes

Temperature (daily): Yes

QA/QC SAMPLES

Negative Control

Control Sediment Collection Site: Unknown

Water Source: North Hood Canal sea water, 0.45 μm filtered

Current priority pollutant scan available? No

Mean Combined Mortality/Abnormality (%): Batch 1: 98.9% Batch 2: 88.6%

Exceeds QA Limit of 30%? No

Positive Control - Batch 1

Reference Toxicant: Ammonium chloride

Exposure Concentrations	0.75	1.5	3	6	12
Percent mortality	13%	14%	50%	100%	100%

Organism Response (LC50): 2.90 mg $NH_3 + NH_4^+$/L

Lab Performance Standards for Reference Toxicant (95% Confidence Interval): Mean 5.97; 0.96 - 9.57 mg NH3 + NH4+/L

Did the test LC50 fall within the lab standards? Yes

Positive Control - Batch 2

Reference Toxicant: Ammonium chloride

Exposure Concentrations	0.75	1.5	3	6	12
Percent mortality	11%	8%	9%	100%	100%

Organism Response (LC50): 4.31 mg $NH_3 + NH_4^+$/L

Lab Performance Standards for Reference Toxicant (95% Confidence Interval): Mean 5.24; 0.90 - 9.59 mg NH3 + NH4+/L

Did the test LC50 fall within the lab standards? Yes

CHECKLIST FOR SEDIMENT LARVAL BIOASSAY (SOLID PHASE) (continued)

Reference Sediment

Collection Site: Carr Inlet

Mean Combined Mortality/Abnormality (%): CR-12 = 17.6%, CARR20 = 20.1%, CR-02 = 22.9%

Exceeds PSDDA QA Limit of 35%?: No

Test and Reference Sediment Variance

Is the standard deviation of combined mortality/abnormality with test and/or reference sediments > 20%? ______

If yes, then power of t-test must be at least 0.6 or greater to accept test results.

WATER QUALITY

Samples with pH < 7 or > 9: pH was 6.7 (0.3 pH units lower than the stipulated range) in Sample SD0001 at test initiation

Samples with DO < 5 mg/L: DO was <5 mg/L on Day 2 for CARR-20 and 23 of the site samples in Batch 1 and CR-02 and 12 site samples in Batch 2

Samples with salinity < 27 or > 29 ppt: None

Temperature: ______

Mytilus sp. (< 15 or > 17 °C): Temperature was18°C (one degree higher than range stipulated in test protocol) in Sample SD0009 at test initiation

SEDIMENT TESTING FOR WESTERN PORT ANGELES HARBOR

PORT ANGELES, WASHINGTON

FINAL

SEPTEMBER 20, 2013

PREPARED FOR:

Western Port Angeles Harbor Group, consisting of:
City of Port Angeles
Georgia-Pacific LLC
Merrill & Ring
Nippon Paper Industries USA Co., Ltd.
Port of Port Angeles

PREPARED BY:

NewFields

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Introduction

NewFields conducted biological toxicity testing and bioaccumulation tests with sediment samples collected from Port Angeles Harbor in support of the Western Port Angeles Harbor Remedial Investigation and Feasibility Study (RI/FS). Reference sediment samples were tested concurrent to the test sediments and were collected in Carr Inlet by NewFields. Biological testing was conducted on selected stations within the harbor using the 10-day amphipod test with *Eohaustorius estuarius*, the 20-day polychaete test with *Neanthes arenaceodentata* and the 48-h benthic larval test with the bivalve *Mytilus galloprovincialis* following the resuspension protocol. In addition, a 45-day bioaccumulation study was conducted with *Macoma nasuta* and *Nepthys caecoides* to evaluate the potential for selected contaminants or potential concern to bioaccumulate into the tissues of aquatic organisms. This report presents the results of the toxicity testing portion of the Western Port Angeles Harbor RI/FS. The results of the bioaccumulation exposures will be presented in a separate report.

Methods

Methods for sediment collection, storage and handling, and toxicity testing followed those outlined in the "*Western Port Angeles Harbor RI/FS Sampling and Analysis Plan*" (Integral 2013). Biological test methods followed guidance provided by the Puget Sound Estuary Program (PSEP 1995) with appropriate modifications as developed in support of the Sediment Management Standards Program (SMS), the WDOE Sediment Sampling and Analysis Plan Appendix (SSAPA; Ecology 2008), and the various updates presented during the Annual Sediment Management Review meetings (SMARM). The SMS Program is administered by the Department of Ecology, providing sediment management standards for marine and estuarine environments in the state of Washington with the goal of reducing or eliminating adverse effects on biological resources.

Sample and Animal Receipt

Forty seven test sediments were collected between June 25 and July 9, 2013; samples were delivered to by courier to NewFields. Three reference sediment samples were collected from Carr Inlet by NewFields personnel on June 25, 2013. Sediment samples were stored in the dark with zero headspace in a walk-in cold room at 4 ± 2°C. Twenty test sediments were selected for testing with the full suite of PSEP bioassays (amphipod, juvenile polychaete, and benthic larval tests) and 27 test samples were tested using benthic larval test only. A summary of samples, the selected analyses, grain size, and suitable reference are presented in Table 1. Sample numbers are provided in this report. Sample numbers may differ from station numbers and should not be relied upon for the location of the sample. The test sediment was not sieved prior to testing and all tests were conducted within the eight week holding time.

Amphipods (*Eohaustorius estuarius*) were supplied by Northwestern Aquatic Sciences in Newport, Oregon. *Eohaustorius* were held in native sediment at 15°C prior to test initiation. Juvenile polychaete worms (*Neanthes arenaceodentata*) were obtained from Aquatic Toxicology Support in Bremerton, Washington. Juvenile polychaetes were held in seawater at 20°C (*Neanthes* were cultured in water-only and were not held in sediment prior to testing). *Mytilus galloprovincialis* (mussel) broodstock were provided by Taylor Shellfish in Shelton, Washington. Broodstock were held in unfiltered seawater at 16°C prior to spawning. Native *E. estuarius* sediment from Yaquina Bay, Oregon was provided by Northwestern Aquatic Sciences for use as control sediment treatments for both the amphipod and polychaete tests.

Table 1. Sample and Reference Grain Size Comparison

Treatment	Grain Size[1]	Reference Comparison	PSEP Suite	Larval Only
CR-12	4		●	●
CARR-20	26		●	●
CR-02	59		●	●
SD0001	53	CR-02	●	
SD0002	48	CR-02	●	
SD0003	38	CARR-20	●	
SD0004	39	CARR-20	●	
SD0005	78	CR-02	●	
SD0006	56	CR-02	●	
SD0007	80	CR-02	●	
SD0008	66	CR-02	●	
SD0009	71	CR-02	●	
SD0010	67	CR-02	●	
SD0011	79	CR-02	●	
SD0012	82	CR-02	●	
SD0013	77	CR-02	●	
SD0014	77	CR-02	●	
SD0015	77	CR-02	●	
SD0017	70	CR-02	●	
SD0018	78	CR-02	●	
SD0019	50	CR-02	●	
SD0020	56	CR-02	●	
SD0021	64	CR-02	●	
SD0022	65	CR-02		●
SD0023	31	CARR-20		●
SD0024	44	CR-02		●
SD0025	24	CARR-20		●
SD0026	77	CR-02		●
SD0027	20	CARR-20		●
SD0028	45	CR-02		●
SD0029	73	CR-02		●
SD0030	73	CR-02		●
SD0031	84	CR-02		●
SD0032	81	CR-02		●
SD0033	59	CR-02		●
SD0034	71	CR-02		●
SD0035	28	CARR-20		●
SD0036	76	CR-02		●

Table 1. Sample and Reference Grain Size Comparison (*Continued*)

Treatment	Grain Size[1]	Reference Comparison	PSEP Suite	Larval Only
SD0037	60	CR-02		●
SD0038	63	CR-02		●
SD0039	71	CR-02		●
SD0040	85	CR-02		●
SD0042	75	CR-02		●
SD0043	77	CR-02		●
SD0044	91	CR-02		●
SD0045	62	CR-02		●
SD0046	12	CR-12		●
SD0047	14	CR-12		●
SD0048	64	CR-02		●
SD0049	52	CR-02		●

[1] Percent fines (∑ silt and clay)

Sample Grain Size and Reference Comparison

Sediment grain size is one of the characteristics used in selecting the appropriate reference sediment(s) to compare with the biological results of the test treatments. The percent fines value is defined as the mass of sediment that passes through a 62.5-µm sieve, expressed as a percentage of the mass of the total sample analyzed. Percent fines for each of the test treatments and the reference treatments based on analytical laboratory grain size analysis as well as the selected reference for comparison are presented Table 1.

10-day Amphipod Bioassay

The 10-day acute toxicity test with *E. estuarius* was initiated on July 19, 2013. To prepare the test exposures, approximately 175 mL of sediment was placed in clean, acid and solvent-rinsed 1-L glass jars, which were then filled with 775 mL of 0.45-µm filtered seawater at 28 ppt. Eight replicate chambers were prepared for each test treatment, the reference sediment, and the native control sediment. The control and reference sediments were tested concurrently with the test treatments. Five replicates were used to evaluate sediment toxicity while the remaining three replicates were designated as sacrificial water quality surrogates. Two surrogate chambers were sacrificed to measure porewater and overlying ammonia and sulfides at test initiation and test Day 5. The remaining surrogate chamber was used for measuring daily water quality throughout the test, as well as porewater and overlying ammonia and sulfides at test termination. Total ammonia as nitrogen was monitored using an Orion meter fitted with an ammonia ion-specific probe. Total sulfides as S^{2-} were monitored using a HACH DR/2800 Spectrophotometer.

Test chambers were placed in randomly assigned positions in a 15°C water bath and allowed to equilibrate overnight. Trickle-flow aeration was provided to prevent dissolved oxygen concentrations from dropping below acceptable levels.

Immediately prior to test initiation, water quality parameters were measured in the surrogate chamber for each treatment. Dissolved oxygen (DO), temperature, pH, and salinity were then monitored in the surrogate chambers daily until test termination.

Target test parameters were:

Dissolved Oxygen: ≥5.1 mg/L
pH: 7 - 9 units
Temperature: 15 ± 1°C
Salinity: 28 ± 1‰

The tests were initiated by randomly allocating 20 *E. estuarius* into each test chamber, ensuring that each of the amphipods successfully buried into the sediment. Amphipods that did not bury within approximately one hour were replaced with healthy amphipods. The 10-day amphipod bioassay was conducted as a static test with no feeding during the exposure period. At test termination, sediment from each test chamber was sieved through a 0.5-mm screen and all recovered amphipods transferred into a Petri dish. The number of surviving and dead amphipods was then determined under a dissecting microscope.

A water-only, 4-day reference-toxicant test was conducted concurrently with the sediment tests using ammonium chloride. The ammonium chloride reference-toxicant test was used to ensure animals used in the test were of a similar sensitivity to prior tests. This test also provided information on the sensitivity of the test population to ammonia concentrations in the test sediments.

20-day Juvenile Polychaete Bioassay

The 20-day chronic toxicity test with *N. arenaceodentata* was initiated on July 12, 2013. Test exposures were prepared with approximately 175 mL of sediment placed in clean, acid and solvent-rinsed 1-L glass jars, which were then filled with 775 mL of 0.45-µm filtered seawater at 28 ppt. Eight replicate chambers were prepared for each test treatment, the two reference sediments, and control sediment. The control and reference sediments were tested concurrently with the test treatments. Five replicates were used to evaluate sediment toxicity while the remaining two replicates were designated as sacrificial water quality surrogate chambers. Two surrogate chambers were sacrificed to measure porewater and overlying ammonia and sulfides at test initiation and test Day 10. The remaining surrogate chamber was used for measuring daily water quality throughout the test, as well as overlying and interstitial ammonia and sulfides at test termination. Total ammonia as nitrogen was monitored using an Orion meter fitted with an ammonia ion-specific probe. Total sulfides as S^{2-} were monitored using a HACH DR/2800 Spectrophotometer.

Test chambers were placed in randomly assigned positions in a water bath at 20°C and allowed to equilibrate overnight. Trickle-flow aeration was provided to prevent dissolved oxygen concentrations from dropping below acceptable levels.

Immediately prior to test initiation, water quality parameters were measured. Dissolved oxygen, temperature, pH, and salinity were then monitored in the surrogates daily until test termination. Target test parameters were as follows:

Dissolved Oxygen: ≥4.6 mg/L
pH: 7 - 9 units
Temperature: 20 ± 1°C
Salinity: 28 ± 2‰

The juvenile polychaete test was initiated by randomly allocating five *N. arenaceodentata* into each test chamber and observing whether each of the worms successfully buried into the sediment. Worms that did not bury within approximately one hour were replaced with healthy worms. The 20-day test was conducted as a static-renewal test, with exchanges of 300 mL of water occurring every third day. *N. arenaceodentata* were fed every other day with 40 mg of TetraMarin® (approximately 8 mg dry weight per worm). At test termination, sediment from each test chamber was sieved through a 0.5-mm screen and all recovered worms transferred into a Petri dish. The number of surviving and dead worms was determined. All surviving worms were then transferred to pre-weighed, aluminum foil weigh-boats, and then dried in a drying oven at 60°C for approximately 24 hours. Each weigh-boat was removed, cooled in a dessicator, and then weighed on a microbalance to 0.01 mg. Each of the weigh boats was then heated to 550°C for 2 hours in order to determine the ashed weight. Ash-free dry weights (AFDW) were calculated to remove the influence of the mass of sediment in the guts of the test organisms. The ashed boats were weighed to 0.01 mg and the ashed weight was subtracted from the dry weight to calculate the AFDW. Both dry weight and AFDW were used to determine individual worm weight and growth rates.

A water-only, 4-day reference-toxicant test was conducted concurrently with the sediment tests using ammonium chloride. The ammonium chloride reference-toxicant test was used to ensure animals used in the test were of similar sensitivity to prior tests. This test also provided information on the sensitivity of the test population to ammonia concentrations in the test sediments.

Larval Developmental Bioassay

Test sediment was evaluated using the larval benthic toxicity test with the mussel, *M. galloprovincialis*. The mussel larval tests were initiated on July 1 (Batch 1) and July 17 (Batch 2) 2013. The seawater control and each of the reference sediments were tested concurrently with the test treatments for both test batches. To prepare the test exposures, 18 g (±0.5 g) of test sediment was placed in clean, acid and solvent-rinsed 1-L glass jars, which were then filled to 900 mL with 0.45-µm filtered seawater. Six replicate chambers were prepared for each test treatment, reference sediment, and control treatment. Five of the replicates were used to evaluate the test; the sixth replicate was used as a water quality surrogate. Each chamber was shaken for 10 seconds and then placed in predetermined randomly-assigned positions in a water bath at 16°C.

To collect gametes for each test, mussels were placed in clean seawater and acclimated at 16°C for approximately 20 minutes. The water bath temperature was then increased over a period of 15 minutes to 20°C. Mussels were held at 20°C and monitored for spawning individuals. Spawning females and males were removed from the water bath and placed in individual containers with seawater. These individuals were allowed to spawn until sufficient gametes were available to initiate the test. After the spawning period, eggs were transferred to fresh seawater and filtered through a 0.5 mm Nitex® mesh screen to remove large debris, feces, and excess gonadal matter. A composite was made of the sperm and diluted with fresh seawater. The fertilization process was initiated by adding sperm to the isolated egg containers. Egg-sperm solutions were periodically homogenized with a perforated plunger during the fertilization process and sub-samples observed under the microscope for egg and sperm viability. Approximately one to one and a half hours after fertilization, embryo solutions were checked for fertilization rate. Only those embryo stocks with >90% fertilization were used to initiate the tests. Embryo solutions were rinsed free of excess sperm and then combined to create one embryo stock solution. Density of the embryo stock solution was determined by counting the number of embryos in a subsample of homogenized stock solution. This was used to determine the volume of embryo stock solution to deliver approximately 27,000 embryos to each test chamber.

Dissolved oxygen, temperature, pH, and salinity were monitored in water quality surrogates to prevent loss or transfer of larvae by adhesion to water-quality probes. Ammonia and sulfides in the overlying water were measured on Day 0 and Day 2. Total ammonia as nitrogen was monitored using an Orion meter fitted with an ammonia ion-specific probe. Total sulfides as S^{-2} were monitored using a HACH DR/2800V Spectrophotometer.

Target test parameters were as follows:

Dissolved Oxygen:	≥5.0 mg/L
pH:	7 - 9 units
Temperature:	16 ± 1°C
Salinity:	28 ± 1‰

The development test was conducted as a static test. Aeration was provided for treatments with DO concentrations approaching 5.0 mg/L during the test.

The larval test was conducted following the resuspension technique developed by USACE and Ecology to address the potential entrainment of larvae in very fine sediments or sediments with a high wood-debris component (Kendall et al. 2012). At approximately 40 hours, the controls were checked for development to verify that greater than 90% of the larvae present had developed into the normal D-cell stage. The test sediment was then resuspended in the test chamber by gentle mixing with a perforated plunger for approximately 10 seconds. The contents of the test jar were then allowed to settle. At 48 hours, the tests were terminated by decanting the overlying seawater into a clean 1-L jar. The supernatant was homogenized with a perforated plunger. From this container, a 10 mL subsample was transferred to a scintillation vial and preserved in 5% buffered formalin. Larvae were subsequently stained with a dilute solution of Rose Bengal in 70% alcohol to help visualization of larvae. The number of normal and abnormal larvae was enumerated on an inverted microscope. Normal larvae included all D-shaped prodissoconch I stage larvae. Abnormal larvae included abnormally shaped prodissoconch I larvae and all early stage larvae.

A water-only reference-toxicant test was conducted concurrently with the sediment tests using ammonium chloride. The ammonium chloride reference-toxicant test was used to ensure animals used in the test were healthy and of similar sensitivity to prior tests. This test also provided information on the sensitivity of the test population to ammonia concentrations in the test sediments.

Data Analysis and QA/QC

All water quality and endpoint data were entered into Excel spreadsheets. Water quality parameters were summarized by calculating the mean, minimum, and maximum values for each test treatment. Endpoint data were calculated for each replicate and the mean values and standard deviations were determined for each test treatment. All hand-entered data was reviewed for data entry errors, which were corrected prior to summary calculations. A minimum of 10% of all calculations and data sorting were reviewed for errors.

For the larval test, normal survivorship was used to evaluate the test sediments. Control performance was based on the number of normal larvae in the control divided by the stocking density, expressed as a percentage. Normal survivorship in the test and references treatments was defined as the number of normal larvae in the test or reference divided by the number of normal larvae in the control, expressed as a percentage, as defined in Ecology (2005).

For SMS suitability determinations, comparisons were made according to SSAPA and Fox et al. (1998). Data reported as percent mortality or survival was transformed using an arcsine square root transformation prior to statistical analysis. All data were tested for normality using the Wilk-Shapiro test and equality of variance using Levene’s test. Determinations of statistical significance were based on one-tailed Student’s t-tests with an alpha of 0.05. A comparison of the larval endpoint relative to the reference was made using an alpha level of 0.10. For samples failing to meet assumptions of normality, a Mann-Whitney test was conducted to determine significance. For those samples failing to meet the assumptions of normality and equality of variance, a t-test on rankits was used.

Results

The results of sediment testing, including a summary of test results and water quality observations are presented in this section. Laboratory bench sheets are provided in Appendix A and statistical analyses are provided in Appendix B.

10-day Amphipod Bioassay

The bioassay test with *Eohaustorius estuarius* was validated with 4% mortality in the native sediment control, which met the SMS performance criterion of ≤10% mortality. This indicates that the test conditions were suitable for adequate amphipod survival. Mean mortality in the reference treatments were 4% (CR-12), 7% (CARR-20), and 2% (CR-02), which met the SMS performance criteria of <25% mortality (SMS). These results indicated that the reference sediments were acceptable for use in suitability determination. Mean percentage survival in each of the test treatments was ≥90% and is summarized in Table 2.

Summaries of water quality measurements, ammonia and sulfide concentrations, and test conditions are presented in Tables 3, 4, and 5. Water-quality parameters were within the acceptable limits throughout the duration of the test. A reference-toxicant test (positive control) was performed on the batch of test organisms utilized for this study. The LC_{50} value was within control chart limits (±2 standard deviations from the laboratory historical mean). This indicates that the test organisms used in this study were of similar sensitivity to those previously tested at NewFields.

Ammonia concentrations observed in the *E. estuarius* test were below the no observed effect concentration (NOEC) value derived from the concurrent ammonia reference-toxicant test (Table 4; compare to NOEC of 68.3 mg/L total ammonia). Ammonia values in the test treatments were also below the published threshold concentration of 15 mg/L total ammonia (Barton 2002). Total sulfide concentrations in the interstitial porewater ranged from 0.049 to 2.84 mg/L for the test treatments; overlying water total sulfide concentrations ranged from 0.002 to 0.102 mg/L.

Table 2. Test Results for *Eohaustorius estuarius*

Treatment	Number Surviving					Mean Percentage		Standard Deviation
	Replicate					Survival	Mortality	
	1	2	3	4	5			
Control	17	19	20	20	20	96	4	6.5
CR-12 Reference	20	19	19	19	19	96	4	2.2
CARR-20 Reference	18	19	19	19	18	93	7	2.7
CR-02 Reference	20	20	20	18	20	98	2	4.5
SD0001	20	18	18	19	18	93	7	4.5
SD0002	16	19	20	20	20	95	5	8.7
SD0003	19	18	18	20	19	94	6	4.2
SD0004	19	19	20	18	20	96	4	4.2
SD0005	20	20	20	20	20	100	0	0.0
SD0006	20	20	19	17	20	96	4	6.5
SD0007	19	18	14	20	19	90	10	11.7
SD0008	20	20	20	18	20	98	2	4.5
SD0009	20	19	20	20	20	99	1	2.2
SD0010	20	20	20	19	20	99	1	2.2
SD0011	17	20	17	18	20	92	8	7.6
SD0012	20	19	19	20	18	96	4	4.2
SD0013	19	20	20	19	20	98	2	2.7
SD0014	19	20	20	19	19	97	3	2.7
SD0015	19	19	20	18	19	95	5	3.5
SD0017	19	20	19	20	20	98	2	2.7
SD0018	17	20	19	20	19	95	5	6.1
SD0019	19	19	19	19	18	94	6	2.2
SD0020	20	20	17	19	20	96	4	6.5
SD0021	20	20	18	17	19	94	6	6.5

Table 3. Water Quality Summary for *Eohaustorius estuarius*

Treatment	Dissolved Oxygen (mg/L)			Temperature (°C)			Salinity (ppt)			pH (units)		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Control	8.1	7.1	8.4	15.0	14.1	15.8	28	28	28	8.0	7.9	8.1
CR-12 Reference	8.1	7.1	8.4	15.0	14.2	15.7	28	28	28	8.1	7.9	8.4
CARR-20 Reference	8.0	7.3	8.4	15.0	14.4	16.0	28	28	28	8.1	7.9	8.3
CR-02 Reference	8.1	8.0	8.3	15.0	14.2	15.8	28	28	28	8.0	7.8	8.1
SD0001	7.9	7.6	8.2	15.3	14.5	15.8	28	28	28	7.9	7.6	8.1
SD0002	8.0	7.8	8.2	15.2	14.5	15.7	28	28	28	8.0	7.8	8.2
SD0003	8.0	7.8	8.3	15.0	14.2	15.8	28	28	29	7.9	7.8	8.2
SD0004	7.9	7.6	8.3	15.3	14.4	15.9	28	28	29	8.0	7.7	8.3
SD0005	8.1	7.9	8.2	15.2	14.3	15.8	28	28	29	8.0	7.9	8.2
SD0006	8.1	7.9	8.4	15.0	14.2	15.8	28	28	29	8.1	7.8	8.3
SD0007	8.0	7.8	8.1	15.2	14.4	15.9	28	28	29	8.2	7.9	8.5
SD0008	8.1	7.9	8.3	15.0	14.2	15.8	28	28	29	8.1	7.9	8.6
SD0009	8.0	7.7	8.4	15.1	14.3	16.4	28	28	29	8.0	7.8	8.3
SD0010	8.2	7.1	8.5	15.0	14.1	15.8	28	28	29	8.0	7.9	8.3
SD0011	8.2	8.0	8.4	15.0	14.2	15.7	28	28	29	8.0	7.9	8.1
SD0012	8.0	7.7	8.2	15.3	14.7	16.5	28	28	29	8.1	7.8	8.6
SD0013	8.1	7.8	8.3	15.0	14.1	15.7	28	28	29	7.9	7.8	8.1
SD0014	8.1	7.8	8.4	15.1	14.6	16.1	28	28	29	7.9	7.8	8.1
SD0015	8.1	7.8	8.3	14.8	14.0	15.6	28	28	29	7.9	7.8	8.1
SD0017	8.1	7.9	8.3	15.1	14.3	15.7	28	28	29	8.1	7.9	8.3
SD0018	8.1	7.8	8.3	15.1	14.3	15.7	28	28	29	7.9	7.8	8.1
SD0019	8.1	7.9	8.3	14.9	14.0	15.7	28	28	29	8.1	7.8	8.5
SD0020	8.1	7.8	8.4	14.9	14.2	15.9	28	28	29	7.9	7.8	8.1
SD0021	8.1	7.9	8.4	15.0	14.2	15.8	28	27	29	8.0	7.8	8.2

Table 4. Ammonia and Sulfide Summary for *Eohaustorius estuarius*

Treatment	Overlying Ammonia (mg/L Total)			Interstitial Ammonia (mg/L Total)			Overlying Total Sulfide		Interstitial Total Sulfide	
	Day			Day			Day		Day	
	0	5	10	0	5	10	0	10	0	10
Control	<0.5	<0.5	<0.5	0.52	<0.5	<0.5	0.015	0.004	NA*	NA*
CR-12 Reference	<0.5	2.28	1.50	8.05	3.95	2.85	0.027	0.007	NA*	NA*
CARR-20 Reference	1.05	3.49	5.60	18.2	7.20	12.1	0.060	0.008	NA*	NA*
CR-02 Reference	0.72	0.63	<0.5	9.48	6.18	NA*	0.035	0.033	0.051	NA*
SD0001	0.75	2.18	5.06	4.23	2.93	5.60	0.102	0.002	2.840	0.220
SD0002	0.99	3.43	6.58	6.67	5.13	6.53	0.041	0.013	0.590	0.220
SD0003	0.58	2.81	<0.5	4.94	4.92	1.68	0.060	0.007	0.540	0.305
SD0004	<0.5	0.68	<0.5	2.14	1.25	0.80	0.077	0.014	0.155	0.280
SD0005	<0.5	0.92	<0.5	1.50	1.20	<0.5	0.046	0.031	0.220	0.235
SD0006	<0.5	0.96	<0.5	1.61	1.31	<0.5	0.037	0.030	0.250	0.165
SD0007	<0.5	2.23	1.20	4.14	2.87	0.88	0.063	0.030	0.190	0.230
SD0008	<0.5	1.50	<0.5	2.18	2.36	0.58	0.079	0.024	0.115	0.125
SD0009	<0.5	<0.5	<0.5	0.54	<0.5	<0.5	0.066	0.013	0.140	0.130
SD0010	<0.5	0.55	<0.5	1.24	0.50	<0.5	0.067	0.028	0.150	0.165
SD0011	<0.5	<0.5	<0.5	1.07	<0.5	<0.5	0.064	0.017	0.185	0.205
SD0012	<0.5	<0.5	<0.5	1.07	<0.5	<0.5	0.037	0.049	0.165	0.175
SD0013	<0.5	<0.5	<0.5	0.81	<0.5	<0.5	0.032	0.006	0.180	0.160
SD0014	<0.5	<0.5	<0.5	0.81	<0.5	<0.5	0.044	0.015	0.049	0.200
SD0015	<0.5	<0.5	<0.5	1.32	<0.5	<0.5	0.051	0.010	0.084	0.330
SD0017	<0.5	<0.5	<0.5	1.62	<0.5	<0.5	0.048	0.023	0.065	0.200
SD0018	<0.5	<0.5	<0.5	1.85	0.51	<0.5	0.046	0.025	0.104	0.415
SD0019	<0.5	<0.5	<0.5	0.68	<0.5	<0.5	0.023	0.029	0.170	0.265
SD0020	<0.5	0.55	<0.5	1.16	0.85	<0.5	0.079	0.018	0.425	0.405
SD0021	<0.5	<0.5	<0.5	1.80	1.21	<0.5	0.058	0.015	0.138	0.735

Ammonia NOEC (concurrent reference-toxicant test derived) = 68.3 mg/L total

*NA: Insufficient porewater for analysis

Table 5. Test Condition Summary for *Eohaustorius estuarius*

Test Conditions: *E. estuarius* (SMS)		
Sample Identification	Control; References CR-12, CARR-20, CR-02; SD0001 – SD0015, SD0017 – SD0021	
Date sampled	Reference Sediment: June 25, 2013 Test Sediment: June 27 – July 9, 2013	
Date received at NewFields	June 28 – July 10, 2013	
Test dates	July 19 - 29, 2013	
Sample storage conditions	4°C, dark	
Holding time Recommended: ≤8 weeks (56 days)	22 days	
Source of control sediment	Yaquina Bay, OR	
Test Species	***E. estuarius***	
Supplier	Northwestern Aquatic Sciences, OR	
Date acquired	July 17, 2013	
Acclimation/holding time	2 days	
Age class	Subadult, 3-5 mm	
Test Procedures	PSEP 1995 with SMARM revisions	
Regulatory Program	SMS	
Test location	NewFields Laboratory	
Test type/duration	10-Day static	
Control water	North Hood Canal sea water, 0.45µm filtered	
Test dissolved oxygen	Recommended: > 4.6 mg/L	Achieved: 7.1 – 8.5 mg/L
Test temperature	Recommended: 15 ± 1 °C	Achieved: 14.0- 16.5 °C
Test Salinity	Recommended: 28 ± 1 ppt	Achieved: 27 - 29 ppt
Test pH	Recommended: 7 - 9	Achieved: 7.6 – 8.6
SMS control performance standard	Recommended: Control ≤ 10% mortality	Achieved: 4%; Pass
SMS reference performance standard	Recommended: Reference mortality < 25%	Achieved: Pass CR-12: 4%; CARR-20: 7%; CR-20: 2%
Reference Toxicant LC$_{50}$ (total ammonia)	LC$_{50}$ = 167 mg/L total ammonia	
Mean; Acceptable Range (total ammonia)	142; 17.5 - 266 mg/L total ammonia	
NOEC (total ammonia)	68.3 mg/L total ammonia	
NOEC (unionized ammonia)	0.839 mg NH_3 /L	
Test Lighting	Continuous	
Test chamber	1-Liter Glass Chamber	
Replicates/treatment	5 + 3 surrogates (used for WQ measurements)	
Organisms/replicate	20	
Exposure volume	175 mL sediment/ 775 mL water	
Feeding	None	
Water renewal	None	
Deviations from Test Protocol	Slight deviation in temperature (0.5°C)	

20-day Juvenile Polychaete Bioassay

No mortality was observed in the *N. arenaceodentata* control sediment and mean individual growth (MIG) in the control sediment was 0.513 mg/ind/day (dry weight) and 0.347 mg/ind/day (AFDW). These values are within the test acceptability criteria for mean mortality (≤10%) and mean individual growth (≥0.38 mg/ind/day dry weight; Kendall 1996), indicating that the test conditions were suitable for adequate polychaete survival and growth. A summary of the test results for all samples is shown in Table 6. Summaries of water quality measurements, ammonia and sulfide concentrations, and test conditions are presented in Tables 7, 8, and 9.

Mean mortality in the reference treatments was 0%, meeting the reference performance standard of ≥80% of the control survival (Ecology 2008). Mean individual growth rates in the reference treatments (CR-12, CARR-20, and CR-12) were 0.417 to 0.634 mg/ind/day (dry weight) and 0.292 to 403 mg/ind/day (AFDW). Relative to the control, MIG in reference treatments CR-12, CARR-20, and CR-02 was 124%, 116%, and 81.3%, meeting the reference acceptability criteria of ≥80%.

A reference-toxicant test (positive control) was performed to determine the relative sensitivity of the batch of test organisms utilized in this study. The LC_{50} value of 142 mg/L total ammonia was within control chart limits (±2 standard deviations from the laboratory historical mean, 46.5 - 264 mg total ammonia/L). This indicates that the test organisms used in this study were of similar sensitivity to those previously tested at NewFields.

All water quality parameters were within the target range of the species throughout the duration of the test. Ammonia concentrations observed in the *N. arenaceodentata* test were below the NOEC value derived from the concurrent ammonia reference-toxicant test (Table 8; compare to NOEC of 95.6 mg/L total ammonia). This indicates that ammonia concentrations within the sediment samples were not above effects thresholds for mortality. Sulfide concentrations in interstitial water were below the NOEC (3.47 mg/L; Kendall and Barton 2004) for all samples.

Table 6. Test Results for *Neanthes arenaceodentata*

Treatment	Replicate	Survivors	Mean Mortality (%)	Individual Growth (mg/ind/day)					
				Dry Weight	Mean	SD	AFDW	Mean	SD
Control	1	5	0	0.409	0.513	0.092	0.304	0.347	0.062
	2	5		0.512			0.340		
	3	5		0.608			0.403		
	4	5		0.434			0.271		
	5	5		0.602			0.414		
CR-12 Reference	1	5	0	0.636	0.634	0.039	0.392	0.403	0.029
	2	5		0.662			0.435		
	3	5		0.681			0.427		
	4	5		0.607			0.400		
	5	5		0.586			0.361		
CARR-20 Reference	1	5	0	0.647	0.596	0.085	0.410	0.394	0.023
	2	5		0.624			0.392		
	3	5		0.690			0.424		
	4	5		0.481			0.375		
	5	5		0.538			0.370		
CR-02 Reference	1	5	0	0.445	0.417	0.101	0.314	0.292	0.083
	2	5		0.422			0.283		
	3	5		0.306			0.195		
	4	5		0.346			0.251		
	5	5		0.566			0.419		
SD-0001	1	5	0	0.568	0.567	0.077	0.479	0.465	0.059
	2	5		0.478			0.392		
	3	5		0.579			0.464		
	4	5		0.685			0.553		
	5	5		0.526			0.436		
SD-0002	1	5	0	0.650	0.598	0.069	0.550	0.490	0.063
	2	5		0.512			0.406		
	3	5		0.564			0.460		
	4	5		0.580			0.477		
	5	5		0.685			0.555		
SD-0003	1	5	0	0.634	0.719	0.095	0.555	0.624	0.083
	2	5		0.651			0.566		
	3	5		0.668			0.572		
	4	5		0.804			0.693		
	5	5		0.839			0.734		
SD-0004	1	5	0	0.701	0.689	0.029	0.604	0.594	0.020
	2	5		0.655			0.564		
	3	5		0.686			0.604		
	4	5		0.671			0.583		
	5	5		0.730			0.614		

Table 6. Test Results for *Neanthes arenaceodentata* (*Continued*)

Treatment	Replicate	Survivors	Mean Mortality (%)	Individual Growth (mg/ind/day)					
				Dry Weight	Mean	SD	AFDW	Mean	SD
SD-0005	1	5	0	0.652	0.701	0.079	0.535	0.584	0.054
	2	5		0.748			0.612		
	3	5		0.792			0.639		
	4	5		0.594			0.518		
	5	5		0.719			0.615		
SD-0006	1	5	0	0.762	0.764	0.064	0.648	0.646	0.052
	2	5		0.760			0.649		
	3	5		0.710			0.599		
	4	6*		0.718			0.604		
	5	5		0.870			0.729		
SD-0007	1	5	0	0.779	0.685	0.087	0.631	0.572	0.066
	2	5		0.746			0.625		
	3	5		0.587			0.494		
	4	5		0.600			0.507		
	5	5		0.714			0.603		
SD-0008	1	5	0	0.571	0.627	0.089	0.494	0.529	0.065
	2	5		0.747			0.616		
	3	5		0.694			0.578		
	4	5		0.587			0.492		
	5	5		0.538			0.463		
SD-0009	1	5	0	0.671	0.716	0.039	0.576	0.606	0.038
	2	5		0.762			0.628		
	3	5		0.689			0.572		
	4	5		0.709			0.595		
	5	5		0.748			0.661		
SD-0010	1	5	0	0.773	0.752	0.074	0.637	0.632	0.069
	2	5		0.659			0.543		
	3	5		0.712			0.604		
	4	5		0.759			0.645		
	5	5		0.857			0.733		
SD-0011	1	5	0	0.342	0.581	0.136	0.291	0.483	0.112
	2	5		0.684			0.584		
	3	5		0.617			0.504		
	4	5		0.640			0.530		
	5	5		0.624			0.507		
SD-0012	1	5	0	0.723	0.716	0.042	0.605	0.596	0.043
	2	5		0.721			0.595		
	3	5		0.734			0.595		
	4	5		0.759			0.652		
	5	5		0.646			0.531		

Table 6. Test Results for *Neanthes arenaceodentata (Continued)*

Treatment	Replicate	Survivors	Mean Mortality (%)	Individual Growth (mg/ind/day)					
				Dry Weight	Mean	SD	AFDW	Mean	SD
SD-0013	1	5	0	0.581	0.667	0.079	0.458	0.541	0.073
	2	5		0.592			0.475		
	3	5		0.680			0.552		
	4	5		0.756			0.621		
	5	5		0.727			0.599		
SD-0014	1	5	0	0.702	0.660	0.079	0.560	0.539	0.057
	2	5		0.552			0.465		
	3	5		0.764			0.620		
	4	5		0.648			0.529		
	5	5		0.633			0.519		
SD-0015	1	5	0	0.770	0.638	0.120	0.586	0.482	0.103
	2	5		0.517			0.372		
	3	5		0.765			0.593		
	4	5		0.566			0.406		
	5	5		0.573			0.452		
SD-0017	1	5	0	0.732	0.787	0.061	0.587	0.642	0.046
	2	5		0.767			0.622		
	3	5		0.737			0.625		
	4	5		0.822			0.671		
	5	5		0.875			0.703		
SD-0018	1	5	0	0.743	0.744	0.103	0.603	0.577	0.087
	2	5		0.823			0.556		
	3	5		0.690			0.552		
	4	5		0.860			0.706		
	5	5		0.604			0.468		
SD-0019	1	5	0	0.619	0.733	0.129	0.494	0.567	0.086
	2	5		0.604			0.479		
	3	5		0.718			0.551		
	4	5		0.903			0.674		
	5	5		0.820			0.637		
SD-0020	1	5	0	0.733	0.712	0.087	0.538	0.552	0.068
	2	5		0.571			0.448		
	3	5		0.793			0.615		
	4	5		0.694			0.543		
	5	5		0.770			0.613		
SD-0021	1	5	0	0.778	0.762	0.041	0.645	0.616	0.038
	2	5		0.691			0.552		
	3	5		0.783			0.637		
	4	5		0.791			0.636		
	5	5		0.767			0.612		

* Test replicate initiated with 6 test organisms; all means and growth calculations based on 6 test organisms.

Table 7. Water Quality Summary for *Neanthes arenaceodentata*

Treatment	Dissolved Oxygen (mg/L)			Temperature (°C)			Salinity (ppt)			pH (units)		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Control	7.5	7.0	7.7	19.8	19.6	20.2	28	27	28	7.9	7.7	8.2
CR-12 Reference	7.5	7.1	7.7	19.7	19.1	20.0	28	27	29	8.1	7.7	8.3
CARR-20 Reference	7.5	7.2	7.6	19.7	19.6	20.0	28	27	29	8.1	7.9	8.3
CR-02 Reference	7.5	7.0	7.7	19.8	19.6	20.2	28	27	28	7.9	7.7	8.2
SD0001	7.5	7.1	7.7	19.7	19.1	20.0	28	27	29	8.1	7.7	8.3
SD0002	7.5	7.2	7.6	19.7	19.6	20.0	28	27	29	8.1	7.9	8.3
SD0003	7.5	7.2	7.6	19.8	19.5	20.3	28	28	29	8.1	7.8	8.4
SD0004	7.4	7.2	7.6	19.8	19.6	20.0	28	28	29	8.0	7.8	8.2
SD0005	7.4	7.0	7.6	19.8	19.6	20.2	28	27	29	8.1	7.8	8.4
SD0006	7.4	7.1	7.7	19.8	19.4	20.3	28	28	29	8.1	7.8	8.3
SD0007	7.4	7.0	7.7	19.8	19.6	20.1	28	28	29	8.2	7.8	8.5
SD0008	7.5	7.3	7.7	19.9	19.7	20.4	28	28	29	8.1	7.9	8.3
SD0009	7.5	7.3	7.7	19.9	19.7	20.4	28	28	29	8.2	8.0	8.4
SD0010	7.5	7.2	7.7	20.0	19.7	20.5	28	28	29	8.2	8.0	8.5
SD0011	7.2	6.7	7.6	19.8	19.7	20.5	28	28	29	8.3	7.8	8.8
SD0012	7.5	7.1	7.6	19.8	19.6	20.0	28	28	29	8.1	7.8	8.4
SD0013	7.5	7.2	7.7	19.8	19.6	20.2	28	28	29	8.0	7.4	8.2
SD0014	7.3	6.9	7.6	19.8	19.6	20.1	28	27	29	8.0	7.4	8.3
SD0015	7.5	7.2	7.6	19.8	19.4	20.0	28	28	29	8.2	7.9	8.4
SD0017	7.4	6.9	7.6	19.8	19.6	20.2	28	28	29	8.0	7.7	8.3
SD0018	7.2	6.7	7.6	19.8	19.6	20.0	28	28	29	8.1	7.6	8.6
SD0019	7.5	7.3	7.7	20.0	19.7	20.5	28	28	29	8.0	7.8	8.4
SD0020	7.4	6.8	7.6	19.8	19.6	20.2	28	27	29	8.0	7.8	8.2
SD0021	7.5	7.3	7.7	19.8	19.4	20.3	28	28	29	8.1	7.8	8.3

Table 8. Ammonia and Sulfide Summary for *Neanthes arenaceodentata*

Treatment	Overlying Ammonia			Interstitial Ammonia			Overlying Sulfides		Interstitial Sulfides	
	Day			Day			Day		Day	
	0	5	10	0	5	10	0	10	0	10
Control	0.83	0.11	0.11	5.73	1.03	0.56	0.02	0.01	NA	0.03
CR-12 Reference	1.18	2.65	0.09	9.32	4.97	0.66	0.04	0.02	NA	0.02
CARR-20 Reference	1.37	2.90	<0.5	6.76	5.30	3.70	0.30	0.03	NA	0.04
CR-02 Reference	0.56	0.27	<0.5	3.19	4.00	0.54	0.04	0.01	0.05	0.03
SD0001	0.78	3.16	<0.5	4.81	2.55	<0.5	0.10	0.01	2.46	0.02
SD0002	0.76	3.39	<0.5	5.25	3.33	<0.5	0.06	0.00	0.48	0.03
SD0003	0.90	3.10	<0.5	5.85	5.48	0.58	0.16	0.02	2.50	0.02
SD0004	<0.5	0.80	<0.5	2.74	2.17	<0.5	0.07	0.00	0.88	0.01
SD0005	<0.5	0.84	<0.5	2.21	0.78	<0.5	0.05	0.02	0.13	0.01
SD0006	<0.5	1.15	<0.5	2.24	1.13	<0.5	0.03	0.00	0.27	0.01
SD0007	0.67	1.68	<0.5	4.54	1.61	<0.5	0.10	0.01	0.18	0.02
SD0008	<0.5	1.60	<0.5	2.67	1.77	<0.5	0.08	0.01	0.71	0.02
SD0009	<0.5	0.95	<0.5	1.36	1.61	<0.5	0.05	0.03	0.76	0.03
SD0010	<0.5	0.99	<0.5	2.55	1.38	<0.5	0.09	0.02	1.49	0.01
SD0011	<0.5	1.35	<0.5	1.61	1.55	<0.5	0.11	0.01	0.88	0.02
SD0012	<0.5	1.51	<0.5	1.65	1.75	<0.5	0.04	0.01	0.30	0.03
SD0013	<0.5	<0.5	<0.5	1.41	0.86	<0.5	0.08	0.02	0.09	0.02
SD0014	<0.5	1.07	<0.5	1.02	0.81	<0.5	0.07	0.00	0.18	0.01
SD0015	<0.5	<0.5	<0.5	1.35	1.16	<0.5	0.11	0.01	0.11	0.02
SD0017	0.50	0.63	<0.5	3.18	0.94	<0.5	0.08	0.00	0.29	0.02
SD0018	<0.5	<0.5	<0.5	2.63	1.05	<0.5	0.06	0.01	0.16	0.02
SD0019	<0.5	<0.5	<0.5	2.06	1.90	<0.5	0.04	0.01	0.18	0.02
SD0020	<0.5	2.03	<0.5	2.63	2.57	0.55	0.09	0.02	1.48	0.03
SD0021	<0.5	0.92	<0.5	1.43	1.41	0.56	0.09	0.00	0.12	0.02

NOEC for ammonia = 95.6 mg/L total ammonia

Table 9. Test Condition Summary for *Neanthes arenaceodentata*

Test Conditions: PSEP *N. arenaceodentata* (SMS)		
Sample Identification	Control; References CR-12, CARR-20, CR-02; SD0001 – SD0015, SD0017 – SD0021	
Date sampled	Reference Sediment: June 25, 2013 Test Sediment: June 27 – July 9, 2013	
Date received at NewFields	June 28 – July 10, 2013	
Test dates	July 12 to August 1, 2013	
Sample storage conditions	4°C, dark	
Holding (Recommended: ≤8 wks	14 days	
Source of control sediment	Yaquina Bay, Oregon	
Test Species	***N. arenaceodentata***	
Supplier	Aquatic Toxicology Support	
Date acquired	July 12, 2013	
Acclimation/holding time	0 days	
Age class	Juvenile; 19 -21 days old	
Test Procedures	PSEP 1995 with SMARM revisions	
Regulatory Program	SMS	
Test location	NewFields Northwest Laboratory	
Test type/duration	20-Day static renewal	
Control water	North Hood Canal sea water, 0.45µm filtered	
Test dissolved oxygen	Recommended: > 4.6 mg/L	Achieved: 6.7 – 7.7 mg/L
Test temperature	Recommended: 20 ± 1 °C	Achieved: 19.1 – 20.5 °C
Test Salinity	Recommended: 28 ± 2 ppt	Achieved: 27- 29 ppt
Test pH	Recommended: 7 - 9	Achieved: 7.4 – 8.6
Initial biomass	Recommended: 0.5 - 1.0 mg DW Minimum: 0.25 mg DW	0.445 mg DW
SMS control performance standard	Recommended: Mortality: < 10% MIG: ≥ 0.72 mg/ind/day Minimum: ≥ 0.38 mg/ind/day (as dry weight)	Achieved: Mortality: 0%; Pass MIG: 0.513 mg/ind/day; Pass
SMS and DMMP control performance standard	Recommended: Mortality ≤20% $MIG_{Reference}/MIG_{Control} \geq 80\%$	Achieved: Mortality: 0%; Pass MIG: 81% to 124%; Pass
Reference Toxicant LC_{50}	LC_{50} = 142 mg $NH_3 + NH_4^+$/L	
Mean; Acceptable Range	155; 46.5 - 264 mg $NH_3 + NH_4^+$/L	
NOEC (total ammonia)	95.6 mg $NH_3 + NH_4^+$/L	
NOEC (unionized ammonia)	0.943 mg NH_3/L	
Test Lighting	Continuous	
Test chamber	1-Liter Glass Chamber	
Replicates/treatment	5 + 2 surrogates (one used for WQ measurements)	
Organisms/replicate	5	
Exposure volume	175 mL sediment/ 775 mL water	
Feeding	40 mg/jar every other day (8 mg/ind every other day)	
Water renewal	Water renewed every third day (1/3 test volume)	
Deviations from Test Protocol	None	

Larval Development Bioassay

The larval development test with *M. galloprovincialis* was performed in two batches. The first test batch was initiated on July 1, 2013 and included test samples collected between June 25 and June 28' 2013 (samples SD0005 – SD0007 and SD0023 – SD0049). The second test batch was initiated on July 17, 2013 and included samples collected between July 3 and July 9, 2013 (samples SD0001 – SD0004 and SD0008 – SD0022). Each of the three reference treatments, as well as a negative and positive control, was tested concurrently with each test batch.

The results of Test Batch 1 are summarized in Table 10. Summaries of water quality measurements, ammonia and sulfide concentrations, and test conditions are presented in Tables 11, 12, and 13. Test 1 was validated by 98.9% mean normal survivorship, defined as the mean number of normal larvae within the control divided by the stocking density. This value met the SMS acceptability criteria of ≥70%. Mean normal survival (control normalized) in the reference treatments CR-12, CARR-20, and CR-02 was 82.4%, 79.9, and 77.1%, respectively, meeting the reference acceptability criteria of ≥65% mean control-normalized normal survival. Mean control-normalized normal survivorship in the test treatments ranged between 51.9% and 87.1%. The mean stocking density for Test 1 was 22.6 embryos per mL.

A reference-toxicant test (positive control) was performed on the batch of test organisms utilized for this study. The LC_{50} value of 2.90 was within control chart limits (±2 standard deviations from the laboratory historical mean, 0.96 – 9.57 mg total ammonia/L). This indicates that the test organisms used in this study were of similar sensitivity to those previously tested at NewFields.

All water quality parameters were within the acceptable limits throughout the duration of the test, with the exception of dissolved oxygen. Dissolved oxygen met the target range of ≥5.0 mg/L on days 1 and 2 of the test; however, DO concentrations were between 3 and 5 mg/L for many of the test treatments at test termination. This was likely due to the resuspension of test sediments; water quality measurements were taken after resuspension. It is unlikely that the suppressed DO affected normal development as development was complete prior to resuspension. In addition, normal survivorship did not appear to be related to DO concentration, with high larval recovery in treatments with lower DO concentrations. Total sulfide concentrations in the test and reference treatments ranged from 0.126 – 0.338 mg/L at test initiation and ranged from 0.046 – 0.121 mg/L at test termination. Ammonia concentrations observed in the *M. galloprovincialis* test were below the NOEC value derived from the concurrent ammonia reference-toxicant test (Table 12; compare to NOEC of 1.46 mg/L for mean observed at NewFields). This indicates that ammonia concentrations within the sediment samples were below effects levels and should not have been a contributor to adverse biological effects observed in the test treatments.

Table 10. Test Results for *Mytilus galloprovincialis* Test Batch 1

Treatment	Replicate	Number Normal	Number Abnormal	Mean Number Normal	Normal Survivorship (%)[1, 2]	Mean Normal Survivorship (%)	SD
Control	1	215	8	236.4	95.0	98.9	2.2
	2	237	8		100		
	3	225	8		99.5		
	4	255	19		100		
	5	250	4		100		
CR-12 Reference	1	182	3	196.4	77.0	82.4	10.1
	2	245	8		100		
	3	182	3		77.0		
	4	180	15		76.1		
	5	193	3		81.6		
CARR-20 Reference	1	206	5	189.0	87.1	79.9	6.1
	2	174	18		73.6		
	3	188	21		79.5		
	4	176	29		74.5		
	5	201	10		85.0		
CR-02 Reference	1	201	9	175.6	85.0	77.1	8.2
	2	143	29		60.5		
	3	169	6		71.5		
	4	163	18		69.0		
	5	202	8		85.4		
SD-0005	1	155	7	158.8	65.6	67.2	5.4
	2	139	3		58.8		
	3	161	7		68.1		
	4	168	5		71.1		
	5	171	4		72.3		
SD-0006	1	142	6	142.0	60.1	60.1	6.3
	2	129	9		54.6		
	3	134	14		56.7		
	4	167	10		70.6		
	5	138	10		58.4		
SD-0007	1	180	7	163.0	76.1	69.0	7.9
	2	170	5		71.9		
	3	173	3		73.2		
	4	132	7		55.8		
	5	160	11		67.7		
SD-0023	1	137	10	147.0	58.0	62.2	3.9
	2	139	21		58.8		
	3	147	3		62.2		
	4	154	17		65.1		
	5	158	8		66.8		

Table 10. Test Results for *Mytilus galloprovincialis* Test Batch 1 *(Continued)*

Treatment	Replicate	Number Normal	Number Abnormal	Mean Number Normal	Normal Survivorship (%)$^{1, 2}$	Mean Normal Survivorship (%)	SD
SD-0024	1	149	8	158.0	63.0	66.8	5.1
	2	162	10		68.5		
	3	158	4		66.8		
	4	176	8		74.5		
	5	145	2		61.3		
SD-0025	1	138	18	122.8	58.4	51.9	9.4
	2	133	19		56.3		
	3	145	23		61.3		
	4	101	35		42.7		
	5	97	25		41.0		
SD-0026	1	182	3	181.0	77.0	76.6	9.7
	2	177	2		74.9		
	3	161	4		68.1		
	4	166	5		70.2		
	5	219	3		92.6		
SD-0027	1	138	1	132.6	58.4	56.1	8.9
	2	126	6		53.3		
	3	166	10		70.2		
	4	122	10		51.6		
	5	111	11		47.0		
SD-0028	1	171	10	175.2	72.3	74.1	2.2
	2	178	10		75.3		
	3	172	12		72.8		
	4	183	8		77.4		
	5	172	15		72.8		
SD-0029	1	157	4	141.8	66.4	60.0	8.3
	2	137	22		58.0		
	3	164	4		69.4		
	4	114	15		48.2		
	5	137	25		58.0		
SD-0030	1	156	2	160.4	66.0	67.9	3.5
	2	166	3		70.2		
	3	172	5		72.8		
	4	156	3		66.0		
	5	152	3		64.3		
SD-0031	1	154	0	166.2	65.1	70.3	6.1
	2	190	10		80.4		
	3	164	14		69.4		
	4	156	3		66.0		
	5	167	4		70.6		

Table 10. Test Results for *Mytilus galloprovincialis* Test Batch 1 *(Continued)*

Treatment	Replicate	Number Normal	Number Abnormal	Mean Number Normal	Normal Survivorship (%)[1, 2]	Mean Normal Survivorship (%)	SD
SD-0032	1	169	4	188.4	71.5	79.7	7.4
	2	184	11		77.8		
	3	181	9		76.6		
	4	216	4		91.4		
	5	192	16		81.2		
SD-0033	1	186	8	160.6	78.7	67.9	13.4
	2	179	6		75.7		
	3	175	5		74.0		
	4	108	13		45.7		
	5	155	6		65.6		
SD-0034	1	159	6	157.8	67.3	66.8	7.6
	2	162	13		68.5		
	3	156	15		66.0		
	4	131	4		55.4		
	5	181	9		76.6		
SD-0035	1	164	9	177.2	69.4	75.0	8.0
	2	185	3		78.3		
	3	194	2		82.1		
	4	192	4		81.2		
	5	151	2		63.9		
SD-0036	1	179	11	183.4	75.7	77.6	6.9
	2	201	11		85.0		
	3	170	6		71.9		
	4	200	7		84.6		
	5	167	6		70.6		
SD-0037	1	184	4	176.2	77.8	74.5	6.1
	2	190	4		80.4		
	3	168	3		71.1		
	4	155	8		65.6		
	5	184	4		77.8		
SD-0038	1	190	15	187.6	80.4	79.4	11.3
	2	165	12		69.8		
	3	186	25		78.7		
	4	231	15		97.7		
	5	166	8		70.2		
SD-0039	1	161	56	160.6	68.1	67.9	3.2
	2	154	52		65.1		
	3	169	31		71.5		
	4	167	31		70.6		
	5	152	45		64.3		
SD-0040	1	189	4	178.2	79.9	75.4	3.8
	2	180	4		76.1		
	3	178	2		75.3		
	4	180	6		76.1		
	5	164	7		69.4		

[1] Control normality normalized to stocking density (226).

[2] Reference and treatment normal survivorship are normalized to the mean number of normal larvae in the Control (236).

Table 11. Water Quality Summary for *Mytilus galloprovincialis* Test Batch 1

Treatment	Dissolved Oxygen (mg/L)			Temperature (°C)			Salinity (ppt)			pH (units)		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Control	7.5	7.3	7.8	15.8	15.0	16.7	29	29	29	8.0	7.9	8.1
CR-12 Reference	7.6	7.3	7.7	16.0	15.5	16.6	29	29	29	8.0	7.9	8.1
CARR-20 Reference	6.1	4.4	7.3	15.9	15.6	16.4	29	29	29	7.9	7.7	8.0
CR-02 Reference	6.3	5.3	6.8	16.3	15.9	16.6	29	29	29	7.9	7.8	8.0
SD0005	5.8	4.1	7.3	16.4	16.1	16.5	29	29	29	7.9	7.7	8.0
SD0006	5.6	4.3	6.6	15.9	15.7	16.1	29	28	29	7.8	7.7	7.9
SD0007	5.6	4.4	6.3	16.1	15.4	16.6	29	29	29	7.9	7.7	8.1
SD0023	6.3	4.4	7.8	16.3	16.1	16.4	29	29	29	7.9	7.7	8.0
SD0024	5.8	3.6	7.5	16.2	15.9	16.8	29	29	29	7.9	7.7	8.0
SD0025	5.8	4.8	6.9	16.7	16.2	17.0	29	29	29	7.8	7.7	7.9
SD0026	6.1	5.0[1]	8.0	15.8	15.3	16.4	29	28	29	7.9	7.9	8.0
SD0027	6.0	4.7	7.0	16.0	15.4	16.7	29	29	29	7.8	7.6	8.0
SD0028	6.0	4.3	7.2	16.1	15.8	16.7	29	29	29	7.9	7.7	8.1
SD0029	6.1	5.5	7.0	16.0	15.8	16.2	29	28	29	7.9	7.7	8.0
SD0030	6.5	5.6	7.1	16.6	16.3	17.0	29	29	29	7.9	7.8	8.0
SD0031	6.3	5.2	7.0	16.8	16.4	17.0	29	29	29	7.9	7.7	8.1
SD0032	6.1	4.2	7.4	16.1	16.0	16.2	29	29	29	7.9	7.7	8.1
SD0033	5.5	4.0	6.4	15.9	15.4	16.3	29	29	29	7.9	7.7	8.1
SD0034	5.6	3.6	7.2	16.5	16.0	17.0	29	29	29	7.8	7.6	7.9
SD0035	5.4	3.1	7.1	16.0	15.6	16.9	29	29	29	7.9	7.7	8.0
SD0036	6.2	4.8	7.1	16.8	16.6	17.0	29	29	29	7.9	7.7	8.1
SD0037	5.9	3.5	7.6	16.2	15.6	16.9	29	29	29	7.9	7.7	8.1
SD0038	6.1	4.2	7.3	16.3	15.8	16.8	29	29	29	7.9	7.7	8.1
SD0039	6.3	4.7	7.5	16.4	16.2	16.7	29	29	29	7.9	7.7	8.0
SD0040	5.7	3.7	7.4	16.5	15.9	17.0	29	29	29	7.9	7.8	8.0
SD0042	5.1	3.1	6.2	16.4	16.0	17.0	29	29	29	8.0	7.8	8.1
SD0043	5.8	4.4	6.8	15.9	15.4	16.2	29	29	29	7.9	7.7	8.1
SD0044	6.0	3.8	7.5	16.0	15.4	16.7	29	29	29	7.9	7.7	8.0
SD0045	5.6	4.2	6.3	16.1	15.4	16.8	29	29	29	7.9	7.7	8.0
SD0048	6.6	5.2	7.6	16.6	16.3	17.0	29	29	29	7.9	7.8	8.0
SD0049	7.3	6.6	7.8	16.2	16.2	16.3	29	29	29	8.0	7.8	8.1

[1] Dissolved oxygen below target range of ≥5.0 mg/L, dissolved oxygen within range following aeration

Table 12. Ammonia and Sulfide Summary for *Mytilus galloprovincialis* Test Batch 1

Treatment	Overlying Ammonia (mg/L Total)		Overlying Sulfides (mg/L)	
	Initial	Final	Initial	Final
Control	<0.5	0.968	0.026	0.033
CR-12 Reference	<0.5	<0.5	0.070	0.047
CARR-20 Reference	<0.5	<0.5	0.106	0.041
CR-02 Reference	<0.5	<0.5	0.173	0.082
SD0005	<0.5	<0.5	0.286	0.116
SD0006	<0.5	<0.5	0.239	0.082
SD0007	<0.5	<0.5	0.274	0.112
SD0023	<0.5	<0.5	0.300	0.084
SD0024	<0.5	<0.5	0.126	0.052
SD0025	<0.5	<0.5	0.219	0.093
SD0026	<0.5	<0.5	0.199	0.090
SD0027	<0.5	<0.5	0.284	0.084
SD0028	<0.5	<0.5	0.202	0.046
SD0029	<0.5	<0.5	0.153	0.055
SD0030	<0.5	<0.5	0.243	0.085
SD0031	<0.5	<0.5	0.220	0.099
SD0032	<0.5	<0.5	0.306	0.127
SD0033	<0.5	<0.5	0.211	0.077
SD0034	<0.5	<0.5	0.220	0.068
SD0035	<0.5	<0.5	0.214	0.061
SD0036	<0.5	<0.5	0.190	0.058
SD0037	<0.5	<0.5	0.235	0.073
SD0038	<0.5	<0.5	0.266	0.076
SD0039	<0.5	<0.5	0.214	0.059
SD0040	<0.5	<0.5	0.198	0.081
SD0042	<0.5	<0.5	0.138	0.099
SD0043	<0.5	<0.5	0.197	0.108
SD0044	<0.5	<0.5	0.338	0.106
SD0045	<0.5	<0.5	0.260	0.112
SD0046	<0.5	<0.5	0.146	0.098
SD0047	<0.5	<0.5	0.194	0.121
SD0048	<0.5	<0.5	0.146	0.098
SD0049	<0.5	<0.5	0.225	0.079

Table 13. Test Condition Summary for *Mytilus galloprovincialis* Test Batch 1

Test Conditions: PSEP *M. galloprovincialis* (SMS)		
Sample Identification	Control, CR-12, CARR-20, CR-20, SD0005 – SD0007, SD0023 – SD0049	
Date sampled	June 25- 28, 2013	
Date received at NewFields Northwest	June 28, 2013	
Test dates	July 1-3, 2013	
Sample storage conditions	4°C, dark	
Holding time Recommended: < 8 weeks (56 days)	6 days	
Test Species	***M. galloprovincialis***	
Supplier	Taylor Shellfish, Shelton, WA	
Date acquired	July 1, 2013	
Acclimation/holding time (broodstock)	0 day	
Age class	<2-h old embryos	
Test Procedures	PSEP 1995 with SMARM revisions	
Regulatory Program	SMS	
Test location	NewFields Northwest Laboratory	
Test type/duration	48-60 Hour static test	
Control water	North Hood Canal sea water, 0.45µm filtered	
Test dissolved oxygen	Recommended: >5.0 mg/L	Achieved: 3.1 – 8.0 mg/L
Test temperature	Recommended: 16 ± 1 °C	Achieved: 15.0 – 17.0 °C
Test Salinity	Recommended: 28 ± 1 ppt	Achieved: 28 – 29 ppt
Test pH	Recommended: 7 - 9	Achieved: 7.6 – 8.1
Stocking Density	Recommended: 20 – 40 embryos/mL	Achieved: 22.6 embryos/mL
Control performance standard	Recommended: Control normal survival $\geq$70%	Achieved: 98.9%; Pass
Reference performance standard	Recommended: Reference normal survival $\geq$65%	Achieved: 77.1 – 83.1%; Pass
Reference Toxicant LC$_{50}$ (total ammonia)	LC$_{50}$ = 2.90 mg NH$_3$ + NH$_4^+$/L	
Mean; Acceptable Range (total ammonia)	5.27; 0.96 – 9.57 mg NH$_3$ + NH$_4^+$/L	
NOEC (total ammonia)	1.46 mg NH$_3$ + NH$_4^+$/L	
NOEC (unionized ammonia)	0.036 mg NH$_3$ /L	
Test Lighting	14hr Light / 10hr Dark	
Test chamber	1-Liter Glass Chamber	
Replicates/treatment	5 + 1 surrogate (used for WQ measurements)	
Exposure volume	18 g sediment/ 900 mL water	
Feeding	None	
Water renewal	None	
Deviations from Test Protocol	Dissolved oxygen on Day 3 following resuspension	

The results of Test Batch 2 are summarized in Table 14. Summaries of water quality measurements, ammonia and sulfide concentrations, and test conditions are presented in Tables 15, 16, and 17. Test 2 was validated by 88.6% combined normal survivorship, meeting the SMS acceptability criteria of ≥70%. Mean control-normalized normal survival in the reference treatments CR-12, CARR-20, and CR-02 was 85.8%, 81.4%, and 80.7%, respectively, meeting the reference acceptability criteria of ≥65% mean normal survivorship. Mean control-normalized normal survivorship in the test treatments ranged between 59.6% and 87.8%. The mean stocking density for Test 2 was 38.0 embryos per mL.

A reference-toxicant test (positive control) was performed on the batch of test organisms utilized for this study. The LC_{50} value of 4.31 mg total ammonia/L was within control chart limits (±2 standard deviations from the laboratory historical mean, 0.90 – 9.59 mg total ammonia/L). This indicates that the test organisms used in this study were of similar sensitivity to those previously tested at NewFields.

All water quality parameters were within the acceptable limits throughout the duration of the test, with the exception of dissolved oxygen. Dissolved oxygen met the target range of ≥5.0 mg/L on days 1 and 2 of the test; however, DO concentrations were between 4.2 and 4.9 mg/L for many of the test treatments following resuspension. Aeration was provided to all replicates of these treatments; DO concentrations returned to above 5.0 mg/L. Sulfide concentrations in the test and reference treatments ranged from 0.131 – 0.290 mg/L at test initiation and ranged from 0.022 – 0.140 mg/L at test termination. Ammonia concentrations observed in the *M. galloprovincialis* test were below the NOEC value derived from the concurrent ammonia reference-toxicant test (Table 16; compare to NOEC of 3.05 mg/L for mean observed at NewFields). This indicates that ammonia concentrations within the sediment samples should not have been a contributor to adverse biological effects observed in the test treatments.

Table 14. Test Results for *Mytilus galloprovincialis* Test Batch 2

Treatment	Replicate	Number Normal	Number Abnormal	Mean Number Normal	Normal Survivorship (%)[1, 2]	Mean Normal Survivorship (%)	SD
Control	1	351	17	336.8	92.3	88.6	4.3
	2	326	11		85.7		
	3	331	5		87.1		
	4	319	11		83.9		
	5	357	9		93.9		
CR-12 Reference	1	265	2	289.0	78.7	85.8	4.8
	2	281	5		83.4		
	3	306	9		90.9		
	4	297	6		88.2		
	5	296	8		87.9		
CARR-20 Reference	1	274	15	274.2	81.4	81.4	4.4
	2	289	31		85.8		
	3	281	15		83.4		
	4	277	14		82.2		
	5	250	24		74.2		
CR-02 Reference	1	278	16	271.8	82.5	80.7	1.9
	2	278	13		82.5		
	3	272	20		80.8		
	4	264	7		78.4		
	5	267	15		79.3		
SD-0001	1	207	16	232.2	61.5	68.9	8.9
	2	210	32		62.4		
	3	278	11		82.5		
	4	247	31		73.3		
	5	219	46		65.0		
SD-0002	1	276	16	229.8	81.9	68.2	9.6
	2	245	26		72.7		
	3	197	43		58.5		
	4	228	26		67.7		
	5	203	31		60.3		
SD-0003	1	168	25	211.8	49.9	62.9	8.6
	2	227	32		67.4		
	3	226	49		67.1		
	4	240	38		71.3		
	5	198	36		58.8		
SD-0004	1	199	33	200.8	59.1	59.6	2.5
	2	194	43		57.6		
	3	210	58		62.4		
	4	209	47		62.1		
	5	192	41		57.0		

Table 14. Test Results for *Mytilus galloprovincialis* Test Batch 2 *(Continued)*

Treatment	Replicate	Number Normal	Number Abnormal	Mean Number Normal	Normal Survivorship (%)$^{1, 2}$	Mean Normal Survivorship (%)	SD
SD-0008	1	259	11	254.4	76.9	75.5	3.8
	2	236	6		70.1		
	3	247	10		73.3		
	4	265	6		78.7		
	5	265	11		78.7		
SD-0009	1	229	29	223.6	68.0	66.4	5.6
	2	233	13		69.2		
	3	190	7		56.4		
	4	236	6		70.1		
	5	230	12		68.3		
SD-0010	1	215	17	209.8	63.8	62.3	5.9
	2	232	6		68.9		
	3	220	13		65.3		
	4	180	17		53.4		
	5	202	11		60.0		
SD-0011	1	243	7	248.6	72.1	73.8	3.5
	2	256	12		76.0		
	3	265	15		78.7		
	4	244	20		72.4		
	5	235	20		69.8		
SD-0012	1	266	9	261.4	79.0	77.6	2.9
	2	270	8		80.2		
	3	261	7		77.5		
	4	245	14		72.7		
	5	265	12		78.7		
SD-0013	1	233	13	258.2	69.2	76.7	5.6
	2	246	9		73.0		
	3	274	7		81.4		
	4	260	11		77.2		
	5	278	10		82.5		
SD-0014	1	270	9	232.6	80.2	69.1	6.3
	2	225	13		66.8		
	3	217	7		64.4		
	4	229	13		68.0		
	5	222	5		65.9		
SD-0015	1	213	6	243.6	63.2	72.3	7.7
	2	223	14		66.2		
	3	269	14		79.9		
	4	270	14		80.2		
	5	243	17		72.1		

Table 14. Test Results for *Mytilus galloprovincialis* Test Batch 2 *(Continued)*

Treatment	Replicate	Number Normal	Number Abnormal	Mean Number Normal	Normal Survivorship (%)[1, 2]	Mean Normal Survivorship (%)	SD
SD-0017	1	239	11	248.6	71.0	73.8	6.2
	2	222	14		65.9		
	3	267	15		79.3		
	4	243	14		72.1		
	5	272	11		80.8		
SD-0018	1	274	9	280.2	81.4	83.2	5.2
	2	304	4		90.3		
	3	290	5		86.1		
	4	275	6		81.7		
	5	258	15		76.6		
SD-0019	1	234	4	266.0	69.5	79.0	5.9
	2	276	6		81.9		
	3	278	5		82.5		
	4	283	9		84.0		
	5	259	18		76.9		
SD-0020	1	203	21	220.2	60.3	65.4	5.6
	2	248	14		73.6		
	3	202	21		60.0		
	4	227	16		67.4		
	5	221	44		65.6		
SD-0021	1	255	14	295.6	75.7	87.8	8.1
	2	294	6		87.3		
	3	331	9		98.3		
	4	304	27		90.3		
	5	294	7		87.3		
SD-0022	1	244	7	264.8	72.4	78.6	4.0
	2	266	12		79.0		
	3	262	7		77.8		
	4	279	2		82.8		
	5	273	9		81.1		

[1] Control normality normalized to stocking density (380).

[2] Reference and treatment normal survivorship are normalized to the mean number normal in Control (337).

Table 15. Water Quality Summary for *Mytilus galloprovincialis* Test Batch 2

Treatment	Dissolved Oxygen (mg/L)			Temperature (°C)			Salinity (ppt)			pH (units)		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Control	7.3	7.2	7.4	16.2	15.8	16.5	28	28	28	7.8	7.8	7.8
CR-12 Reference	7.1	6.9	7.3	16.6	16.4	16.8	28	28	28	7.8	7.8	7.9
CARR-20 Reference	6.1	5.1	7.3	16.8	16.8	16.9	28	28	28	7.7	7.6	7.8
CR-02 Reference	5.7	4.3[1]	7.4	16.7	16.6	16.9	28	28	28	7.7	7.5	7.9
SD0001	6.2	4.8[1]	7.8	16.5	16.2	16.6	28	28	28	7.6	7.6	7.7
SD0002	5.8	4.2[1]	7.2	16.7	16.6	16.8	28	28	28	7.7	7.6	7.7
SD0003	5.7	4.7[1]	7.2	16.9	16.8	16.9	28	28	28	7.6	7.5	7.7
SD0004	5.8	4.9[1]	7.0	16.7	16.5	17.0	28	28	28	7.6	7.5	7.7
SD0008	6.0	4.8[1]	7.2	16.9	16.9	17.0	28	28	28	7.6	7.6	7.7
SD0009	6.5	5.0	7.9	16.7	16.4	17.0	28	28	28	7.7	7.6	7.8
SD0010	6.2	5.3	7.1	16.9	16.8	17.1	28	28	28	7.6	7.5	7.7
SD0011	5.9	4.9[1]	6.9	16.8	16.7	17.0	28	28	28	7.6	7.5	7.7
SD0012	5.8	4.5[1]	7.2	16.8	16.7	16.9	28	28	28	7.7	7.6	7.8
SD0013	5.7	5.1	6.5	16.9	16.7	17.0	28	28	28	7.7	7.6	7.8
SD0014	5.9	4.9[1]	7.1	16.7	16.6	16.7	28	28	28	7.7	7.6	7.8
SD0015	6.4	5.4	7.1	16.6	16.2	17.0	28	27	28	7.7	7.6	7.8
SD0017	6.1	4.6[1]	6.8	16.7	16.6	16.9	28	28	28	7.6	7.4	7.8
SD0018	6.0	5.0	6.7	16.4	15.9	16.9	28	28	28	7.7	7.6	7.8
SD0019	5.3	4.5[1]	6.0	16.5	16.0	17.0	28	28	28	7.7	7.6	7.8
SD0020	6.2	5.6	6.7	16.6	16.4	16.8	28	27	28	7.7	7.6	7.7
SD0021	5.8	4.7[1]	7.0	16.5	16.0	16.9	28	28	28	7.6	7.5	7.7
SD0022	5.9	4.8[1]	7.0	16.7	16.5	16.8	28	28	28	7.7	7.5	7.8

[1] Dissolved oxygen below target range of ≥5.0 mg/L, dissolved oxygen within range following aeration

Table 16. Ammonia and Sulfide Summary for *Mytilus galloprovincialis* Test Batch 2

Treatment	Overlying Ammonia (mg/L Total)		Overlying Sulfides (mg/L)	
	Initial	Final	Initial	Final
Control	<0.5	<0.5	0.009	0.013
CR-12 Reference	<0.5	<0.5	0.077	0.048
CARR-20 Reference	<0.5	<0.5	0.127	0.033
CR-02 Reference	<0.5	<0.5	0.126	0.031
SD0001	<0.5	<0.5	0.131	0.031
SD0002	0.562	<0.5	0.167	0.097
SD0003	<0.5	<0.5	0.147	0.077
SD0004	<0.5	<0.5	0.251	0.037
SD0008	<0.5	<0.5	0.231	0.079
SD0009	<0.5	<0.5	0.272	0.102
SD0010	<0.5	<0.5	0.290	0.107
SD0011	<0.5	<0.5	0.244	0.102
SD0012	<0.5	<0.5	0.163	0.089
SD0013	<0.5	<0.5	0.214	0.094
SD0014	<0.5	<0.5	0.177	0.111
SD0015	<0.5	<0.5	0.163	0.086
SD0017	<0.5	<0.5	0.215	0.140
SD0018	<0.5	<0.5	0.229	0.088
SD0019	<0.5	<0.5	0.136	0.022
SD0020	<0.5	<0.5	0.192	0.054
SD0021	<0.5	<0.5	0.213	0.069
SD0022	<0.5	<0.5	0.203	0.061

Table 17. Test Condition Summary for *Mytilus galloprovincialis* Test Batch 2

Test Conditions: *M. galloprovincialis* (SMS)		
Sample Identification	Control, CR-12, CARR-20, CR-20, SD0001 – SD0004, SD0008 – SD0022	
Date sampled	July 1 - 9, 2013	
Date received at NewFields Northwest	July 10, 2013	
Test dates	July 17 - 19, 2013	
Sample storage conditions	4°C, dark	
Holding time Recommended: < 8 weeks (56 days)	16 days	
Test Species	***M. galloprovincialis***	
Supplier	Taylor Shellfish, Shelton, WA	
Date acquired	July 17, 2013	
Acclimation/holding time (broodstock)	0 day	
Age class	<2-h old embryos	
Test Procedures	PSEP 1995 with SMARM revisions	
Regulatory Program	SMS	
Test location	NewFields Northwest Laboratory	
Test type/duration	48-60 Hour static test	
Control water	North Hood Canal sea water, 0.45µm filtered	
Test dissolved oxygen	Recommended: >5.0 mg/L	Achieved: 4.3 – 7.9 mg/L
Test temperature	Recommended: 16 ± 1 °C	Achieved: 15.8 – 17.1 °C
Test Salinity	Recommended: 28 ± 1 ppt	Achieved: 27 – 28 ppt
Test pH	Recommended: 7 - 9	Achieved: 7.4 – 7.9
Stocking Density	Recommended: 20 – 40 embryos/mL	Achieved: 38.0 embryos/mL
Control performance standard	Recommended: Control normal survival ≥70%	Achieved: 88.6%; Pass
Reference performance standard	Recommended: Reference normal survival ≥65%	Achieved: 80.7 – 85.8%; Pass
Reference Toxicant LC$_{50}$ (total ammonia)	LC$_{50}$ = 4.31 mg $NH_3 + NH_4^+$/L	
Mean; Acceptable Range (total ammonia)	5.24; 0.90 – 9.59 mg $NH_3 + NH_4^+$/L	
NOEC (total ammonia)	3.05 mg $NH_3 + NH_4^+$/L	
NOEC (unionized ammonia)	0.055 mg NH_3/L	
Test Lighting	14hr Light / 10hr Dark	
Test chamber	1-Liter Glass Chamber	
Replicates/treatment	5 + 1 surrogate (used for WQ measurements)	
Exposure volume	18 g sediment/ 900 mL water	
Feeding	None	
Water renewal	None	
Deviations from Test Protocol	Dissolved oxygen following resuspension, aeration provided	

Discussion

Sediments were evaluated based on criteria specified in the Sediment Management Standards (SMS). The biological criteria are based on both statistical significance (a statistical comparison) and the degree of biological response (a numerical comparison). The SMS criteria are derived from the Washington Department of Ecology Sediment Sampling and Analysis Plan Appendix (WDOE 2008). The criteria include a lower and a higher threshold, sediment quality standards (SQS) and Cleanup Standards Limit (CSL).

Endpoint comparisons were made for each treatment against the appropriate reference sample. Reference selection was based on a comparison of the percentage of fines for the test treatment and the each of the references. That reference with the most similar percentage of fines was selected for SMS endpoint evaluation. If the difference for two references were similar, the finer grained size reference was selected. With the exception of samples SD0040, SD0044, and SD0054, the percentage of fines for all selected references were within the SMS recommended range of ≤25% (Fox 1997), relative to the test treatments. The difference in percentage of fines for SD0040 and SD0054 and Reference CR-02 was 26%. The percentage of fines in sample SD0044 was 32% higher than in Reference CR-02.

Amphipod Test

Under the SMS program, a treatment will fail SQS if mean mortality in the test sediment is >25% more (on an absolute basis) than the mean mortality in the appropriate reference sediment and the difference is statistically significant ($p \leq 0.05$). Treatments fail the CSL if mean mortality in the test treatment >30% over that of the reference sediment and the difference is statistically significant. A summary of the SMS evaluation for the Western Port Angeles Harbor test samples is presented in Table 18. All test treatments met both the SQS and CSL criteria for the benthic amphipod test.

Juvenile Polychaete Test

Suitability determinations for the juvenile polychaete test were based on mean individual growth (MIG) using ash-free dry weight (AFDW). A test treatment fails SQS criteria if MIG is statistically lower in the test treatment, relative to the reference, and MIG in the test treatment is <70% that of the reference (on a relative basis). The treatments will fail CSL criteria if MIG is significantly lower than the reference treatment and is <50% that of the treatment. A summary of the SMS evaluation for the Western Port Angeles Harbor test samples is presented in Table 19. All test treatments met both the SQS and CSL criteria for the juvenile polychaete test.

Larval Bivalve Test

Larval test treatments fail SQS criteria if the percentage of normal larvae in the test treatment is significantly lower than that of the reference and if normal survivorship in the test treatment is less than 85%, relative to normal survivorship in the reference (on a relative basis). Test treatments fail CSL criteria if normal survivorship in the test treatment is significantly lower than that of the reference and if the normal survivorship in the test treatment is less than 70%, relative to the reference.

A summary of the SMS comparisons for the Batch 1 benthic larval test is presented in Table 20. With the exception of five samples, all test samples in Test Batch 1 passed both SQS and CSL criteria. Mean normal survivorship in samples SD0006, SD0023, SD0027, and SD0029 ranged from 70% to 78%, relative to the reference, falling below the SQS criteria, but meeting the CSL criteria. Mean normal survivorship in sample SD0025 was 65% relative to the reference, failing the CSL criteria.

A summary of the SMS comparisons for the Batch 2 benthic larval test is presented in Table 21. With the exception of five samples, all test samples in Test Batch 2 passed both SQS and CSL criteria. Mean normal survivorship in samples SD0003, SD0004, SD0009, SD0010, and SD0020 ranged from 73% to 82%, relative to the appropriate reference, falling below the SQS criteria, but meeting the CSL criteria.

Overall Summary

A summary of the SMS comparisons for each of the Western Port Angeles Harbor test samples is presented in Table 22.

Table 18. SMS Comparison for the Benthic Amphipod Test with *Eohaustorius estuarius*

Treatment	Mean Mortality (%)	Reference	Statistically More than Reference?	Mortality Comparison to Reference $M_T - M_R$ (%)	Fails SQS?[1] >25 %	Fails CSL?[2] >30 %
Control	4					
CR-12 Reference	4					
CARR-20 Reference	7					
CR-02 Reference	2					
SD0001	7	CR-02	Yes	5	No	No
SD0002	5	CR-02	No	3	No	No
SD0003	6	CARR-20	No	-1	No	No
SD0004	4	CARR-20	No	-3	No	No
SD0005	0	CR-02	No	-2	No	No
SD0006	4	CR-02	No	2	No	No
SD0007	10	CR-02	No	8	No	No
SD0008	2	CR-02	No	0	No	No
SD0009	1	CR-02	No	-1	No	No
SD0010	1	CR-02	No	-1	No	No
SD0011	8	CR-02	No	6	No	No
SD0012	4	CR-02	No	2	No	No
SD0013	2	CR-02	No	0	No	No
SD0014	3	CR-02	No	1	No	No
SD0015	5	CR-02	No	3	No	No
SD0017	2	CR-02	No	0	No	No
SD0018	5	CR-02	No	3	No	No
SD0019	6	CR-02	No	4	No	No
SD0020	4	CR-02	No	2	No	No
SD0021	6	CR-02	No	4	No	No

M = Mortality, T = Treatment, R = Reference

[1] SQS: Statistical Significance and M_T-M_R >25%

[2] CSL: Statistical Significance and M_T-M_R >30%

No = Meets criteria; Yes = Does not meet criteria

Table 19. SMS Comparison for the Juvenile Polychaete Test with *Neanthes arenaceodentata*

Treatment	MIG (mg/ind/day) AFDW	Reference	AFDW Statistically More than Reference?	Comparison to Reference MIG_T / MIG_R	Fails SQS?[1] >70 %	Fails CSL?[2] >50 %
Control	0.347					
CR-12 Reference	0.403					
CARR-20 Reference	0.394					
CR-02 Reference	0.292					
SD0001	0.465	CR-02	No	159	No	No
SD0002	0.490	CR-02	No	167	No	No
SD0003	0.624	CARR-20	No	158	No	No
SD0004	0.594	CARR-20	No	151	No	No
SD0005	0.584	CR-02	No	200	No	No
SD0006	0.646	CR-02	No	221	No	No
SD0007	0.572	CR-02	No	196	No	No
SD0008	0.529	CR-02	No	181	No	No
SD0009	0.606	CR-02	No	207	No	No
SD0010	0.632	CR-02	No	216	No	No
SD0011	0.483	CR-02	No	165	No	No
SD0012	0.596	CR-02	No	204	No	No
SD0013	0.541	CR-02	No	185	No	No
SD0014	0.539	CR-02	No	184	No	No
SD0015	0.482	CR-02	No	165	No	No
SD0017	0.642	CR-02	No	219	No	No
SD0018	0.577	CR-02	No	197	No	No
SD0019	0.567	CR-02	No	194	No	No
SD0020	0.552	CR-02	No	189	No	No
SD0021	0.616	CR-02	No	211	No	No

M = Mortality, T = Treatment, R = Reference

[1] SQS: Statistical Significance and N_{CT}<0.70*N_{CR}

[2] CSL: Statistical Significance and N_{CT}<0.50*N_{CR}

No = Meets criteria; Yes = Does not meet criteria

Table 20. SMS Comparison for the Benthic Larval Test with *Mytilus galloprovincialis* Test Batch 1

Treatment	Mean Normal Survival (%)	Reference	Statistically Less than Reference?	Normal Survival Comparison to Reference $(N_T/N_C)/(N_R/N_C)$	Fails SQS?[1] < 85%	Fails CSL?[2] < 70%
Control	236					
CR-12 Reference	196					
CARR-20 Reference	189					
CR-02 Reference	182					
SD0005	159	CR-02	**Yes**	87	No	No
SD0006	142	CR-02	**Yes**	78	**Yes**	No
SD0007	163	CR-02	No	89	No	No
SD0023	147	CARR-20	**Yes**	78	**Yes**	No
SD0024	158	CR-02	**Yes**	87	No	No
SD0025	123	CARR-20	**Yes**	65	**Yes**	**Yes**
SD0026	181	CR-02	No	99	No	No
SD0027	133	CARR-20	**Yes**	70	**Yes**	No
SD0028	175	CR-02	No	96	No	No
SD0029	142	CR-02	**Yes**	78	**Yes**	No
SD0030	160	CR-02	**Yes**	88	No	No
SD0031	166	CR-02	No	91	No	No
SD0032	188	CR-02	No	103	No	No
SD0033	161	CR-02	No	88	No	No
SD0034	158	CR-02	**Yes**	87	No	No
SD0035	177	CARR-20	No	94	No	No
SD0036	183	CR-02	No	101	No	No
SD0037	176	CR-02	No	97	No	No
SD0038	188	CR-02	No	103	No	No
SD0039	161	CR-02	**Yes**	88	No	No
SD0040	178	CR-02	No	98	No	No
SD0042	170	CR-02	No	93	No	No
SD0043	199	CR-02	No	109	No	No
SD0044	190	CR-02	No	104	No	No
SD0045	161	CR-02	No	88	No	No
SD0046	197	CR-12	No	100	No	No
SD0047	185	CR-12	No	94	No	No
SD0048	202	CR-02	No	111	No	No
SD0049	206	CR-02	No	113	No	No

[1] SQS: Statistical Significance and $N_{CT}<0.85*N_{CR}$

[2] CSL: Statistical Significance and $N_{CT}<0.70*N_{CR}$

No = Meets criteria; Yes = Does not meet criteria

Table 21. SMS Comparison for the Benthic Larval Test with *Mytilus galloprovincialis* Test Batch 2

Treatment	Mean Normal Survival (%)	Reference	Statistically Less than Reference?	Normal Survival Comparison to Reference $(N_T/N_C)/(N_R/N_C)$	Fails SQS?[1] < 85%	Fails CSL?[2] < 70%
Control	337					
CR-12 Reference	289					
CARR-20 Reference	274					
CR-02 Reference	272					
SD0001	232	CR-02	**Yes**	85	No	No
SD0002	230	CR-02	**Yes**	85	No	No
SD0003	212	CARR-20	**Yes**	77	**Yes**	No
SD0004	201	CARR-20	**Yes**	73	**Yes**	No
SD0008	254	CR-02	**Yes**	94	No	No
SD0009	224	CR-02	**Yes**	82	**Yes**	No
SD0010	210	CR-02	**Yes**	77	**Yes**	No
SD0011	249	CR-02	**Yes**	91	No	No
SD0012	261	CR-02	**Yes**	96	No	No
SD0013	258	CR-02	No	95	No	No
SD0014	233	CR-02	**Yes**	86	No	No
SD0015	244	CR-02	**Yes**	90	No	No
SD0017	249	CR-02	**Yes**	91	No	No
SD0018	280	CR-02	No	103	No	No
SD0019	266	CR-02	No	98	No	No
SD0020	220	CR-02	**Yes**	81	**Yes**	No
SD0021	296	CR-02	No	109	No	No
SD0022	265	CR-02	No	97	No	No

[1] SQS: Statistical Significance and $N_{CT}<0.85*N_{CR}$

[2] CSL: Statistical Significance and $N_{CT}<0.70*N_{CR}$

No = Meets criteria; Yes = Does not meet criteria

Table 22. Summary of SMS Comparisons for Western Port Angeles Harbor Samples

Treatment	Grain Size[1]	Reference Comparison	Amphipod	Juvenile Polychaete	Benthic Larval
SD0001	53	CR-02	Pass	Pass	Pass
SD0002	48	CR-02	Pass	Pass	Pass
SD0003	38	CARR-20	Pass	Pass	Fails SQS
SD0004	39	CARR-20	Pass	Pass	Fails SQS
SD0005	78	CR-02	Pass	Pass	Pass
SD0006	56	CR-02	Pass	Pass	Fails SQS
SD0007	80	CR-02	Pass	Pass	Pass
SD0008	66	CR-02	Pass	Pass	Pass
SD0009	71	CR-02	Pass	Pass	Fails SQS
SD0010	67	CR-02	Pass	Pass	Fails SQS
SD0011	79	CR-02	Pass	Pass	Pass
SD0012	82	CR-02	Pass	Pass	Pass
SD0013	77	CR-02	Pass	Pass	Pass
SD0014	77	CR-02	Pass	Pass	Pass
SD0015	77	CR-02	Pass	Pass	Pass
SD0017	70	CR-02	Pass	Pass	Pass
SD0018	78	CR-02	Pass	Pass	Pass
SD0019	50	CR-02	Pass	Pass	Pass
SD0020	56	CR-02	Pass	Pass	Fails SQS
SD0021	64	CR-02	Pass	Pass	Pass
SD0022	65	CR-02	NT[2]	NT	Pass
SD0023	31	CARR-20	NT	NT	Fails SQS
SD0024	44	CR-02	NT	NT	Pass
SD0025	24	CARR-20	NT	NT	Fails CSL
SD0026	77	CR-02	NT	NT	Pass
SD0027	20	CARR-20	NT	NT	Fails SQS
SD0028	45	CR-02	NT	NT	Pass
SD0029	73	CR-02	NT	NT	Fails SQS
SD0030	73	CR-02	NT	NT	Pass
SD0031	84	CR-02	NT	NT	Pass
SD0032	81	CR-02	NT	NT	Pass
SD0033	59	CR-02	NT	NT	Pass
SD0034	71	CR-02	NT	NT	Pass
SD0035	28	CARR-20	NT	NT	Pass
SD0036	76	CR-02	NT	NT	Pass

Table 23. Summary of SMS Comparisons for Western Port Angeles Harbor Samples (*Continued*)

Treatment	Grain Size[1]	Reference Comparison	Amphipod	Juvenile Polychaete	Benthic Larval
SD0037	60	CR-02	NT	NT	Pass
SD0038	63	CR-02	NT	NT	Pass
SD0039	71	CR-02	NT	NT	Pass
SD0040	85	CR-02	NT	NT	Pass
SD0042	75	CR-02	NT	NT	Pass
SD0043	77	CR-02	NT	NT	Pass
SD0044	91	CR-02	NT	NT	Pass
SD0045	62	CR-02	NT	NT	Pass
SD0046	12	CR-12	NT	NT	Pass
SD0047	14	CR-12	NT	NT	Pass
SD0048	64	CR-02	NT	NT	Pass
SD0049	52	CR-02	NT	NT	Pass

[1] Percent fines (∑ silt and clay)

[2] Treatment evaluated with the larval test only

References

American Society for Testing and Materials (ASTM). 2006. E1688-00 Standard Guide for Determination of the Bioaccumulation of Sediment-Associated Contaminants by Benthic Invertebrates. Annual Book of Standards, Water and Environmental Technology, Vol. 11.06, West Conshohocken, PA.

Barton, J, 2002. DMMP/SMS Clarification Paper: Ammonia and Amphipod Toxicity Testing. Presented at the 14th Annual Sediment Management Annual Review Meeting for USACE Seattle, Washington.

Ecology 2005. DMMP/SMS Clarification Paper: Interpreting Sediment Toxicity Tests: Consistency between Regulatory Programs. Toxics Cleanup Program/Sediment Management Unit, Washington Department of Ecology, Olympia, Washington.

Ecology 2008. Sediment Sampling and Analysis Plan Appendix (SSAPA): Guidance on the Development of Sediment Sampling and Analysis Plans Meeting the Requirements of the Sediment Management Standards (Chapter 173-204 WAC), Sediment Management Unit, Department of Ecology, Bellevue, Washington. Revised February 2008.

Fox, D. and T Michelsen. 1997. Selection of Negative Control Seidment and Use of Control Sediments as Reference Sediments. DMMP Clarification Paper. SMS Draft Technical Information Memorandum. Toxics Cleanup Program/Sediment Management Unit, Washington Department of Ecology, Olympia, Washington.

Fox, D, DA Gustafson, and TC Shaw. 1998. Biostat Software for the Analysis of DMP/SMS. Presented at the 10th Annual Sediment Management Annual Review Meeting.

Kendall D, R McMillan, and B Gardiner. 2012. Draft DMMP/SMS Clarification Paper: Bioassay Endpoint Refinements: Bivalve Larvae and Neanthes Growth Bioassay. Presented at the 24th Annual Sediment Management Annual Review Meeting for USACE Seattle, Washington.

Kendall, D, 1996. DMMP/SMS Clarification Paper: Neanthes 20-Day Growth Bioassay – Further Clarification on Negative Control Growth Standard, Initial Size and Feeding Protocol. Presented at the 9th Annual Sediment Management Annual Review Meeting for USACE Seattle, Washington.

Kendall, D, and Barton, J, 2004. DMMP/SMS Clarification Paper: Ammonia and Sulfide Guidance Relative to Neanthes Growth Bioassay. Presented at the 16th Annual Sediment Management Annual Review Meeting for USACE Seattle, Washington.

PSEP 1986. Recommended Protocols for Measuring Conventional Sediment Variables in Puget Sound. Puget Sound Water Quality Authority, Olympia, Washington.

PSEP. 1995. Puget Sound Protocols and Guidelines. Puget Sound Estuary Program. Puget Sound Water Quality Action Team, Olympia, Washington.

PSEP 1997. Recommended Guidelines for Sampling Marine Sediment, Water Column, and Tissue in Puget Sound. Puget Sound Estuary Program. Puget Sound Water Quality Action Team, Olympia, Washington.

United States Environmental Protection Agency and United States Army Corps of Engineers (USEPA/USACE). 1991. Evaluation of Dredged Material Proposed for Ocean Disposal: Testing Manual (Ocean Testing Manual). EPA 503/8-91/001. EPA Office of Water, Washington, DC.

USEPA/USACE. 1998. Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S: - Testing Manual. EPA 823-B-98-004. February 1998.

Appendix A

Data Sheets

Appendix A.1

Amphipod Test with *Eohaustorius estuaries*

NewFields

10-DAY SOLID PHASE TEST OBSERVATION DATA

CLIENT Integral Consulting Inc.	PROJECT WPAH	SPECIES *Eohaustorius estuarius*	NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	TEST START DATE 19-Jul-13	TEST END DATE 29-Jul-13	

N = Normal
#E = Emergence
#M = Mortality or Molts
G = Growth
(fungal, bacterial, or algal)
D = No Air Flow (DO?)
F = Floating on Surface
TC = Too Cloudy
S = on sed. surface

Initial # of Organisms: 20

			ENDPOINT DATA AND OBSERVATIONS											
			Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10		
			Date 7/20	Date 7/21	Date 7/22	Date 7/23	Date 7.24	Date 7/25	Date 7.26	Date 7/27	Date 7/28	Date 7/29		
Client/NewFields ID	Rep	Jar #	Tech. JL	Tech. JL	Tech. JL	Tech. MWB	Tech. BH	Tech. BG	Tech. BH	Tech. ~~H~~ JL	Tech. JL	Tech. CR	Number Alive	Number Dead Recovered (if any) / Comments
Control	1		N	N	N	N	N	N	1M	N	N	N	17	1
	2		1M			1M		1M	1M				19	
	3		N			N		N	N				20	
	4					↓			N				20	
	5						↓		N			↓	20	
CR-12	1					N	N		N			N	20	
	2					N	N	↓	G				19	
	3					G,1M	1M	1M	N				19	
	4					N	1M	1M	N				19	
	5		↓			N	N	N	G	↓		↓	19	
CARR-20	1		1F			1F	G	G	N	1F		N	18	1
	2		N			1E,1M	N	1M		N			19	
	3		1F			N	1F	N					19	
	4		N		↓	N	N	N	↓	↓	↓		19	
	5			↓	G	1F,G	N	1F	G	G	G	↓	18	
CR-02	1			1F,G	G	N	N	N	N	N	N	N	20	
	2		↓	N	N	N					↓		20	
	3				1F	1F		↓			1F		8	1
	4		G		N	N		1M			N		② ~~20~~ 18	
	5		N	↓	↓	↓	↓	N	↓	↓	↓	↓	20	

Surr 20

① one large polychaete 7/29/13
② WC CR 7/29
③ Enumerated organisms in Surr because rep 3 7/29/13

NewFields

10-DAY SOLID PHASE TEST OBSERVATION DATA

CLIENT Integral Consulting Inc.	PROJECT WPAH	SPECIES *Eohaustorius estuarius*	NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	TEST START DATE 19-Jul-13	TEST END DATE 29-Jul-13	

N = Normal
#E = Emergence
#M = Mortality or Molts
G = Growth
(fungal, bacterial, or algal)
D = No Air Flow (DO?)
F = Floating on Surface
TC = Too Cloudy

	Initial # of Organisms		ENDPOINT DATA AND OBSERVATIONS											
			Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Number Alive	Number Dead Recovered (if any) / Comments
	20		Date 7/20	Date 7/21	Date 7/22	Date 7/23	Date 7.24	Date 7/25	Date 7.26	Date 7/27	Date 7/28	Date 7/29		
Client/NewFields ID	Rep	Jar #	Tech. JL	Tech. JL	Tech. JL	Tech. MMB	Tech. BH	Tech. BA	Tech. BH	Tech. JL	Tech. JL	Tech.		
SD0001	1		N	N	N	N	N	N	N	N	N	N	20	
	2			G	G	1M	G	1M					18	
	3			N	G, 1M	1E, 1M	N	1M					18	
	4				G	G	G	G				↓	19	
	5		↓	↓	N	N	N	N	↓				18	1
SD0002	1		2F, G	G	1F, G	G	1E G	FG	N	↓	↓	N	16	
	2		3F, G	2F, G	1F, G	G	2F, G	FG	G	G	G		19	
	3		G	G	G	G, 1M	1F, 1E, G	1M G	1F	N	N		20	
	4		G	G	G	N	1M	1M	N			↓	20	
	5		5F, G	3F	G	1F	N	1FOS	1F				20	
SD0003	1		5F	1F	N	N	N	N	N			N	19	
	2		N	N					1F				18	
	3			2E, 6S①					N				18	
	4			N									20	
	5								↓			↓	19	
SD0004	1								N			N	19	
	2								1F				19	
	3			↓					N		↓		20	
	4			1F							2F		18	
	5		↓	N	↓	↓	↓	↓	↓	↓	N	↓	20	

① Aeration restored to chamber. JL 7/21/13.
[D.O. 7.7 mg/L pH 7.9
Temp. 14.5 °C Sal. 29 ppt]

FG lots of fungal growth

NewFields

10-DAY SOLID PHASE TEST OBSERVATION DATA

CLIENT	PROJECT	SPECIES	NEWFIELDS LABORATORY	PROTOCOL
Integral Consulting Inc.	WPAH	*Eohaustorius estuarius*	Port Gamble Bath 3	PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	TEST START DATE 19-Jul-13	TEST END DATE 29-Jul-13	

N = Normal
#E = Emergence
#M = Mortality or Molts
G = Growth
(fungal, bacterial, or algal)
D = No Air Flow (DO?)
F = Floating on Surface
TC = Too Cloudy
A- Avoidance

Initial # of Organisms: 20

ENDPOINT DATA AND OBSERVATIONS

Client/NewFields ID	Rep	Jar #	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Number Alive	Number Dead Recovered (if any) / Comments
	Date		7/20	7/21	7/22	7/23	7.24	7/25	7.26	7/27	7/28	7/29		
	Tech.		JL	JL	JL	MMB	BH	BG	BH	JL	JL	L		
SD0005	1		N	N	N	N	N	N	N	1F	N	N	20	
	2									N	↓	↓	20	
	3			↓							1F	1 A	20	
	4			1F							N	N	20	
	5		↓	N								↓	20	
SD0006	1		2F									N	20	
	2		N		↓								20	
	3		1F		4S, 1F				↓				19	
	4		2F		N				1M				17	
	5		N	↓		↓	↓		N			↓	20	
SD0007	1		2F	1F		N	1M		N			N	19	
	2		1F	2F		1M	N	↓	1F				18	
	3		N	1F		1E	6M	① 6M 1FOS	11M				14	
	4			N	↓	N	N	N	N				20	
	5		↓		1E	N	N					↓	19	
SD0008	1		N		N	N	N					N	20	
	2												20	
	3		↓										20	
	4		1F					↓					18	
	5		2F	↓	↓	↓	↓	2FOS	↓	↓	↓	↓	20	

① I accidentally buried a mort while checking if it was still alive

NewFields

10-DAY SOLID PHASE TEST OBSERVATION DATA

CLIENT Integral Consulting Inc.	PROJECT WPAH	SPECIES *Eohaustorius estuarius*	NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	TEST START DATE 19-Jul-13	TEST END DATE 29-Jul-13	

N = Normal
#E = Emergence
#M = Mortality or Molts
G = Growth
(fungal, bacterial, or algal)
D = No Air Flow (DO?)
F = Floating on Surface
TC = Too Cloudy
A - Avoidance

Initial # of Organisms: 20

ENDPOINT DATA AND OBSERVATIONS

Client/NewFields ID	Rep	Jar #	Day 1 Date 7/20 Tech. JL	Day 2 Date 7/21 Tech. JL	Day 3 Date 7/22 Tech. JL	Day 4 Date 7/23 Tech. MMB	Day 5 Date 7.24 Tech. BH	Day 6 Date 7/25 Tech. BG	Day 7 Date 7.26 Tech. BH	Day 8 Date 7/27 Tech. JL	Day 9 Date 7/28 Tech. JL	Day 10 Date 7/29 Tech.	Number Alive	Number Dead Recovered (if any) / Comments
SD0009	1		1F	N	N	N	1F, G	1FOS	N	N	N	N	20	
	2		1F	1F	G	N	N	N	N		↓	1F	19	
	3		1F	N	N	2F	N	N	1F		1F	1A	20	
	4		N	↓		N	G	G	N		N	N	20	
	5			3F		1F	N	2FOS	1F		1F	↓	20	
SD0010	1			1F		N	N	N	N		N	N	20	
	2		↓	N		↓	N	N					20	
	3		2F	1F			N	N					20	
	4		1F	1F		1F	1F						19	
	5		N	N		1F	N	↓				↓ ①W	20	
SD0011	1					1M	N	1FOS			↓	20 N	17	
	2					N	N	1FOS	↓		1F	19	20	
	3					1F	2F	N	1F		N	20	17	
	4					N	N		N			20	18	
	5					N	N		1F			↓	20	
SD0012	1					N	N		N			N 20 ①W	20	
	2								1F			20	19	
	3								N				19	1
	4							↓		↓	↓		20	
	5		↓	↓	↓	↓	↓	1FOS	↓	1M		↓	18	

① WC 7/29/13

10-DAY SOLID PHASE TEST OBSERVATION DATA

CLIENT Integral Consulting Inc.	PROJECT WPAH	SPECIES *Eohaustorius estuarius*	NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	TEST START DATE 19-Jul-13	TEST END DATE 29-Jul-13	

N = Normal
#E = Emergence
#M = Mortality or Molts
G = Growth
(fungal, bacterial, or algal)
D = No Air Flow (DO?)
F = Floating on Surface
TC = Too Cloudy

Client/NewFields ID	Rep	Jar #	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Number Alive	Number Dead Recovered (if any) / Comments
Initial # of Organisms: 20			Date 7/20	Date 7/21	Date 7/22	Date 7/23	Date 7.24	Date 7/25	Date 7.26	Date 7/27	Date 7/28	Date 7/29		
			Tech. JL	Tech. JL	Tech. JL	Tech. MMB	Tech. BH	Tech. BW	Tech. BH	Tech. JL	Tech. JL	Tech. ✓		
SD0013	1		N	N	N	N	N	N	1F	N	N	N	19	
	2								N				20	
	3								1F				20	
	4								N				19	
	5											1E	20	
SD0014	1						1F					N	19	
	2						N						20	
	3						N						20	
	4						1F		2F				19	1
	5						N		N				19	
SD0015	1						N					N	19	
	2												19	
	3												20	
	4						2F			1F			18	1
	5						N			N			19	
SD0017	1						N					N	19	
	2												20	
	3												19	
	4								1F				20	
	5						1F		N				20	

NewFields

10-DAY SOLID PHASE TEST OBSERVATION DATA

CLIENT Integral Consulting Inc.	PROJECT WPAH	SPECIES *Eohaustorius estuarius*	NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	TEST START DATE 19-Jul-13	TEST END DATE 29-Jul-13	

N = Normal
#E = Emergence
#M = Mortality or Molts
G = Growth
(fungal, bacterial, or algal)
D = No Air Flow (DO?)
F = Floating on Surface
TC = Too Cloudy

Initial # of Organisms: 20

ENDPOINT DATA AND OBSERVATIONS

Client/NewFields ID	Rep	Jar #	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Number Alive	Number Dead Recovered (if any) / Comments
		Date	7/20	7/21	7/22	7/23	7.24	7/25	7.26	7/27	7/28	7/29		
		Tech.	JL	JL	JL	MMB	BH	DD	BH	JL	JL	CR		
SD0018	1		N	N	N	N	N	N	N	N	N	N	17	
	2												20	
	3											↓	19	
	4											1E	20	
	5										↓	1E	19	
SD0019	1			↓					↓	↓		1E	19	
	2			1F					1F	3F	2F	N	19	
	3			N			↓		N	N	N		19	
	4						1F		1F				19	
	5						N		1m			↓	18	
SD0020	1		↓		↓		N	↓	N			② ~~17~~ N	20	
	2		2F		1F		N	1FOS				(19)	20	
	3		N		7S		1m	N					17	
	4		1F	↓	N		N						19	
	5		2F	5F	6S, 1E, 1F		N					↓	20	
SD0021	1		1F	1F	1F		1F					N	20	
	2		2F	N	N		N					↓	20	
	3		N		2m, 1E	↓	N	↓	↓	↓	↓	1E	18 ~~+2~~ ③	
	4		↓	↓	N	1E, 3M	1m	4m	1m, 1E	G	G	N	17 (1m)	
	5		1F	1F	① ~~2m, 1E~~ 1m	1M	1m	1m	1M	N	N	↓	19	

① Wrong Rep. JL 7/22/13.
② WC 7/29/13
③ WC 7/29/13

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	SPECIES *Eohaustorius estuarius*		NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	TEST START DATE 19-Jul-13	TIME 1340	TEST END DATE 29-Jul-13	TIME

Test Conditions				WATER QUALITY DATA DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0012	0	WQ	12	6	7.7	6	16.5	2	28	5	7.8	BG	7/19/13
SD0014	0	WQ	13	6	7.9	6	16.1	2	29	5	7.8	BG	7/19/13
CARR-20	0	WQ	15		8.0		16.0		28		8.0	BG	
SD0021	0	WQ	18		8.0		15.8		27		7.8	BG	
SD0006	0	WQ	22		7.9		15.8		28		7.8	BG	
SD0003	0	WQ	27		8.0		15.8		29		7.9	BG	
CR-02	0	WQ	29		8.1		15.8		28		7.9	BG	
SD0008	0	WQ	35		8.1		15.8		29		7.9	BG	
Control	0	WQ	47		8.1		15.8		28		7.9	BG	
SD0010	0	WQ	54		8.1		15.8		28		7.9	BG	
CR-12	0	WQ	55		8.1		15.7		28		7.9	BG	
SD0011	0	WQ	58		8.1		15.7		29		7.9	BG	
SD0004	0	WQ	79		8.0		15.9		28		7.9	BG	
SD0007	0	WQ	82		8.1		15.9		28		7.9	BG	
SD0005	0	WQ	88		8.1		15.8		28		7.9	BG	
SD0002	0	WQ	90		8.0		15.8		28		7.9	BG	
SD0001	0	WQ	99		8.0		15.8		28		7.9	BG	
SD0018	0	WQ	104		8.1		15.7		28		8.0	BG	
SD0017	0	WQ	108		8.1		15.7		28		8.0	BG	
SD0009	0	WQ	109		7.8		16.4		28		7.8	BG	

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	SPECIES *Eohaustorius estuarius*		NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	TEST START DATE 19-Jul-13	TIME	TEST END DATE 29-Jul-13	TIME

WATER QUALITY DATA

Test Conditions				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0020	0	WQ	121	6	8.1	6	15.9	2	29	5	7.9	bg	7/19/13
SD0013	0	WQ	135 ba ~~125~~	↓	8.1	↓	15.7	↓	29	↓	7.9	↓	↓
SD0019	0	WQ	131	↓	8.2	↓	15.7	↓	28	↓	7.9	↓	↓
SD0015	0	WQ	136	↓	8.2	↓	15.6	↓	28		7.9	↓	↓

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT	PROJECT	SPECIES		NEWFIELDS LABORATORY	PROTOCOL
Integral Consulting Inc.	WPAH	*Eohaustorius estuarius*		Port Gamble Bath 3	PSEP 1995
NEWFIELDS JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Gardiner	19-Jul-13		29-Jul-13	

Test Conditions				WATER QUALITY DATA									
				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0012	1	WQ	12	6	8.0	6	15.4	2	29	5	7.9	JL	7/20
SD0014	1	WQ	13		8.1		15.2		29		7.9		
CARR-20	1	WQ	15		8.0		15.3		28		7.9		
SD0021	1	WQ	18		8.0		15.2		29		7.8		
SD0006	1	WQ	22		8.1		15.2		29		7.9		
SD0003	1	WQ	27		7.9		15.3		28		7.9		
CR-02	1	WQ	29		8.6		15.2		28		7.9		
SD0008	1	WQ	35		7.9		15.3		29		7.9		
Control	1	WQ	47		8.1		15.1		28		8.0		
SD0010	1	WQ	54		8.2		15.0		29		8.0		
CR-12	1	WQ	55		8.1		15.5		28		8.0		
SD0011	1	WQ	58		8.0		15.3		29		7.9		
SD0004	1	WQ	79		7.6		15.8		29		7.7		
SD0007	1	WQ	82		8.0		15.2		29		7.9		
SD0005	1	WQ	88		8.1		15.6		28		8.0		
SD0002	1	WQ	90		8.0		15.3		28		7.9		
SD0001	1	WQ	99		8.1		15.2		28		7.9		
SD0018	1	WQ	104		8.0		15.3		29		7.9		
SD0017	1	WQ	108		7.9		15.4		29 ~~28~~ ①		7.9 ~~7.8~~ ①		
SD0009	1	WQ	109		① 7.7 ~~8.1~~		15.3 ~~14.9~~ ①		29		7.8 ~~7.9~~ ①		

① wc. JL 7/20/13.

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	SPECIES *Eohaustorius estuarius*	NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	TEST START DATE 19-Jul-13	TEST END DATE 29-Jul-13	TIME

TIME (test start):

			Test Conditions	WATER QUALITY DATA									
				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0020	1	WQ	121	6	8.1	6	15.0	2	29	5	7.9	JL	7/20/13
SD0013	1	WQ	135 ~~125~~	↓	8.1	↓	15.2	↓	28	↓	7.9	↓	↓
SD0019	1	WQ	131	↓	8.0	↓	15.0	↓	29	↓	7.9	↓	↓
SD0015	1	WQ	136	↓	8.0	↓	15.0	↓	28	↓	7.9		↓

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT	PROJECT	SPECIES		NEWFIELDS LABORATORY	PROTOCOL
Integral Consulting Inc.	WPAH	*Eohaustorius estuarius*		Port Gamble Bath 3	PSEP 1995
NEWFIELDS JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Gardiner	19-Jul-13		29-Jul-13	

Test Conditions				WATER QUALITY DATA									
				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0012	2	WQ	12	6	8.1	6	14.9	2	29	5	7.9	JL	7/21/13
SD0014	2	WQ	13		8.2		14.7		29		7.9		
CARR-20	2	WQ	15		8.0		14.7		28		8.0		
SD0021	2	WQ	18		8.0		14.9		29		7.8		
SD0006	2	WQ	22		8.2		14.6		29		7.9		
SD0003	2	WQ	27		7.9		14.9		29		7.8		
CR-02	2	WQ	29		8.1		14.6		28		7.9		
SD0008	2	WQ	35		8.1		14.7		29		7.9		
Control	2	WQ	47		8.2		14.7		28		8.0		
SD0010	2	WQ	54		8.3		14.6		29		8.0		
CR-12	2	WQ	55		8.0		14.8		28		8.0		
SD0011	2	WQ	58		8.1		14.8		29		7.9		
SD0004	2	WQ	79		7.8		15.0		28		7.8		
SD0007	2	WQ	82		7.9		14.9		29		7.9		
SD0005	2	WQ	88		8.1		14.9		29		7.9		
SD0002	2	WQ	90		8.0		15.4		28		8.0		
SD0001	2	WQ	99		7.6		15.7		28		7.9		
SD0018	2	WQ	104		8.2		14.6		28		7.9		
SD0017	2	WQ	108		8.1		14.9		29		7.9		
SD0009	2	WQ	109		8.0		14.8		29		7.8		

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	SPECIES *Eohaustorius estuarius*		NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	TEST START DATE 19-Jul-13	TIME	TEST END DATE 29-Jul-13	TIME

Test Conditions				WATER QUALITY DATA DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0020	2	WQ	121	6	8.1	6	14.3	2	29	5	7.8	JL	7/21/13
SD0013	2	WQ	135 ~~125~~	|	8.1 ~~8.0~~ ①	|	14.5 ~~14.3~~ ①	|	29	|	7.9 ~~7.8~~ ①	|	|
SD0019	2	WQ	131 ~~131~~	|	8.0	|	14.3	|	29	|	7.8	|	|
SD0015	2	WQ	136	↓	8.1	↓	14.1	↓	28	↓	7.8	↓	↓

① WL. JL 7/21/13.

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT	PROJECT	SPECIES		NEWFIELDS LABORATORY	PROTOCOL
Integral Consulting Inc.	WPAH	*Eohaustorius estuarius*		Port Gamble Bath 3	PSEP 1995
NEWFIELDS JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Gardiner	19-Jul-13		29-Jul-13	

Test Conditions				WATER QUALITY DATA									
				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0012	3	WQ	12	6	8.0	6	14.9	2	28	5	7.9	bG	7/22/13
SD0014	3	WQ	13		8.1		14.6		28		7.9		
CARR-20	3	WQ	15		8.2		14.4		28		8.0		
SD0021	3	WQ	18		8.2		14.2		28		7.9		
SD0006	3	WQ	22		8.2		14.2		28		8.0		
SD0003	3	WQ	27		8.1		14.2		28		7.8		
CR-02	3	WQ	29		8.2		14.2		28		8.0		
SD0008	3	WQ	35		8.2		14.2		28		8.0		
Control	3	WQ	47		8.3		14.1		28		8.0		
SD0010	3	WQ	54		8.4		~~14.9~~ E 14.1		28		8.1		
CR-12	3	WQ	55		8.3		14.2		28		8.1		
SD0011	3	WQ	58		8.3		14.2		28		8.0		
SD0004	3	WQ	79		7.9		14.4		28		7.9		
SD0007	3	WQ	82		8.1		14.4		28		8.1		
SD0005	3	WQ	88		8.2		14.3		28		8.0		
SD0002	3	WQ	90		8.2		14.5		28		8.2		
SD0001	3	WQ	99		8.2		14.5		28		8.1		
SD0018	3	WQ	104		8.3		14.3		28		8.1		
SD0017	3	WQ	108		8.3		14.3		28		8.1		
SD0009	3	WQ	109		8.1		14.3		28		8.0		

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	SPECIES *Eohaustorius estuarius*		NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	TEST START DATE 19-Jul-13	TIME	TEST END DATE 29-Jul-13	TIME

Test Conditions				WATER QUALITY DATA									
				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0020	3	WQ	121	6	8.2	6	14.2	2	28	5	8.0	BG	7/22/13
SD0013	3	WQ	125	↓	8.3	↓	14.1	↓	28	↓	8.1	↓	↓
SD0019	3	WQ	131	↓	8.2	↓	14.0	↓	28	↓	8.1	↓	↓
SD0015	3	WQ	136	↓	8.2	↓	14.0	↓	28	↓	8.1	↓	↓

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH		SPECIES *Eohaustorius estuarius*		NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner		TEST START DATE 19-Jul-13	TIME	TEST END DATE 29-Jul-13	TIME

				WATER QUALITY DATA									
Test Conditions				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0012	4	WQ	12	6	7.9	6	15.0	2	28	5	7.9	BG	7/23/13
SD0014	4	WQ	13		8.0		14.9		28		7.9		
CARR-20	4	WQ	15		8.0		14.7		28		8.0		
SD0021	4	WQ	18		8.0		14.6		28		7.8		
SD0006	4	WQ	22		8.1		14.6		28		8.0		
SD0003	4	WQ	27		8.0		14.6		28		7.8		
CR-02	4	WQ	29		8.1		14.6		28		7.9		
SD0008	4	WQ	35		8.1		14.6		28		7.9		
Control	4	WQ	47		8.2		14.6		28		8.0		
SD0010	4	WQ	54		8.3		14.6		29		8.0		
CR-12	4	WQ	55		8.2		14.7		28		8.0		
SD0011	4	WQ	58		8.2		14.7		28		8.0		
SD0004	4	WQ	79		7.9		14.9		28		7.8		
SD0007	4	WQ	82		8.0		14.9		28		8.0		
SD0005	4	WQ	88		8.1		14.8		28		8.0		
SD0002	4	WQ	90		8.1		15.0		28		8.0		
SD0001	4	WQ	99		8.0		15.0		28		7.8		
SD0018	4	WQ	104		8.2		14.8		28		7.9		
SD0017	4	WQ	108		8.2		14.8		28		7.9		
SD0009	4	WQ	109		8.1		14.8		28		7.9		

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner

SPECIES *Eohaustorius estuarius*		NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
TEST START DATE 19-Jul-13	TIME	TEST END DATE 29-Jul-13	TIME

Test Conditions				WATER QUALITY DATA									
				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0020	4	WQ	121	6	8.2	6	14.6	2	28	5	7.9	BG	7/23/13
SD0013	4	WQ	125	↓	8.2	↓	14.6	↓	28	↓	7.9	↓	↓
SD0019	4	WQ	131		8.2		14.5		28		7.9		
SD0015	4	WQ	136		8.2		14.5		28		7.9		

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	SPECIES *Eohaustorius estuarius*		NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	TEST START DATE 19-Jul-13	TIME	TEST END DATE 29-Jul-13	TIME

Test Conditions				WATER QUALITY DATA									
				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0012	5	WQ	12	6	8.2	6	14.9	2	28	5	8.1	BH	7.24.13
SD0014	5	WQ	13		8.2		14.8		28		7.9		
CARR-20	5	WQ	15		8.3		14.8		28		8.1		
SD0021	5	WQ	18		8.2		14.8		27		8.0		
SD0006	5	WQ	22		8.2		14.8		28		8.1		
SD0003	5	WQ	27		8.2		① ~~15~~ 14.8		28		① ~~8.1~~ 7.9		
CR-02	5	WQ	29		8.2		14.8		28		8.0		
SD0008	5	WQ	35		8.2		14.9		28		8.0		
Control	5	WQ	47		8.3		14.8		28		8.0		
SD0010	5	WQ	54		8.3		14.9		28		8.0		
CR-12	5	WQ	55		8.3		14.9		28		8.1		
SD0011	5	WQ	58		8.3		14.9		28		8.0		
SD0004	5	WQ	79		7.8		15.3		28		7.9		
SD0007	5	WQ	82		8.0		15.2		28		8.2		
SD0005	5	WQ	88		8.1		15.1		28		8.1		
SD0002	5	WQ	90		8.2		15.3		28		8.0		
SD0001	5	WQ	99		7.9		15.2		28		7.8		
SD0018	5	WQ	104		8.1		15.1		28		7.9		
SD0017	5	WQ	108		8.2		15.0		28		8.0		
SD0009	5	WQ	109		8.2		15.1		28		8.0		

① IE 7.24.13 BH

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner

SPECIES *Eohaustorius estuarius*		NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
TEST START DATE 19-Jul-13	TIME	TEST END DATE 29-Jul-13	TIME

Test Conditions				WATER QUALITY DATA									
				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0020	5	WQ	121	6	8.2	6	14.9	2	28	5	7.9	BH	7.24.13
SD0013	5	WQ	125	↓	8.2	↓	14.7	↓	28	↓	7.9	↓	↓
SD0019	5	WQ	131	↓	8.2	↓	14.9	↓	28	↓	8.1	↓	↓
SD0015	5	WQ	136	↓	8.2	↓	14.7	↓	28	↓	7.9	↓	↓

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	SPECIES *Eohaustorius estuarius*		NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	TEST START DATE 19-Jul-13	TIME	TEST END DATE 29-Jul-13	TIME

Test Conditions				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0012	6	WQ	12	6	8.0	6	15.3	2	28	5	8.0	BG	7/25/13
SD0014	6	WQ	13		8.1		15.0		28		7.8		
CARR-20	6	WQ	15		8.2		14.9		28		7.9		
SD0021	6	WQ	18		8.2		14.8		28		7.8		
SD0006	6	WQ	22		8.2		~~15~~ RE 14.8		28		8.0		
SD0003	6	WQ	27		8.1		14.8		28		7.8		
CR-02	6	WQ	29		8.2		14.7		28		7.8		
SD0008	6	WQ	35		8.2		14.7		28		7.9		
Control	6	WQ	47		8.3		14.7		28		7.9		
SD0010	6	WQ	54		8.4		14.7		~~28~~ RE 29		7.9		
CR-12	6	WQ	55		8.3		14.8		28		8.0		
SD0011	6	WQ	58		8.3		14.7		28		7.9		
SD0004	6	WQ	79		8.1		14.9		28		7.9		
SD0007	6	WQ	82		8.1		14.9		28		8.1		
SD0005	6	WQ	88		8.2		14.9		28		8.0		
SD0002	6	WQ	90		8.0		14.8		28		7.8		
SD0001	6	WQ	99		7.6		14.8		28		7.6		
SD0018	6	WQ	104		8.2		14.8		28		7.8		
SD0017	6	WQ	108		8.2		14.8		28		8.0		
SD0009	6	WQ	109		8.3		14.8		28		8.0		

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT	PROJECT	SPECIES		NEWFIELDS LABORATORY	PROTOCOL
Integral Consulting Inc.	WPAH	*Eohaustorius estuarius*		Port Gamble Bath 3	PSEP 1995
NEWFIELDS JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Gardiner	19-Jul-13		29-Jul-13	

			Test Conditions	WATER QUALITY DATA									
				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0020	6	WQ	121	6	8.3	6	14.7	2	28	5	~~28~~ WE 7.8	BG	7/25/13
SD0013	6	WQ	125	↓	8.1	↓	15.0	↓	28	↓	7.8	↓	↓
SD0019	6	WQ	131	↓	8.1	↓	14.8	↓	28	↓	8.1	↓	↓
SD0015	6	WQ	136	↓	8.2	↓	14.8	↓	28	↓	7.8	↓	↓

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	SPECIES *Eohaustorius estuarius*		NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	TEST START DATE 19-Jul-13	TIME	TEST END DATE 29-Jul-13	TIME

Test Conditions				WATER QUALITY DATA									
				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0012	7	WQ	12	6	8.2	6	14.8	2	28	5	8.3	BH	7.26.13
SD0014	7	WQ	13		8.4		14.8		28		7.9		
CARR-20	7	WQ	15		8.4		14.8		28		8.1		
SD0021	7	WQ	18		8.4		14.8		28		8.0		
SD0006	7	WQ	22		8.4		14.8		28		8.2		
SD0003	7	WQ	27		8.3		14.9		28		7.9		
CR-02	7	WQ	29		8.3		14.9		28		~~7~~ ① 8.0		
SD0008	7	WQ	35		8.3		14.9		28		8.2		
Control	7	WQ	47		8.4		14.9		28		8.0		
SD0010	7	WQ	54		8.5		14.9		29		8.0		
CR-12	7	WQ	55		8.4		15.0		28		8.2		
SD0011	7	WQ	58		8.4		14.9		28		8.0		
SD0004	7	WQ	79		8.0		15.6		28		8.0		
SD0007	7	WQ	82		8.1		15.3		28		8.3		
SD0005	7	WQ	88		8.2		15.2		28		8.0		
SD0002	7	WQ	90		8.2		15.1		28		8.0		
SD0001	7	WQ	99		8.1		15.1		28		7.8		
SD0018	7	WQ	104		8.3		15.1		28		7.9		
SD0017	7	WQ	108		8.3		15.0		28		8.1		
SD0009	7	WQ	109		8.4		15.0		28		8.1		

① rR 7.26.13 BH

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner

SPECIES *Eohaustorius estuarius*		NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
TEST START DATE 19-Jul-13	TIME	TEST END DATE 29-Jul-13	TIME

Test Conditions				WATER QUALITY DATA									
				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0020	7	WQ	121	6	8.4	6	14.9	2	29	5	7.9	BH	7.26.13
SD0013	7	WQ	125	↓	8.3	↓	14.8	↓	28	↓	7.8	↓	↓
SD0019	7	WQ	131	↓	8.3	↓	14.7	↓	28	↓	8.2	↓	↓
SD0015	7	WQ	136	↓	8.3	↓	14.7	↓	28	↓	~~8~~ ① 7.8	↓	↓

① MR 7.26.13 BH

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT	PROJECT
Integral Consulting Inc.	WPAH
NEWFIELDS JOB NUMBER	PROJECT MANAGER
860.0074.000	B. Gardiner

SPECIES		NEWFIELDS LABORATORY	PROTOCOL
Eohaustorius estuarius		Port Gamble Bath 3	PSEP 1995
TEST START DATE	TIME	TEST END DATE	TIME
19-Jul-13		29-Jul-13	

Test Conditions				WATER QUALITY DATA									
				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0012	8	WQ	12	6	7.8	6	16.0	2	28	5	85		7/27
SD0014	8	WQ	13	6	7.9	6	15.2	2	28	5	8.1		7/27
CARR-20	8	WQ	15	6	7.3	6	15.1	2	28	5	8.3		7/27
SD0021	8	WQ	18	6	8.1	6	15.2	2	28	5	8.2		7/27
SD0006	8	WQ	22	6	8.1	6	15.2	2	28	5	8.3		7/27
SD0003	8	WQ	27	6	8.0	6	15.3	2	28	5	8.1		7/27
CR-02	8	WQ	29	6	8.0	6	15.2	2	28	5	8.1		7/27
SD0008	8	WQ	35	6	8.0	6	15.5	2	28	5	8.5		7/27
Control	8	WQ	47	6	8.1	6	15.5	2	28	5	8.1		7/27
SD0010	8	WQ	54	6	8.2	6	15.3	2	29	5	8.1		7/27
CR-12	8	WQ	55	6	8.2	6	15.2	2	28	5	8.4		7/27
SD0011	8	WQ	58	6	8.2	6	15.2	2	28	5	8.1		7/27
SD0004	8	WQ	79	6	7.8	6	15.7	2	28	5	8.3		7/27
SD0007	8	WQ	82	6	8.0	6	15.7	2	28	5	8.5		7/27
SD0005	8	WQ	88	6	7.9	6	15.6	2	28	5	8.2		7/27
SD0002	8	WQ	90	6	7.9	6	15.7	2	28	5	8.2		7/27
SD0001	8	WQ	99	6	7.8	6	15.7	2	28	5	8.0		7/27
SD0018	8	WQ	104	6	8.1	6	15.3	2	28	5	8.0		7/27
SD0017	8	WQ	108	6	8.1	6	15.6	2	28	5	8.3		7/27
SD0009	8	WQ	109	6	8.0	6	15.4	2	28	5	8.3		7/27

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner

SPECIES *Eohaustorius estuarius*		NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
TEST START DATE 19-Jul-13	TIME	TEST END DATE 29-Jul-13	TIME

Test Conditions				WATER QUALITY DATA									
				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0020	8	WQ	121	6	9.1	6	15.2	① ~~6~~ 2	28	5	9.0		7/27
SD0013	8	WQ	125	6	9.1	6	15.3	2	28	5	8.0		7/27
SD0019	8	WQ	131	6	8.0	6	15.3	2	28	5	8.5		7/27
SD0015	8	WQ	136	6	8.1	6	15.2	2	28	5	8.0		7/27

① WL 7/27

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	SPECIES *Eohaustorius estuarius*		NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	TEST START DATE 19-Jul-13	TIME	TEST END DATE 29-Jul-13	TIME

Test Conditions				WATER QUALITY DATA									
				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0012	9	WQ	12	6	8.1	6	14.7	2	28	5	8.6	JL	7/28
SD0014	9	WQ	13		8.1		14.9		28		8.1		
CARR-20	9	WQ	15		8.0		14.9		28		8.3		
SD0021	9	WQ	18		8.0		14.8		28		8.2		
SD0006	9	WQ	22		8.2		14.8		28		8.3		
SD0003	9	WQ	27		7.8		15.0		28		8.2		
CR-02	9	WQ	29		8.1		14.9		28		8.1		
SD0008	9	WQ	35		7.9		15.1		28		8.6		
Control	9	WQ	47		8.1		14.8		28		8.1		
SD0010	9	WQ	54		8.1		15.0		29		8.1		
CR-12	9	WQ	55		8.0		15.1		28		8.4		
SD0011	9	WQ	58		8.0		15.1		28		8.1		
SD0004	9	WQ	79		7.7		15.2		28		8.3		
SD0007	9	WQ	82		7.8		15.3		28		8.4		
SD0005	9	WQ	88		8.0		15.1		28		8.2		
SD0002	9	WQ	90		7.9		15.2		28		8.1		
SD0001	9	WQ	99		7.8		15.2		28		8.0		
SD0018	9	WQ	104		8.1		15.0		28		8.0		
SD0017	9	WQ	108		8.0		15.1		28		8.3		
SD0009	9	WQ	109		8.0		15.0		28		8.3		

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner

SPECIES *Eohaustorius estuarius*		NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
TEST START DATE 19-Jul-13	TIME	TEST END DATE 29-Jul-13	TIME

Test Conditions				WATER QUALITY DATA DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0020	9	WQ	121	6	8.0	6	14.9	2	29	5	8.1	JL	7/28
SD0013	9	WQ	125	↓	8.0	↓	15.0	↓	28	↓	8.1	↓	↓
SD0019	9	WQ	131	↓	7.9	↓	14.9	↓	28	↓	8.5	↓	↓
SD0015	9	WQ	136	↓	7.9	↓	15.0	↓	28	↓	8.0	↓	↓

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	SPECIES *Eohaustorius estuarius*		NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	TEST START DATE 19-Jul-13	TIME	TEST END DATE 29-Jul-13	TIME

Test Conditions				WATER QUALITY DATA									
				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0012	10	WQ	12	6	7.7	6	15.9	2	28	5	8.4	BG	7/29/13
SD0014	10	WQ	13		7.8		15.8		28		8.0		
CARR-20	10	WQ	15		7.9		15.7		28		8.2		
SD0021	10	WQ	18		7.9		15.7		28		8.2		
SD0006	10	WQ	22		8.0		15.7		28		8.2		
SD0003	10	WQ	27		7.9		15.6		28		8.2		
CR-02	10	WQ	29		8.0		15.6		28		8.1		
SD0008	10	WQ	35		8.0		15.6		28		8.5		
Control	10	WQ	47		8.1		15.6		28		8.0		
SD0010	10	WQ	54		8.1		15.6		28		8.3		
CR-12	10	WQ	55		8.1		15.6		28		8.0		
SD0011	10	WQ	58		8.0		15.7		28		8.0		
SD0004	10	WQ	79		7.9		15.7		28		8.2		
SD0007	10	WQ	82		7.9		15.7		28		8.4		
SD0005	10	WQ	88		8.0		15.7		28		8.1		
SD0002	10	WQ	90		8.0		15.6		28		8.1		
SD0001	10	WQ	99		8.0		15.6		28		7.9		
SD0018	10	WQ	104		8.0		15.6		28		8.0		
SD0017	10	WQ	108		8.1		15.6		28		8.2		
SD0009	10	WQ	109		8.1		15.6		28		8.3		

NewFields

10 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATA SHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner

SPECIES *Eohaustorius estuarius*		NEWFIELDS LABORATORY Port Gamble Bath 3	PROTOCOL PSEP 1995
TEST START DATE 19-Jul-13	TIME	TEST END DATE 29-Jul-13	TIME

Test Conditions				WATER QUALITY DATA									
				DO (mg/L) >4.6 mg/L		Temperature (°C) 15 ± 1		Salinity (ppt) 28 ± 2		pH 7 - 9		Tech	Date
Client/NewFields ID	Day	Rep	Jar#	meter	mg/L	meter	deg C	meter	ppt	meter	unit		
SD0020	10	WQ	121	6	8.1	6	15.6	2	28	5	8.1	DG	7/29/~~30~~ 13 GG
SD0013	10	WQ	125	↓	8.1	↓	15.6	↓	28	↓	8.0	↓	↓
SD0019	10	WQ	131	↓	8.0	↓	15.6	↓	28	↓	8.4	↓	↓
SD0015	10	WQ	136	↓	8.1	↓	15.5	↓	28	↓	8.0	↓	↓

NewFields

Ammonia and Sulfide Analysis Record

Page 1 of 1

Client/Project: Integral | Port Angeles	**Organism:** EoH	**Test Duration (days):** 10

~~PRETEST~~ / [✓ INITIAL] / FINAL / OTHER (circle one) **DAY of TEST:** 0

[✓ OVERLYING (OV)] / POREWATER (PW) (circle one) / Comments:

Calibration Standards Temperature		
Date:	**Temperature:**	Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
7/19/13	23.9	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (mg/L)	Multi-plier	Calc-ulated Sulf. (mg/L)
Control	Surr.	7/19/13 BG	0.6231	23.3	7/19/13 BG	N			10	0.015		
CR-12			0.~~0~~ 0.421							0.027		
CARR-20			1.05							0.026		
CR-02			0.717							0.035		
SD0001			0.753							0.102		
SD0002			0.987							0.041		
SD0003			0.576							0.060		
SD0004			0.198							0.077		
SD0005			0.185							0.046		
SD0006			0.142							0.037		
SD0007			0.475							0.063		
SD0008			0.136							0.079		
SD0009			0.0577							0.066		
SD0010			0.151							0.067		
SD0011			0.140							0.064		
SD0012			0.111							0.037		
SD0013			0.0547							0.032		
SD0014			0.117							0.044		
SD0015			0.163							0.051		
SD0017			0.242							0.048		
SD0018			0.238							0.046		
SD0019			0.0864							0.023		
SD0020			0.112							0.079		
SD0021			0.175							0.058		

Ammonia and Sulfide Analysis Record

Page 1 of 1

Client/Project: Integral / Port Angeles	**Organism:** Eoh	**Test Duration (days):**

PRETEST / [✓ INITIAL] / ~~FINAL / OTHER~~ (circle one) DAY of TEST: 0

OVERLYING (OV) / [✓ POREWATER (PW)] (circle one) / Comments:

Calibration Standards Temperature		
Date:	**Temperature:**	Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
	24	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (mg/L)	Multi-plier	Calc-ulated Sulf. (mg/L)
Control		7/19 BG	0.525	24	7/19 BG	N	7.6	27	– ~~10~~	NA ~~0.051~~	—	
CR-12			8.05				7.9	30	–	N/A	—	
CARR-20			18.2				7.9	30	–	N/A	—	
CR-02			9.48				7.8	30	10	0.051	—	
SD0001			4.23				7.6	31	1	0.284	10	
SD0002			6.67				7.6	31	2	0.118	5	
SD0003			4.94				7.5	32	2	0.108	5	
SD0004			2.14				7.6	32	2	0.031	5	
SD0005			1.5				7.6	32	2	0.044	5	
SD0006			1.61				7.6	32	2	0.050	5	
SD0007			4.14				7.6	32	2	0.038	5	
SD0008			2.18				7.7	32	2	0.023	5	
SD0009			0.543				7.6	32	2	0.028	5	
SD0010			1.24				7.5	33	2	0.030	5	
SD0011			1.07				7.6	33	2	0.037	5	
SD0012			1.07				7.5	33	2	0.033	5	
SD0013			0.808				7.6	32	2	0.036	5	
SD0014			0.808				7.5	33	10	0.049	—	
SD0015			1.32				7.4	33	10	0.084	—	
SD0017			1.62				7.6	33	10	0.065	—	
SD0018			1.85				7.5	33	10	0.104	—	
SD0019			0.677				7.6	32	5	0.085	2	
SD0020			1.16				7.4	33	2	0.085	5	
SD0021			1.80				7.4	33	5	0.069	2	

NewFields Ammonia and Sulfide Analysis Record

Page 1 of 1

Client/Project: Integral / Port Angles	**Organism:** Eoh	**Test Duration (days):**

PRETEST / INITIAL / FINAL / [✓ OTHER] (circle one) DAY of TEST: 5

[✓ OVERLYING (OV)] / POREWATER (PW) (circle one) / Comments:

Calibration Standards Temperature		
Date: 7124113	**Temperature:** 23.5	Sample temperature should be within ±1°C of standards temperature at time and date of analysis.

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (mg/L)	Multi-plier	Calc-ulated Sulf. (mg/L)
Control	surr	7124 Hz	0.0887	22.5	7124 Hz	N						
CR-12			2.28									
CARR-20			3.49									
CR-02			0.628									
SD0001			2.18									
SD0002			3.43									
SD0003			2.81									
SD0004			0.680									
SD0005			0.916									
SD0006			0.957									
SD0007			2.23									
SD0008			1.50									
SD0009			0.436									
SD0010			0.546									
SD0011			0.335									
SD0012			0.296									
SD0013			0.152									
SD0014			0.160									
SD0015			0.117									
SD0017			0.174									
SD0018			0.234									
SD0019			0.158									
SD0020			0.553									
SD0021			0.402									

NewFields

Ammonia and Sulfide Analysis Record

Page 1 of 1

Client/Project: Integral / Port Angeles	**Organism:** EOh	**Test Duration (days):**

PRETEST / INITIAL / FINAL / [✓ OTHER] (circle one) **DAY of TEST:** 5

OVERLYING (OV) / [✓ POREWATER] (PW) (circle one) / Comments:

Calibration Standards Temperature		
Date: 7/24	**Temperature:**	Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
	23.5	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (mg/L)	Multi-plier	Calc-ulated Sulf. (mg/L)
Control	surf	7/24 [illegible]	0.340	22.7	7/24 [illegible]	N	7.9	28				
CR-12			3.95				8.0	28				
CARR-20			7.20				8.2	28				
CR-02			6.18				8.0	28				
SD0001			2.93				7.9	29				
SD0002			5.13				7.8	29				
SD0003			4.92				7.8	28				
SD0004			1.25				7.7	29				
SD0005			1.20				7.7	29				
SD0006			1.31				7.7	28				
SD0007			2.87				7.8	28				
SD0008			2.36				7.8	28				
SD0009			0.417				7.8	29				
SD0010			0.504				7.7	29				
SD0011			0.332				7.7	29				
SD0012			0.415				7.8	28				
SD0013			0.254				7.7	28				
SD0014			0.309				7.7	28				
SD0015			0.312				7.7	29				
SD0017			0.174				7.8	29				
SD0018			0.507				7.8	27				
SD0019			0.406				7.8	24				
SD0020			0.846				7.5	29				
SD0021			1.21				7.6	27				

Ammonia and Sulfide Analysis Record

Page 1 of 2

Client/Project: Integral / Port Angeles	**Organism:** Eohs	**Test Duration (days):** 10

PRETEST / INITIAL / ~~FINAL~~ / [✓ OTHER] (circle one) **DAY of TEST:** 5

[✓ OVERLYING (OV)] / ~~POREWATER~~ (PW) IE, MMB (circle one) / Comments:

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date: NA	**Temperature:** NA	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (mg/L)	Multi-plier	Calc-ulated Sulf. (mg/L)
Control	Swsn.	7/24/13 HE			7/30/13 MMB	y			10	0.003		
CR-12										0.013		
CARR-20										0.010		
CR-02										0.014		
SD0001										0.024		
SD0002										0.010		
SD0003										0.005		
SD0004										0.005		
SD0005										0.001		
SD0006										0.011		
SD0007										0.023		
SD0008										0.011		
SD0009										0.014		
SD0010										0.023		
SD0011										0.001		
SD0012										0.003		
SD0013										0.008		
SD0014										0.010		
SD0015										0.022		
SD0017										0.002		
SD0018										0.005		
SD0019										0.003		
SD0020										0.611		
SD0021										0.001		

NewFields

Ammonia and Sulfide Analysis Record

Page 1 of 1

Client/Project: Integral/Port Angeles
Organism: Eohs
Test Duration (days): 10

PRETEST / INITIAL / ~~FINAL~~ / [✓ OTHER] (circle one)
DAY of TEST: 5

OVERLYING (OV) / [✓ POREWATER (PW)] (circle one) / Comments:

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date: NA	**Temperature:** NA	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (mg/L)	Multi-plier	Calc-ulated Sulf. (mg/L)
Control	Swd.	7/24/13 HE			7/30/13 MMB	Y			2.5	0.010	4	0.040
CR-12									5	0.012	2	0.024
CARR-20									2.5	0.013	4	0.052
CR-02									10	0.015	1	
SD0001										0.006		
SD0002										0.016		
SD0003										0.009		
SD0004										0.017		
SD0005										0.026		
SD0006										0.005		
SD0007										0.004		
SD0008										0.005		
SD0009										0.013		
SD0010										0.001		
SD0011										0.012		
SD0012										0.019		
SD0013										0.015		
SD0014										0.015		
SD0015										0.001		
SD0017										0.004		
SD0018										0.018		
SD0019									2	0.079	5	0.158
SD0020									10	0.016	1	
SD0021									10	0.015	1	

NewFields **Ammonia and Sulfid Analysis Record**

Client/Project: Integral / WPAH
Organism: Ehs.
Test Duration (days): 10

PRETEST / **INITIAL** / [✓ **FINAL**] / **OTHER** (circle one)
DAY of TEST: 10

[✓ **OVERLYING (OV)**] / ~~**POREWATER (PW)**~~ (circle one) / **Comments:**

Calibration Standards Temperature		
Date: 7/29/13	**Temperature:** 22.6	Sample temperature should be within ±1°C of standards temperature at time and date of analysis.

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (mg/L)	Multi-plier	Calc-ulated Sulf. (mg/L)
OV. Control	Surv.	7/29/13 BG	0.0910	22.4	7/29/13 JC	N	NA	NA	10	0.004	NA	NA
CK.02			0.0952							0.033		
CARR.20			① ~~1.50~~ 5.65							0.008		
CK.12			① ~~5.65~~ 1.50							0.007		
1			5.06							0.002		
2			6.58							0.013		
3			0.408							0.007		
4			0.439							0.014		
5			0.183							0.031		
6			0.0407							0.030		
7			1.20							0.030		
8			0.424							0.024		
9			0.0229							0.013		
10			0.0173							0.028		
11			0.0113							0.017		
12			0.00							0.049		
13			0.00							0.006		
14			0.00							0.015		
15			0.00							0.010		
17			0.00							0.023		
18			0.00							0.025		
19 ↓	↓	↓	0.00	↓	↓	↓	↓	↓	↓	0.029	↓	↓

① WE JC 7/29/13

Ammonia and Sulfide Analysis Record

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (mg/L)	Multi-plier	Calc-ulated Sulf. (mg/L)
OV. 20	Surv.	7/29/13 BG	0.185	22.4	7/29/13 JL	N	NA	NA	10	0.018	NA	NA
↓ 21	↓	↓	0.0010	↓	↓		↓	↓	↓	0.015	↓	↓
pw. Control	Surv.		0.195	23.5			7.3	27				
CR·02			①									
CARR·20			12.1	23.5			7.6	28				
CR·12			2.85				7.1	27				
1			5.60				7.5	28	2	0.044	5	0.220
2			6.53				7.5	28		0.044		0.220
3			1.68				7.1	29		0.061		0.305
4			0.795				7.2	28		0.056		0.280
5			0.255				7.4	29		0.047		0.235
6			0.100				7.5	29		0.033		0.165
7			0.876				7.4	28		0.046		0.230
8			0.579				7.2	28		0.025		0.125
9			0.154				7.0	28		0.026		0.130
10			0.132				7.1	29		0.033		0.165
11			0.0622				7.3	28		0.041		0.205
12			0.0341				7.2	29		0.035		0.175
13			0.0241	↓			7.5	28		0.032		0.160
14			0.00	22.5			7.1	28		0.040		0.200
15			0.00				7.3	28		0.066		0.330
17			0.00				7.1	29		0.040		0.200
18			0.00				7.3	28		0.083		0.415
19			0.0883				6.9	27		0.053		0.265
20			0.120	↓			6.9	28		0.081		0.405
↓ 21	↓		0.00	↓		↓	7.0	28	↓	0.147	↓	0.735

①Insufficient porewater for analysis

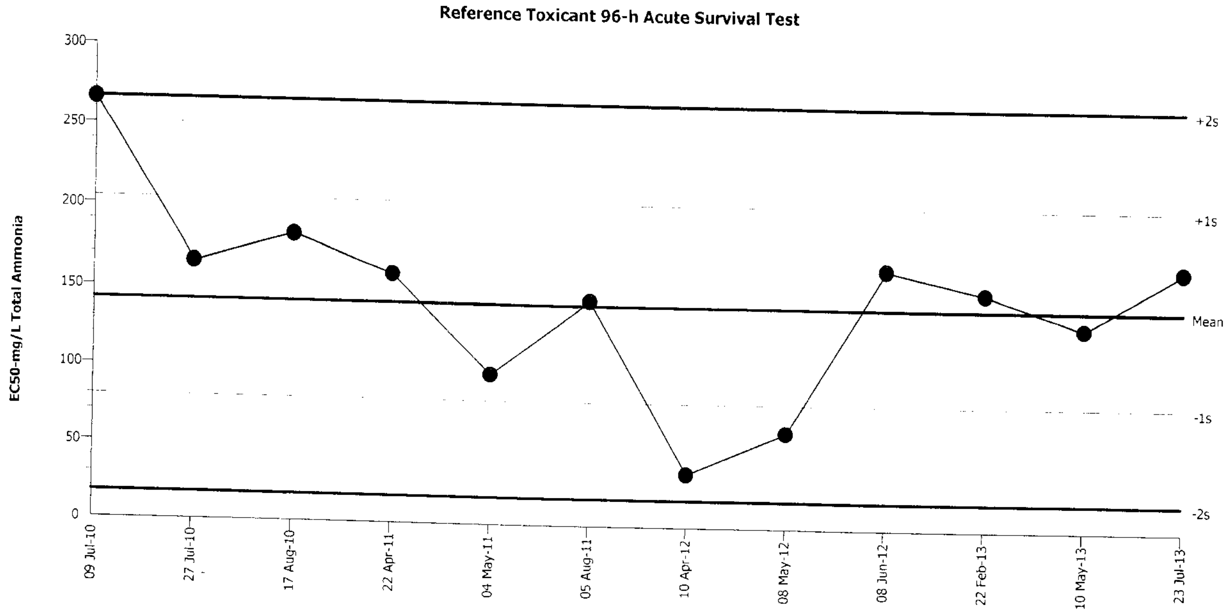
CETIS QC Plot

Report Date: 21 Aug-13 16:26 (1 of 1)

Reference Toxicant 96-h Acute Survival Test

NewFields

Test Type:	Survival	**Organism:**	Eohaustorius estuarius (Amphipod)	**Material:**	Total Ammonia
Protocol:	EPA/600/R-94/025 (1994)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	141.9	**Count:**	11	**-1s Warning Limit:**	79.7	**-2s Action Limit:**	17.5
Sigma:	62.2	**CV:**	43.80%	**+1s Warning Limit:**	204.1	**+2s Action Limit:**	266.3

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2010	Jul	9	15:20	265.9	124	1.994	(+)		02-9263-1875	13-7083-7088
2			27	14:50	165.5	23.62	0.3798			16-3262-6250	12-1070-3879
3		Aug	17	16:00	182.5	40.64	0.6534			00-5947-2918	13-7468-5586
4	2011	Apr	22	16:45	159.7	17.76	0.2856			12-3251-7366	15-6923-8618
5		May	4	14:20	96.78	-45.12	-0.7254			15-9053-5291	03-3498-4458
6		Aug	5	14:35	144.9	2.959	0.04757			05-3970-3796	17-5474-7748
7	2012	Apr	10	15:10	34.72	-107.2	-1.723	(-)		02-5902-8958	20-3951-0452
8		May	8	14:30	61.87	-80.03	-1.287	(-)		20-1853-8108	14-9890-9529
9		Jun	8	15:30	166.5	24.59	0.3953			03-4756-9479	07-8270-3224
10	2013	Feb	22	11:40	152.2	10.32	0.1659			09-9358-3146	14-0757-4516
11		May	10	14:20	130.8	-11.14	-0.1792			01-9831-6628	02-4493-3987
12		Jul	23	15:10	167.1	25.24	0.4058			15-9850-7427	05-2897-2730

Analyst: QA:

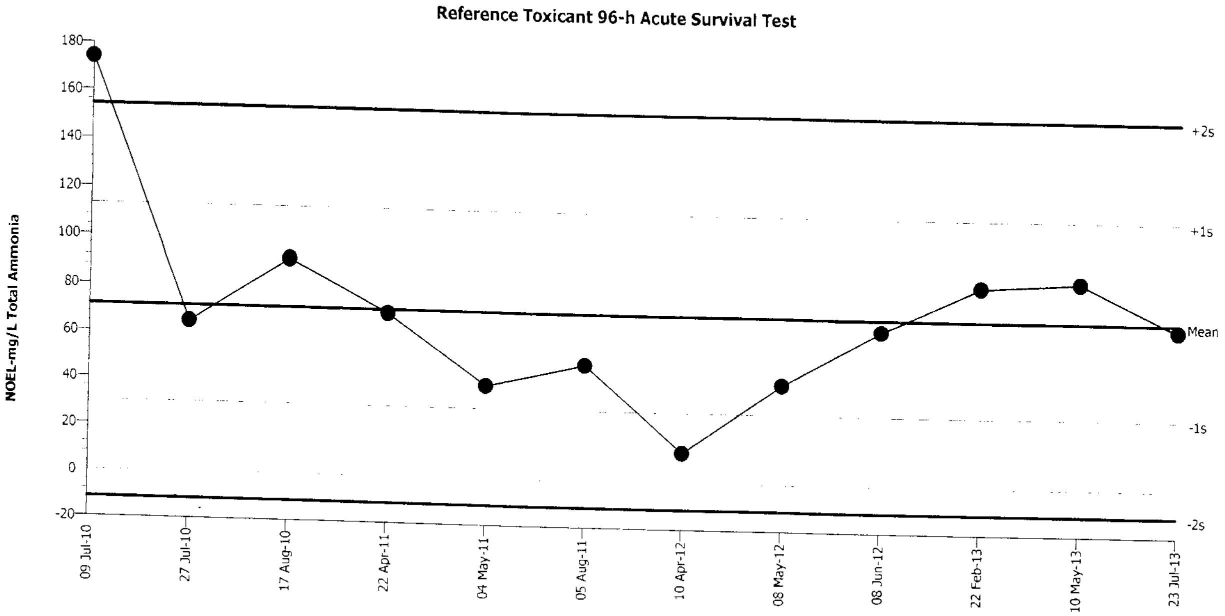
CETIS QC Plot

Report Date: 21 Aug-13 16:27 (1 of 1)

Reference Toxicant 96-h Acute Survival Test

NewFields

Test Type: Survival
Protocol: EPA/600/R-94/025 (1994)
Organism: Eohaustorius estuarius (Amphipod)
Endpoint: Proportion Survived
Material: Total Ammonia
Source: Reference Toxicant-REF



Mean: 71.37
Sigma: 41.47
Count: 11
CV: 58.10%
-1s Warning Limit: 29.9
+1s Warning Limit: 112.8
-2s Action Limit: -11.57
+2s Action Limit: 154.3

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2010	Jul	9	15:20	174	102.6	2.475	(+)	(+)	02-9263-1875	21-0926-0699
2			27	14:50	64.7	-6.67	-0.1608			16-3262-6250	07-8105-4494
3		Aug	17	16:00	91.6	20.23	0.4878			00-5947-2918	19-8213-9681
4	2011	Apr	22	16:45	69.8	-1.57	-0.03786			12-3251-7366	16-4565-4919
5		May	4	14:20	39.8	-31.57	-0.7613			15-9053-5291	14-1177-0441
6		Aug	5	14:35	49.6	-21.77	-0.525			05-3970-3796	20-5970-4725
7	2012	Apr	10	15:10	13	-58.37	-1.408	(-)		02-5902-8958	03-7154-8292
8		May	8	14:30	42.6	-28.77	-0.6938			20-1853-8108	20-5519-2940
9		Jun	8	15:30	66.4	-4.97	-0.1198			03-4756-9479	03-6674-9041
10	2013	Feb	22	11:40	85.6	14.23	0.3431			09-9358-3146	06-2817-6220
11		May	10	14:20	88	16.63	0.401			01-9831-6628	03-9560-5903
12		Jul	23	15:10	68.3	-3.07	-0.07403			15-9850-7427	18-8212-0119

Analyst: CR QA: BK

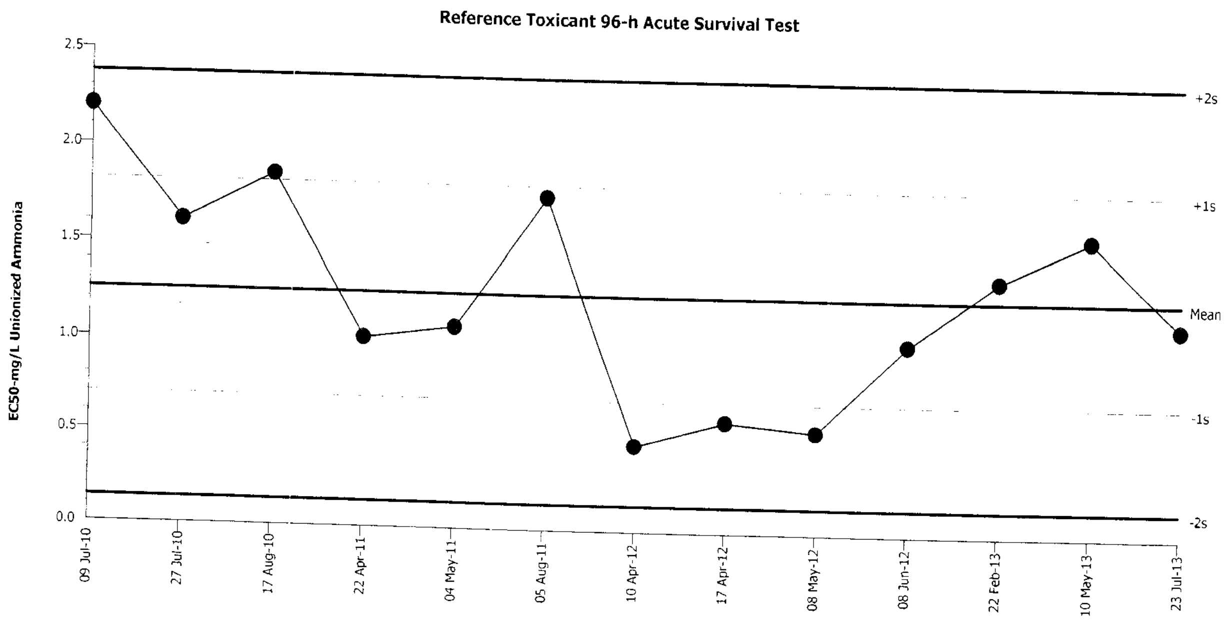
CETIS QC Plot

Report Date: 21 Aug-13 16:27 (1 of 1)

Reference Toxicant 96-h Acute Survival Test

NewFields

Test Type: Survival
Protocol: EPA/600/R-94/025 (1994)
Organism: Eohaustorius estuarius (Amphipod)
Endpoint: Proportion Survived
Material: Unionized Ammonia
Source: Reference Toxicant-REF



Mean: 1.258
Sigma: 0.559
Count: 12
CV: 44.40%
-1s Warning Limit: 0.699
+1s Warning Limit: 1.817
-2s Action Limit: 0.14
+2s Action Limit: 2.376

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2010	Jul	9	15:20	2.198	0.9395	1.681	(+)		01-7209-8485	05-8082-3474
2			27	14:50	1.608	0.3504	0.6268			00-7007-0295	03-9110-2709
3		Aug	17	16:00	1.854	0.5963	1.067	(+)		04-9660-1658	10-4250-3896
4	2011	Apr	22	16:45	1.017	-0.2406	-0.4304			03-6965-3395	14-3447-2473
5		May	4	14:20	1.081	-0.1768	-0.3162			18-8723-9922	17-9305-2155
6		Aug	5	14:35	1.76	0.5022	0.8984			17-9542-0646	06-2792-7024
7	2012	Apr	10	15:10	0.4636	-0.7944	-1.421	(-)		18-7283-5013	07-7471-6807
8			17	15:45	0.5982	-0.6598	-1.18	(-)		18-5229-3668	10-4921-5938
9		May	8	14:30	0.5509	-0.7071	-1.265	(-)		15-4565-2403	06-1396-7211
10		Jun	8	15:30	1.024	-0.2337	-0.4181			03-7901-3036	07-6844-7156
11	2013	Feb	22	11:40	1.364	0.1062	0.1899			10-3861-9695	21-2507-0831
12		May	10	14:20	1.578	0.3198	0.5721			05-8857-3753	18-2954-4563
13		Jul	23	15:10	1.126	-0.1321	-0.2363			08-8059-3744	12-6137-6954

Analyst: CR QA: CH

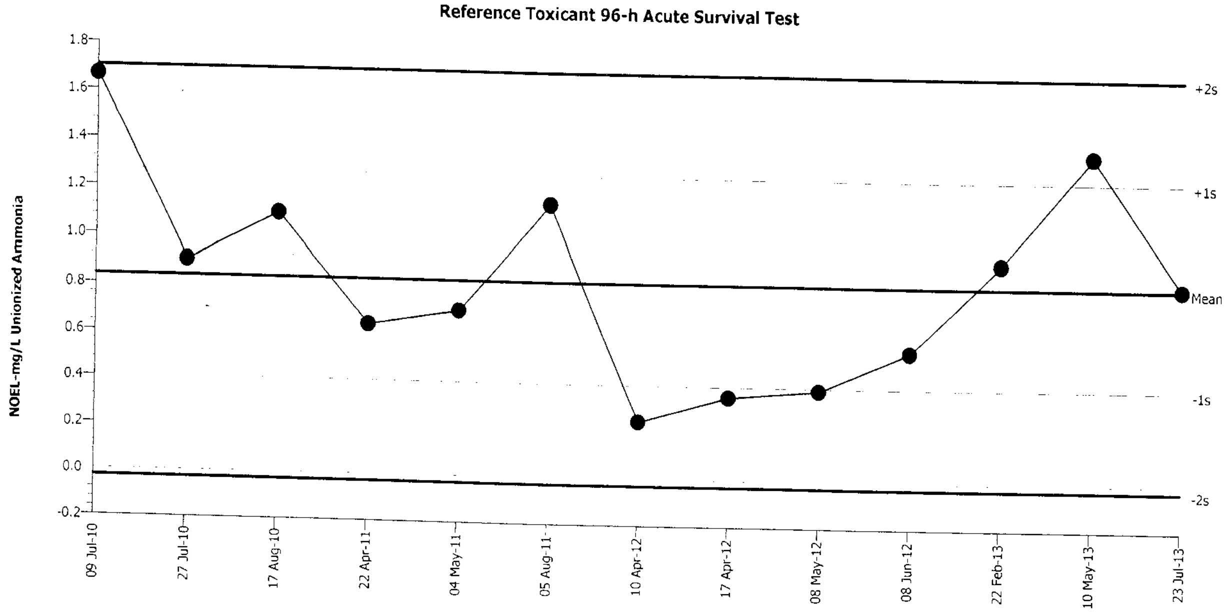
CETIS QC Plot

Report Date: 21 Aug-13 16:27 (1 of 1)

Reference Toxicant 96-h Acute Survival Test

NewFields

Test Type:	Survival	**Organism:**	Eohaustorius estuarius (Amphipod)	**Material:**	Unionized Ammonia
Protocol:	EPA/600/R-94/025 (1994)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	0.837	**Count:**	12	**-1s Warning Limit:**	0.4042	**-2s Action Limit:**	-0.0286
Sigma:	0.4328	**CV:**	51.70%	**+1s Warning Limit:**	1.27	**+2s Action Limit:**	1.703

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2010	Jul	9	15:20	1.665	0.828	1.913	(+)		01-7209-8485	15-5728-8112
2			27	14:50	0.9	0.063	0.1456			00-7007-0295	13-8034-1240
3		Aug	17	16:00	1.096	0.259	0.5984			04-9660-1658	04-8886-1755
4	2011	Apr	22	16:45	0.644	-0.193	-0.4459			03-6965-3395	08-9559-0930
5		May	4	14:20	0.71	-0.127	-0.2934			18-8723-9922	06-9505-1415
6		Aug	5	14:35	1.152	0.315	0.7278			17-9542-0646	01-3764-6854
7	2012	Apr	10	15:10	0.249	-0.588	-1.359	(-)		18-7283-5013	17-8032-8770
8			17	15:45	0.36	-0.477	-1.102	(-)		18-5229-3668	21-3980-0168
9		May	8	14:30	0.393	-0.444	-1.026	(-)		15-4565-2403	07-1675-0393
10		Jun	8	15:30	0.56	-0.277	-0.64			03-7901-3036	09-3097-7160
11	2013	Feb	22	11:40	0.935	0.098	0.2264			10-3861-9695	14-6175-2687
12		May	10	14:20	1.38	0.543	1.255	(+)		05-8857-3753	12-0577-0060
13		Jul	23	15:10	0.839	0.002	0.004621			08-8059-3744	14-8468-9199

Analyst: CR QA: BH

CETIS Summary Report

Report Date: 21 Aug-13 16:24 (p 1 of 1)
Test Code: 347CCB50 | 08-8059-3744

Reference Toxicant 96-h Acute Survival Test

NewFields

Batch ID:	20-4929-9630	**Test Type:**	Survival	**Analyst:**	
Start Date:	23 Jul-13 15:10	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	23 Jul-13 13:15	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	NA	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	15-9733-9892	**Code:**	5F3578F4	**Client:**	Internal Lab
Sample Date:	27 Sep-11	**Material:**	Unionized Ammonia	**Project:**	Reference Toxicant
Receive Date:		**Source:**	Reference Toxicant		
Sample Age:	665d 15h	**Station:**	P110927.139		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
14-8468-9199	Proportion Survived	0.839	1.014	0.9224	15.0%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
12-6137-6954	Proportion Survived	EC50	1.126	1.082	1.171		Trimmed Spearman-Kärber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	1	1	1	1	1	0	0	0.0%	0.0%
0.36		3	0.9667	0.8232	1	0.9	1	0.03333	0.05774	5.97%	3.33%
0.549		3	0.9667	0.8232	1	0.9	1	0.03333	0.05774	5.97%	3.33%
0.839		3	0.9667	0.8232	1	0.9	1	0.03333	0.05774	5.97%	3.33%
1.014		3	0.8	0.3697	1	0.6	0.9	0.1	0.1732	21.65%	20.0%
1.381		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	1	1
0.36		0.9	1	1
0.549		0.9	1	1
0.839		1	1	0.9
1.014		0.9	0.9	0.6
1.381		0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	10/10	10/10	10/10
0.36		9/10	10/10	10/10
0.549		9/10	10/10	10/10
0.839		10/10	10/10	9/10
1.014		9/10	9/10	6/10
1.381		0/10	0/10	0/10

Analyst: CR QA: BH

CETIS Summary Report

Report Date:	21 Aug-13 16:24 (p 1 of 1)
Test Code:	5F4749A3 | 15-9850-7427

Reference Toxicant 96-h Acute Survival Test

NewFields

Batch ID:	20-4929-9630	**Test Type:**	Survival	**Analyst:**	
Start Date:	23 Jul-13 15:10	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	23 Jul-13 13:15	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	NA	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	19-1851-7521	**Code:**	725A4111	**Client:**	Internal Lab
Sample Date:	27 Sep-11	**Material:**	Total Ammonia	**Project:**	Reference Toxicant
Receive Date:		**Source:**	Reference Toxicant		
Sample Age:	665d 15h	**Station:**	P110927.139		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
18-8212-0119	Proportion Survived	68.3	131	94.59	15.0%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
05-2897-2730	Proportion Survived	EC50	167.1	149.3	187.2		Trimmed Spearman-Kärber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	1	1	1	1	1	0	0	0.0%	0.0%
18.6		3	0.9667	0.8232	1	0.9	1	0.03333	0.05774	5.97%	3.33%
35.6		3	0.9667	0.8232	1	0.9	1	0.03333	0.05774	5.97%	3.33%
68.3		3	0.9667	0.8232	1	0.9	1	0.03333	0.05774	5.97%	3.33%
131		3	0.8	0.3697	1	0.6	0.9	0.1	0.1732	21.65%	20.0%
282		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	1	1
18.6		0.9	1	1
35.6		0.9	1	1
68.3		1	1	0.9
131		0.9	0.9	0.6
282		0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	10/10	10/10	10/10
18.6		9/10	10/10	10/10
35.6		9/10	10/10	10/10
68.3		10/10	10/10	9/10
131		9/10	9/10	6/10
282		0/10	0/10	0/10

Analyst: CR QA: BH

NewFields Ammonia Reference Toxicant Spiking Worksheet

~~Amp~~ Eon NH$_3$ RT

Assumptions in Model
Stock ammonia concentration is 10,000 mg/L = 10 mg/mL

Actual Reading
7350

Test Solutions			Volume of stock to reach desired concentration	
Measured Concentration	Desired Concentration	Volume		
mg/L	mg/L	mL	mL stock to increase	
			[redacted]	SALT WATER
	240	750	[redacted]	**36.735**
	120	750	[redacted]	**18.367**
	60	750	[redacted]	**9.184**
	30	750	[redacted]	**4.592**
	15	750	[redacted]	**2.296**
	0	750	[redacted]	
			[redacted]	
			[redacted]	

NewFields Ammonia Reference Toxicant Test Water Quality Data Sheet

CLIENT Integral Consulting Inc.	PROJECT WPAH	SPECIES *Eohaustorius estuarius*		NEWFIELDS LABORATORY Port Gamble	PROTOCOL PSEP 1995
NEWFIELDS JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	TEST START DATE 7/19/13 ~~00Jan00~~	TIME 1510	TEST END DATE 7/23/13 ~~04Jan00~~	TIME 1315
TEST ID P110927.139	LOT #: 111079				

WATER QUALITY DATA

DILTIN.WAT.BATCH	TEMP REC#	REFERENCE TOX. MATERIAL	REFERENCE TOXXICANT
0		ammonia - TAN	ammonium chloride

TEST CONDITIONS					DO (mg/L)		TEMP(C)		SAL (ppt)		pH		TECHNICIAN		AMMONIA		
					> 4.6		15 ± 1		28 ± 1		8.0 ± 1.0						
CLIENT/ NEWFIELDS ID	CONCENTRATION		DAY	REP	D.O.		TEMP.		SALINITY		pH		WQ TECH		AMMONIA		Tech
	value	units			meter	mg/L	meter	°C	meter	ppt	meter	unit			METER	mg/L	
Ref.Tox.-	0	mg/L	0	Stock	6	7.6	6	16.0	2	28	5	8.0	MMB	7/19	3	0.0254	JL
			4	1	6	6.5	6	15.9	2	28	5	7.6	MMB	7/23			
Ref.Tox.-	15	mg/L	0	Stock	6	7.7	6	16.6	2	28	5	7.9	MMB	7/19	3	18.6	JL
			4	1	6	6.8	6	15.7	2	28	5	7.6	MMB	7/23			
Ref.Tox.-	30	mg/L	0	Stock	6	7.8	6	16.0	2	28	5	7.8	MMB	7/19	3	35.6	JL
			4	1	6	6.7	6	15.6	2	28	5	7.6	MMB	7/23			
Ref.Tox.-	60	mg/L	0	Stock	6	7.8	6	16.0	2	28	5	7.7	MMB	7/19	3	68.3	JL
			4	1	6	6.6	6	15.5	2	28	5	7.6	MMB	7/23			
Ref.Tox.-	120	mg/L	0	Stock	6	7.8	6	16.0	2	29	5	7.5	MMB	7/19	3	131	JL
			4	1	6	6.6	6	15.4	2	28	5	7.6	MMB	7/23			
Ref.Tox.-	240	mg/L	0	Stock	6	7.8	6	16.0	2	29	5	7.3	MMB	7/19	3	282	JL
			4	1	6	6.7	6	15.3	2	29	5	7.5	MMB	7/23			

NewFields Ammonia Reference Toxicant Test Survival Data Sheet

CLIENT	PROJECT	NEWFIELDS JOB NO.	SPECIES		
			Eohaustorius estuarius		
			PROJECT MANAGER	MEC LABORATORY	PROTOCOL
Integral Consulting Inc.	WPAH	860.0074.000	B. Gardiner	Port Gamble	PSEP 1995

SURVIVAL & BEHAVIOR DATA

N = Normal
Q = Quiescent
F = Floating on Surface
D = Discolored

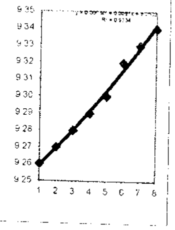
INITIAL # OF ORGANISMS: 10

CLIENT/ NEWFIELDS ID	CONC. value	CONC. units	REP	INITIAL NUMBER	DATE 7/20/13			DATE 7/21/13			DATE 7/22/13			DATE 7/23/13		
					TECHNICIAN JL			TECHNICIAN JL			TECHNICIAN JL			TECHNICIAN MWB		
					#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS
Ref.Tox.- ammonia - TAN	0	mg/L	1		10	0	N	10	0	N	10	0	N	10	0	N
			2		10	0	2F	10	0	2F	10	0	1F	10	0	↓
			3		10	0	3F	10	0	1F	10	0	N	10	0	↓
Ref.Tox.- ammonia - TAN	15	mg/L	1		10	0	1F	10	0	2F	10	0	2F	9	1	N
			2		10	0	4F	10	0	2F	10	0	3F	10	0	↓
			3		10	0	1F	10	0	1F	10	0	N	10	0	↓
Ref.Tox.- ammonia - TAN	30	mg/L	1		10	0	3F	10	0	1F	10	0	N	9	1	N
			2		10	0	1F	10	0	N	10	0	↓	10	0	↓
			3		10	0	N	10	0	↓	10	0	↓	10	0	↓
Ref.Tox.- ammonia - TAN	60	mg/L	1		10	0	2F	10	0	1F	10	0	1F	10	0	N
			2		10	0	2F	10	0	1F	10	0	1F	10	0	↓
			3		10	0	1F	10	0	1F	10	0	N	9	1	↓
Ref.Tox.- ammonia - TAN	120	mg/L	1		10	0	2F	10	0	Q	10	0	Q	9	1	Q
			2		10	0	2F	10	0	Q, 1F	9	1	↓	9	0	↓
			3		10	0	1F	10	0	Q	10	0	↓	6	4	↓
Ref.Tox.- ammonia - TAN	240	mg/L	1		5	5	Q	3	2	Q	2	1	Q	0	2	N
			2		8	2	Q	4	4	Q	0	4	NA	—	—	—
			3		9	1	2F, Q	3	6	Q	1	2	Q	0	1	N

CLIENT:	Internal	Date of Test:	~~25-Jun-13~~ 7/23/13
PROJECT:	RT	Test Type:	~~Neanthes~~ Erhaustorius
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer:	I-factor
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34



	Sample	Mod NH3T (mg/L)	salinity (ppt)	pH	temp (C)	temp (K)	i-factor	Mod NH3U (mg/L)
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	297.26	9.3053	#VALUE!
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	278.16	9.2750	0.008
1	-							
2	15	18.600	28	7.9	16.0	289.16	9.3187	0.360
3	30	35.600	28	7.8	16.0	289.16	9.3187	0.549
4	60	68.300	28	7.7	16.0	289.16	9.3187	0.839
5	120	131.000	29	7.5	16.0	289.16	9.3214	1.014
6	240	282.000	29	7.3	16.0	289.16	9.3214	1.381
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NewFields

ORGANISM RECEIPT LOG

Date: 7.17.13	**Time:** 1445	**NewFields Batch No.** NAS 2877
Organism / Project: Eohaustorius / Port Angeles		**Invoice Attached** Yes [✓ No]
Source / Supplier: Northwestern Aquatic Sciences		**Contact:** Gary Buhler
No. Ordered: 3600	**No. Received:** 3600 + 10%	**Source Batch:** (Collection date, hatch date, etc.): 7.15.13 Collection

Condition of Organisms: (Good, fair, poor; describe.): Good	**Approximate Size or Age:** (Days from hatch, life stage, size class, etc.): 3-5mm
Shipper: FedEx	**B of L (Tracking No.)** 8010 3069 2877
Condition of Container: (Good, fair, poor; describe.): Good	**Received By:** BH

Container	D.O. (mg/L)	Temp. (°C)	Cond. or Sal. (Include Units)	pH (Units)	Number Dead or Moribund	Technician (Initials)
Comp	—	11.3	33	—	—	BH

Notes:

Northwestern Aquatic Sciences
3814 Yaquina Bay Rd., P.O. Box 1437, Newport, OR 97365
Tel: 541-265-7225, Fax: 541-265-2799, www.nwaquatic.com

SUBJECT: Animal Collection Data Sheet (shipping)

SOLD TO: NewFields Northwest
4729 NE View Dr.
P.O. Box 216
Port Gamble WA 98364

FedEx# 3689-9072-8

Brian Hester/Collin Ray
360.297.6044

DATE OF SHIPMENT: 7-16-13

ANIMAL HISTORY

Species	**Age/Size**	**Number Shipped**
Eohaustorius estuarius	3-5mm	3600 + 10%

WATER QUALITY AT TIME OF SHIPMENT

Temperature (°C): 14.6	pH: 8.1	Salinity (ppt): 34.0	D.O. (mg/L): 7.9
Other:			

PACKAGED BY: Y. Makalama **DATE:** 7-16-13

FIELD COLLECTION/CULTURE NOTES

Collected 7-15-13 Yaquina Bay, OR.
Interstitial WQ: Temp: 10.5 °C, Salinity 40.0 ppt; salinity adjust down ~ 5 ppt.
Held at 15°C in aerated water.

ADDITIONAL COMMENTS

2-liters of 0.5 mm sieved home sediment included.

PLEASE RETURN ALL SHIPPING MATERIALS Thank you!

If you have any questions, Please call Gary Buhler or Gerald Irissarri at (541) 265-7225. Thank You.

Appendix A.2

Juvenile Polychaete Test with *Neanthes arenaceodentata*

NewFields

20-DAY SOLID PHASE BIOASSAY
OBSERVATION DATASHEET

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	NEWFIELDS LABORATORY	PROTOCOL	SPECIES
Integral Consulting Inc.	WPAH	860.0074.000	B. Gardiner	Port Gamble Bath 6	PSEP 1995	*Neanthes arenaceodentata*

ENDPOINT DATA & OBSERVATIONS

N = Normal
#E = Emergence
#M = Mortality
G = Growth
(fungal, bacterial, or algal)
D = No Air Flow (DO?)
F = Floating on Surface
TC = Too Cloudy
U=Excess food

INITIAL # OF ORGANISMS: 5

Date and Initials				JL 7/13	JL 7/14	BG 7/15	BG 7/16	BG 7/17	BG 7/18	BG 7/19	JL 7/20	JL 7/21	BG 7/22	BG 7/23	BG 7.24	BG 7/25	JL 7/26	JL 7/27	JL 7/28	BG 7/29	BG 7/30	MMB 7/31	MMB 8/1	NUMBER REMAINING	TARE WEIGHT (mg)	TOTAL WEIGHT (mg)	ASHED WEIGHT (mg)
CLIENT/NEWFIELDS ID	REP	JAR	INITIAL # (if differs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20				
Control /	1			N	N	N	G	G	G	G	N	N	G	G	G	G	G	G	G	G	G	G	G	5	152.84	1 196.50	163.89
	2						G	G	G	G			N	N	N	N			N	N	N			5	146.92	2 200.82	164.58
	3					↓	G	G	G	G			N	N	N	N			G	G	G			5	165.03	3 228.59	186.06
	4					G	G	G	G	G			G	G	G	G								5	120.84	4 167.02	137.67
	5					N	G	G	G	G			G	G									↓	5	133.14	5 196.05	152.39
CR-12 /	1			↓	↓	↓	G	G	G	G			G	G	↓	↓							G	5	148.72	6 215.06	173.61
	2			①	F	①	①	② GE	G	G			N	N	N	N								5	156.53	7 225.47	179.72
	3			N	N	N	G	G	G	G			G	G	G	G								5	148.46	8 219.26	174.36
	4					G	G	G	G	G														5	140.98	9 204.44	162.23
	5					N	G	G	G	G													↓	5	138.89	10 200.22	161.86
CARR-20 /	1						N	N	G	G													G	5	141.75	11 209.21	165.94
	2						N	↓	N	N														5	151.12	12 216.24	174.86
	3						G	G	G	G														5	152.35	13 224.05	179.42
	4						N	G	G	G														5	148.54	14 199.41	159.71
	5			↓	↓	↓	N	G	G	G	↓	↓	↓	↓	↓	↓	1E9 ↓	↓	↓	↓	↓	↓	↓	5	155.97	15 212.52	173.30

Initial Biomass	Rep	Number	Tare Weight (mg)	Dry Weight (mg)	Ashed Weight (mg)
	1	5	51.28	54.54	52.06
	2	5	51.46	53.98	51.84
	3	5	51.39	53.82	51.77

Comments: ① peacrab & Brittle star on Surface.
② aerator was barely at the H2O surface

NewFields

20-DAY SOLID PHASE BIOASSAY
OBSERVATION DATASHEET

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	NEWFIELDS LABORATORY	PROTOCOL	SPECIES
Integral Consulting Inc.	WPAH	860.0074.000	B. Gardiner	Port Gamble Bath 6	PSEP 1995	*Neanthes arenaceodentata*

N = Normal
#E = Emergence
#M = Mortality
G = Growth (fungal, bacterial, or algal)
D = No Air Flow (DO?)
F = Floating on Surface
TC = Too Cloudy
U=Excess food

INITIAL # OF ORGANISMS: 5

ENDPOINT DATA & OBSERVATIONS

CLIENT/ NEWFIELDS ID	REP	JAR	INITIAL # (if differs)	1 JL 7/13	2 JL 7/14	3 BG 7/15	4 BG 7/16	5 BG 7/17	6 BG 7/18	7 BG 7/19	8 JL 7/20	9 JL 7/21	10 7/22 BG	11 BG 7/23	12 DH 7/24	13 BG 7/25	14 JL 7/26	15 JL 7/27	16 JL 7/28	17 7/29 BG	18 7/30 BG	19 MMB 7/31	20 MMB 8/01	NUMBER REMAINING	TARE WEIGHT (mg)	TOTAL WEIGHT (mg)	ASHED WEIGHT (mg)
CR-02 /	1			①	N	①	①	①	①	①	N	N	N	N ①	N	N	N	N	N	N	N	N	N	5	144.98	16 192.26	158.66
	2			①		①	①	①	①	①			N	N ①	N	N	N	N	N			N		5	145.33	17 190.22	159.66
	3			N		N	①	①	①	①			G	G ①	G	G	N	N	N			N		5	133.92	18 167.24	145.51
	4			①		↓	N	N	N	N			N	N	N	IE	N	N	N	↓	↓	N		5	131.09	19 168.47	141.19
	5			N	↓	①	①	①	①	① G			G	G	G	G	G	G	G	G	G	G	↓	5	122.42	20 181.78	137.62
SD0001 /	1				F	G	G	G	G	G									↓	G	G	G	N	5	135.78	21 195.31	145.16
	2			↓	N	G	G	G	G	G							↓	↓	N	N	N	G		5	143.85	22 194.38	152.91
	3			F	F	G	G	G	G	G							N	N	N			N		5	124.63	23 185.27	136.57
	4			F	F	G	G	G	G	G							N	G	N			N		5	133.27	24 204.51	147.02
	5			F	F	G	G	G	G	G	↓						N	N	N	↓	↓	N	↓	5	130.79	25 186.14	140.32
SD0002 /	1			F	F	G	G	G	G	G	IE						G	IE	G	G	G	G	N	5	142.06	26 209.82	152.63
	2			N	N	G	G	G	N	N	N	↓						N	N	N	N		③ ~~4~~	5	132.46	27 186.36	143.53
	3			F	F	G	G	G	G	G	G	G						G	G	G	G			5	139.10	28 198.19	149.92
	4			F	F	G	G	3E	G	G	N	N					↓	↓	↓	G	G	↓	③ 5	5	133.59	29 194.28	144.33
	5			F	F	G	G	G	G	G							N	IE	N	N	N	N	↓	5	140.70	30 211.91	154.15
SD0003 /	1			N	N	G	G	G	G	N							G	G	G	G	G	G	G	③ 5	157.53	31 223.64	165.91
	2				↓	N	N	N	N														G	5	142.33	32 210.18	151.35
	3				F	G	G	G	N	↓													N	5	144.70	33 214.22	154.82
	4			↓	F	N	G	G	N	G	↓	↓											↓	5	135.65	34 218.76	147.20
	5			F	F	G	G	G	G	G	G	G	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	5	143.80	35 230.47	154.85

① Brittle star on surface, JL 7/13.
② Lots of brittle stars in sediment, MMB 8/1/13.
③ WG MMB 8/1/13

NewFields

20-DAY SOLID PHASE BIOASSAY
OBSERVATION DATASHEET

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	NEWFIELDS LABORATORY	PROTOCOL	SPECIES
Integral Consulting Inc.	WPAH	860.0074.000	B. Gardiner	Port Gamble Bath 6	PSEP 1995	*Neanthes arenaceodentata*

ENDPOINT DATA & OBSERVATIONS

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(fungal, bacterial, or algal)
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INITIAL # OF ORGANISMS: 5

CLIENT/NEWFIELDS ID	REP	JAR	Date and Initials / INITIAL # (if differs)	7/13 JC 1	7/14 JC 2	7/15 BG 3	7/16 BG 4	7/17 BG 5	7/18 BG 6	7/19 BG 7	7/20 JC 8	7/21 JC 9	7/22 BG 10	BG 7/23 11	BG 7/24 12	BG 7/25 13	JC 7/26 14	JC 7/27 15	JC 7/28 16	7/29 BG 17	7/30 BG 18	MMB 7/31 19	MMB 8/01 20	NUMBER REMAINING	TARE WEIGHT (mg)	TOTAL WEIGHT (mg)	ASHED WEIGHT (mg)
SD0004 /	1			N	N	G	G	G	G	G	N	N	G	G	G	G	G	G	G	G	G	G	G	5	152.94	36 225.77	163.14
	2					N	G	G	G	G							1EG		L	1E	G			5	128.99	37 197.25	138.61
	3					G	G	G	G	G							G		1EG	G				5	118.21	38 189.51	126.87
	4					N	G	G	G	G									G					5	124.61	39 194.48	133.94
	5						N	G	G	G				1EG										5	137.63	40 213.39	149.74
SD0005 /	1							N	N	N				G									G	5	136.81	41 204.72	148.98
	2												1EG											5	162.65	42 240.18	176.79
	3												G											5	131.15	43 213.04	146.93
	4												N	N										5	129.49	44 191.59	137.61
	5												G	G										5	136.45	45 211.11	147.41
SD0006 /	1									G													G	5	150.15	46 229.04	162.00
	2									G														5	154.22	47 232.92	165.76
	3									N														5	136.08	48 209.78	147.64
	4									N			1EG			1E								6	130.20	49 219.59	144.45
	5									G			G											5	140.39	50 230.13	154.99
SD0007 /	1									N													G	5	143.02	51 223.70	158.41
	2																							5	138.19	52 215 56	150.85
	3												N	N										5	148.00	53 209.43	157.79
	4					G							N	N										5	123.64	54 186.37	133.46
	5					N							G	G										5	142.58	55 216.74	154.26

NewFields

20-DAY SOLID PHASE BIOASSAY
OBSERVATION DATASHEET

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	NEWFIELDS LABORATORY	PROTOCOL	SPECIES
Integral Consulting inc.	WPAH	860.0074.000	B. Gardiner	Port Gamble Bath 6	PSEP 1995	*Neanthes arenaceodentata*

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(fungal, bacterial, or algal)
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TC = Too Cloudy
U=Excess food

INITIAL # OF ORGANISMS: 5

CLIENT/ NEWFIELDS ID	REP	JAR	INITIAL # (if differs)	Date and Initials: 7/13 JC 1	7/14 JC 2	7/15 BG 3	7/16 BG 4	7/17 BG 5	7/18 BG 6	7/19 BG 7	7/20 JC 8	7/21 JC 9	7/22 BG 10	BG 7/23 11	BH 7/24 12	BG 7/25 13	JC 7/26 14	JC 7/27 15	JC 7/28 16	7/29 BG 17	7/30 BG 18	MMB 7/31 19	MMB 8/01 20	NUMBER REMAINING	TARE WEIGHT (mg)	TOTAL WEIGHT (mg)	ASHED WEIGHT (mg)
SD0008 /	1			N	N	N	N	N	G	G	N	N	G	G	G	G	G	G	G	G	G	G	G	5	128.81	56 188.62	136.96
	2						G		N	N				G										5	131.58	57 209.02	145.23
	3						N		G	G				G 1E						1E				5	130.96	58 203.13	143.07
	4					G	G	G	G	G				G					N	N	N			5	124.30	59 185.75	134.36
	5					N	N	N	N	N									G	G	G			5	142.23	60 198.76	150.24
SD0009 /	1					G	G	G	G	G													G	5	145.31	61 215.10	155.25
	2					G	G	G	G	G														5	155.40	62 234.38	169.34
	3					N	G	G	G	G														5	149.08	63 220.72	161.33
	4						G	G	G	G														5	141.15	64 214.76	153.04
	5					G	G	G	G	G							1EG							5	146.32	65 223.88	155.53
SD0010 /	1					N	N	N	N	G							G						G	5	152.79	66 232.87	166.96
	2									N														5	146.89	67 215.52	158.99
	3												N	N										5	148.67	68 222.57	159.97
	4												G	G										5	151.93	69 230.56	163.80
	5								G	G														5	164.69	70 253.17	177.62
SD0011 /	1								N	G													G	5	132.33	71 169.27	137.94
	2									G														5	164.16	72 235.31	174.69
	3									N														5	143.42	73 207.87	155.20
	4									N			N											5	144.26	74 211.04	155.82
	5									N			G											5	131.10	75 196.19	143.23

NewFields

20-DAY SOLID PHASE BIOASSAY
OBSERVATION DATASHEET

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	NEWFIELDS LABORATORY	PROTOCOL	SPECIES
Integral Consulting Inc.	WPAH	860.0074.000	B. Gardiner	Port Gamble Bath 6	PSEP 1995	*Neanthes arenaceodentata*

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INITIAL # OF ORGANISMS 5

ENDPOINT DATA & OBSERVATIONS

CLIENT/ NEWFIELDS ID	REP	JAR	INITIAL # (if differs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	NUMBER REMAINING	TARE WEIGHT (mg)	TOTAL WEIGHT (mg)	ASHED WEIGHT (mg)
Date and Initials				7/13 JC	7/14 JC	7/15 BG	7/16 BG	7/17 BG	7/18 BG	7/19 BG	7/20 JC	7/21 JC	7/22 BG	7/23 BG	BH 7/24	BG 7/25	JC 7/26	JC 7/27	JC 7/28	7/29 BG	7/30 BG	MMB 7/31	MMB 8/01				
SD0012 /	1			N	N	N	N	N	N	G	N	N	G	G	G	G	G	G	G	G	G	G	[illegible]	5	148.20	76 223.24	160.53
	2			↓	↓	↓	↓	↓	↓	N	↓	↓	1E	N	↓	↓	↓	↓	↓	↓	↓	↓	[illegible]	5	145.12	77 219.94	158.22
	3			↓	↓	↓	↓	↓	↓	↓	↓	↓	G	G	↓	↓	↓	↓	↓	↓	↓	↓	[illegible]	5	136.77	78 212.94	151.18
	4			↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	G 1E	1E	↓	↓	↓	↓	[illegible]	5	145.19	79 223.79	156.38
	5			↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	G 1E	G	↓	↓	↓	↓	[illegible]	5	146.60	80 213.89	158.59
SD0013 /	1			↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	G	G	↓	↓	↓	G	G	5	141.22	81 202.04	154.03
	2			↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	G	↓	5	133.86	82 195.81	146.13
	3			↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	N	N	N	N	N	N	↓	5	139.64	83 210.40	152.99
	4			↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	G	G	G	G	G	G	↓	5	148.15	84 226.47	162.13
	5			↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	G	↓	5	149.34	85 224.77	162.63
SD0014 /	1			↓	↓	↓	↓	↓	↓	↓	↓	↓	N	N	↓	↓	↓	↓	↓	↓	↓	G	G	5	135.97	86 208.42	150.70
	2			↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	N	↓	↓	↓	↓	↓	↓	↓	↓	↓	5	134.67	87 192.60	143.90
	3			↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	N 1E	↓	↓	N	N	N	N	N	↓	↓	5	140.82	88 219.97	155.71
	4			↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	N	↓	↓	G	G	G	G	G	↓	↓	5	146.05	89 213.55	158.46
	5			↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	N	↓	↓	↓	↓	↓	↓	↓	1E	↓	5	126.45	90 192.44	138.31
SD0015 /	1			↓	↓	↓	↓	↓	↓	↓	↓	↓	N	N	↓	↓	↓	↓	↓	↓	↓	G	G	5	117.63	91 197.34	136.48
	2			↓	↓	↓	↓	↓	↓	↓	↓	↓	N	N	↓	↓	↓	↓	↓	↓	↓	G	↓	5	127.13	92 181.61	142.14
	3			↓	↓	↓	↓	↓	↓	↓	↓	↓	G	G	↓	↓	N	N	N	N	N	N	↓	5	125.15	93 204.36	142.79
	4			↓	↓	↓	↓	↓	↓	↓	↓	↓	N	N	↓	↓	N	N	G	G	G	G	↓	5	124.22	94 183.53	140.73
	5			↓	↓	↓	↓	↓	↓	↓	↓	↓	N	N	↓	↓	N	N	N	N	N	G	↓	5	125.76	95 185.84	138.42

NewFields

20-DAY SOLID PHASE BIOASSAY
OBSERVATION DATASHEET

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	NEWFIELDS LABORATORY	PROTOCOL	SPECIES
Integral Consulting Inc.	WPAH	860.0074.000	B. Gardiner	Port Gamble Bath 6	PSEP 1995	*Neanthes arenaceodentata*

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(fungal, bacterial, or algal)
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INITIAL # OF ORGANISMS: 5

ENDPOINT DATA & OBSERVATIONS

CLIENT/NEWFIELDS ID	REP	JAR	INITIAL # (if differs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	NUMBER REMAINING	TARE WEIGHT (mg)	TOTAL WEIGHT (mg)	ASHED WEIGHT (mg)
Date and Initials				7/13 JL	7/14 JL	7/15 BG	7/16 BG	7/17 BG	7/18 BG	7/19 BG	7/20 JL	7/21 JL	7/22 BG	7/23 BG	BH 7/24	BG 7/25	JL 7/26	JL 7/27	JL 7/28	7/29 BG	7/3 BG	MMB 7/31	MMB 8/01				
SD0017 /	1			N	N	N	N	N	N	N	N	N	N	N	N	N	G	G	G	G	G	G		5	129.08	96 204.98	144.06
	2								↓	G	↓	↓	G	G	i	G			G IE					5	141.33	97 220.76	156.38
	3								G	G	G	G		G IE			↓	↓	G					5	119.83	98 196.28	131.55
	4								N	G	N	N		G		IE	G IE	G IE						5	133.78	99 218.70	149.37
	5						↓	↓		N							G	G						5	132.40	100 222.64	150.10
SD0018 /	1						G	G	↓	G														5	130.12	101 207.20	144.65
	2						G	N	G	G														5 ~~4~~ ②	124.05	102 192.07	134.25
	3						G	G	G	G														5	123.49	103 195.26	137.82
	4						G	G	G	G		IE		↓	↓	IE					IE			5	126.07	104 214.81	141.97
	5						G	G	N	G		N		N	N	N								5	111.40	105 174.58	125.45
SD0019 /	1						N	N	↓	G					G	IEG								5	123.20	106 187.88	136.24
	2						G	G	G	G				↓	N	N								5	131.78	107 194.94	144.83
	3						N	G	G	G				IE	N	N								5	139.81	108 214.35	157.03
	4							G	N	G				N	N	N								5	136.85	109 229.90	160.23
	5							N	G	G			↓			IE	↓					↓		5	137.02	110 221.78	155.83
SD0020 /	1								G	N			N			N	N					N		5	146.04 ①	112 222.09	166.02
	2								N	N			N				N					G		5	142.92 ①	113 202.79	155.72
	3					↓	↓	↓		N			N				G							5	135.74	114 217.77	154.04
	4					F	G	G		IE			N				G		↓	↓	↓			5	135.02	115 207.16	150.68
	5				↓	N	N	N	↓	↓	N	↓	↓	N	↓	↓	N	↓	N	N	N	↓		5	138.86	116 218.64	155.11

① Rep 1 weighboat #112, Rep 2 #113...
② Lost worm upon transfer, 4 in weighboat 102 MMB 8/11/13

NewFields

20-DAY SOLID PHASE BIOASSAY
OBSERVATION DATASHEET

CLIENT	PROJECT	JOB NO.	PROJECT MANAGER	NEWFIELDS LABORATORY	PROTOCOL	SPECIES
Integral Consulting Inc.	WPAH	860.0074.000	B. Gardiner	Port Gamble Bath 6	PSEP 1995	*Neanthes arenaceodentata*

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CLIENT/ NEWFIELDS ID	REP	JAR	INITIAL # (if differs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	NUMBER REMAINING	TARE WEIGHT (mg)	TOTAL WEIGHT (mg)	ASHED WEIGHT (mg)
Date and Initials				7/13 JL	7/14 JL	7/15 BG	7/16 BG	7/17 BG	7/18 BG	7/19 BG	7/20 JL	7/21 JL	7/22 BG	7/23 BG	BH 7/24	BG-7/25	JL 7/26	JL 7/27	JL 7/28	7/29 BG	7/30 BG	MWB 7/31					
SD0021 /	1			N	N	N	N	N	G	G	N	N	G	G	G	G	G	G	G	G	G	N		5	144.02	117 224.55	157.83
	2								G	G				G 1E								G		5	138.22	118 210.06	152.61
	3								G	G				G						1E				5	127.75	119 208.78	142.87
	4								N	G	↓			G			↓							5	173.95	120 255.83	190.02
	5			↓	↓	↓	↓	↓	G	G		↓	↓	G	↓	↓	4E	↓	↓	↓	↓	↓		5	152.70	121 232.10	168.64

weigboat	tare weight
122	141.89
123	138.00

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
Integral Consulting Inc.	WPAH	1040 /	FSW071113.01	PSEP 1995	12-Jul-2013
JOB NUMBER	**PROJECT MANAGER**	**NEWFIELDS LABORATORY**	**TEMP. RECDR./HOBO#**	**TEST SPECIES**	**TEST END DATE**
860.0074.000	B. Gardiner			*Neanthes arenaceodentata*	1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	WATER RENEWAL	Feeding	TECH/DATE
Control /	0	Surr	84	6	7.5	6	20.2	2	28	5	8.0		CR	7.12.13 BH
Control /	1	Surr	84	6	7.6	6	19.9	2	28	5	8.0			7/13 JL
Control /	2	Surr	84	6	7.7	6	19.8	2	28	5	8.2		JL	7/14 JL
Control /	3	Surr	84	6	7.6	6	19.7	2	27	5	7.9	JL		7/15 BG
Control /	4	Surr	84	6	7.4	6	19.7	2	27	5	7.9		BG	7/16 BG
Control /	5	Surr	84	6	7.3	6	19.8	2	27	5	7.7			7/17 BG
Control /	6	Surr	84	6	7.4	6	19.8	2	27	5	7.8	JL	BG	7/18 BG
Control /	7	Surr	84	6	7.0	6	19.8	2	28	5	7.7			7/19 BG
Control /	8	Surr	84	6	7.4	6	20.0	2	28	5	7.9		JL	7/20 JL
Control /	9	Surr	84	6	7.1	6	19.9	2	28	5	7.7	JL		7/21 JL
Control /	10	Surr	84	6	7.3	6	19.8	2	28	5	7.9		JL	7/22 BG
Control /	11	Surr	84	6	7.5	6	19.7	2	28	5	8.0			7/23 BG
Control /	12	Surr	84	6	7.6	6	19.7	2	28	5	8.0	HE	HE	7/24 HE
Control /	13	Surr	84	6	7.6	6	19.7	2	28	5	7.9			7/25 BG
Control /	14	Surr	84	6	7.6	6	19.9	2	28	5	8.0		JL	7/26 MMB
Control /	15	Surr	84	6	7.6	6	19.9	2	28	5	8.1	JL		7/27 JL
Control /	16	Surr	84	6	7.6	6	19.6	2	28	5	8.1		JL	7/28 JL
Control /	17	Surr	84	6	7.6	6	19.7	2	28	5	8.1			7/29 BG
Control /	18	Surr	84	6	7.6	6	19.7	2	28	5	8.0	BG	JL	7/30 BG
Control /	19	Surr	84	6	7.6	6	19.7	2	28	5	8.0			MMB 7/31
Control /	20	Surr	84	6	7.6	6	19.8	2	28	5	8.0			CR 8/1

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	START TIME/ END TIME 1040 /	DILUTION WATER BATCH FSW071113.01	PROTOCOL PSEP 1995	TEST START DATE 12-Jul-2013
JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	NEWFIELDS LABORATORY	TEMP. RECDR./HOBO#	TEST SPECIES *Neanthes arenaceodentata*	TEST END DATE 1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	D.O. meter	mg/L	TEMP meter	°C	SALINITY meter	ppt	pH meter	unit	WATER RENEWAL	Feeding	TECH/DATE
CR-12 /	0	Surr	5	6	7.6	6	20.0	2	28	5	8.1		CR	7.12.13 BH
CR-12 /	1	Surr	5	6	7.7	6	19.7	2	28	5	8.2			7/13 JL
CR-12 /	2	Surr	5	6	7.7	6	19.7	2	29	5	8.3		JL	7/14 JL
CR-12 /	3	Surr	5	6	7.6	6	19.7	2	28	5	8.0	JL		7/15 BG
CR-12 /	4	Surr	5	6	7.5	6	19.8	2	27	5	8.0		BG	7/16 BG
CR-12 /	5	Surr	5	6	7.4	6	19.9	2	28	5	8.0			7/17 BG
CR-12 /	6	Surr	5	6	7.4	6	19.9	2	28	5	8.0	JL	BG	7/18 BG
CR-12 /	7	Surr	5	6	7.1	6	20.0	2	28	5	8.0			7/19 BG
CR-12 /	8	Surr	5	6	7.5	6	19.9	2	28	5	8.2		JL	7/20 JL
CR-12 /	9	Surr	5	6	7.3	6	19.9	2	28	5	8.1	JL		7/21 JL
CR-12 /	10	Surr	5	6	7.4	6	19.7	2	28	5	8.1		JL	7/22 BG
CR-12 /	11	Surr	5	6	7.5	6	19.4	2	28	5	8.1			7/23 BG
CR-12 /	12	Surr	5	6	7.5	6	19.6	2	28	5	8.0	HE	HE	7/24 HE
CR-12 /	13	Surr	5	6	7.3	6	19.6	2	28	5	7.7			7/25 BG
CR-12 /	14	Surr	5	6	7.6	6	19.6	2	28	5	8.1		JL	7/26 MMB
CR-12 /	15	Surr	5	6	7.5	6	19.9	2	28	5	8.2	JL		7/27 [illegible]
CR-12 /	16	Surr	5	6	7.7	6	19.1	2	28	5	8.2		JL	7/28 JL
CR-12 /	17	Surr	5	6	7.3	6	19.5	2	28	5	8.1			7/29 BG
CR-12 /	18	Surr	5	6	7.4	6	19.9	2	28	5	8.0	BG	JL	7/30 BG
CR-12 /	19	Surr	5	6	7.6	6	19.6	2	28	5	8.1			MMB 7/31
CR-12 /	20	Surr	5	6	7.5	6	19.8	2	28	5	8.1			CR 8/1

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
Integral Consulting Inc.	WPAH	1040 /	FSW071113.01	PSEP 1995	12-Jul-2013
JOB NUMBER	**PROJECT MANAGER**	**NEWFIELDS LABORATORY**	**TEMP. RECDR./HOBO#**	**TEST SPECIES**	**TEST END DATE**
860.0074.000	B. Gardiner			*Neanthes arenaceodentata*	1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	WATER RENEWAL	Feeding	TECH/DATE
CARR-20 /	0	Surr	76	6	7.6	6	20.0	2	29	5	8.0		CR	7.12.13 BH
CARR-20 /	1	Surr	76	6	7.5	6	19.8	2	28	5	8.0			7/13 JL
CARR-20 /	2	Surr	76	6	7.6	6	19.7	2	28	5	8.2		JL	7/14 JL
CARR-20 /	3	Surr	76	6	7.4	6	19.7	2	27	5	7.9	JL		7/15 BG
CARR-20 /	4	Surr	76	6	7.4	6	19.7	2	27	5	8.0		BG	7/16 BG
CARR-20 /	5	Surr	76	6	7.4	6	19.7	2	27	5	7.9			7/17 BG
CARR-20 /	6	Surr	76	6	7.4	6	19.8	2	28	5	8.0	JL	BG	7/18 BG
CARR-20 /	7	Surr	76	6	7.2	6	19.8	2	28	5	8.0			7/19 BG
CARR-20 /	8	Surr	76	6	7.4	6	19.9	2	28	5	8.1		JL	7/20 JL
CARR-20 /	9	Surr	76	6	7.3	6	19.9	2	28	5	8.0	JL		7/21 JL
CARR-20 /	10	Surr	76	6	7.4	6	19.8	2	28	5	8.2		JL	7/22 BG
CARR-20 /	11	Surr	76	6	7.5	6	19.7	2	28	5	8.1			7/23 BG
CARR-20 /	12	Surr	76	6	7.6	6	19.6	2	28	5	8.2	HE	HE	7/24 TK
CARR-20 /	13	Surr	76	6	7.6	6	19.6	2	28	5	8.1			7/25 BG
CARR-20 /	14	Surr	76	6	7.5	6	19.7	2	28	5	8.2		JL	MMB 7/26
CARR-20 /	15	Surr	76	6	7.5	6	19.8	2	28	5	8.0	JL		JL 7/27
CARR-20 /	16	Surr	76	6	7.6	6	19.6	2	28	5	8.3		JL	7/28 JL
CARR-20 /	17	Surr	76	6	7.5	6	19.7	2	28	5	8.3			7/29 BG
CARR-20 /	18	Surr	76	6	7.6	6	19.7	2	28	5	8.2	BG	JL	7/30 BG
CARR-20 /	19	Surr	76	6	7.6	6	19.7	2	28	5	8.2			MMB 7/31
CARR-20 /	20	Surr	76	6	7.6	6	19.8	2	28	5	8.2			CR 8/1

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20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
Integral Consulting Inc.	WPAH	/	FSW071113.01	PSEP 1995	12-Jul-2013
JOB NUMBER	**PROJECT MANAGER**	**NEWFIELDS LABORATORY**	**TEMP. RECDR./HOBO#**	**TEST SPECIES**	**TEST END DATE**
860.0074.000	B. Gardiner			*Neanthes arenaceodentata*	1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	WATER RENEWAL	Feeding	TECH/DATE
CR-02 /	0	Surr	16	6	7.5	6	20.3	2	28	5	7.9		CR	7.12.13 BH
CR-02 /	1	Surr	16	6	7.5	6	19.9	2	28	5	8.0			7/13 JL
CR-02 /	2	Surr	16	6	7.5	6	19.8	2	28	5	8.1		JL	7/14 JL
CR-02 /	3	Surr	16	6	7.5	6	19.7	2	27	5	7.8	JL		7/15 BG
CR-02 /	4	Surr	16	6	7.4	6	19.8	2	27	5	7.9		BG	7/16 BG
CR-02 /	5	Surr	16	6	7.3	6	19.8	2	27	5	7.8			7/17 BG
CR-02 /	6	Surr	16	6	7.4	6	20.0	2	28	5	7.8	JL	BG	7/18 BG
CR-02 /	7	Surr	16	6	7.3	6	19.8	2	28	5	7.9			7/19 BG
CR-02 /	8	Surr	16	6	7.3	6	20.0	2	28	5	8.1		JL	7/20 JL
CR-02 /	9	Surr	16	6	7.2	6	20.0	2	28	5	8.1	JL		7/21 JL
CR-02 /	10	Surr	16	6	7.4	6	19.8	2	28	5	8.2		JL	7/22 BG
CR-02 /	11	Surr	16	6	7.5	6	19.6	2	28	5	8.0			7/23 BG
CR-02 /	12	Surr	16	6	1.6	6	19.6	2	28	5	8.0	HE	HE	7/24 HE
CR-02 /	13	Surr	16	6	7.5	6	19.6	2	28	~~5~~	~~8.9~~ ① 7.9			7/25 BG
CR-02 /	14	Surr	16	6	7.5	6	19.7	2	28	5	8.2		JL	7/26 MMB
CR-02 /	15	Surr	16	6	7.5	6	19.8	2	28	5	8.3	JL		7/27 JL
CR-02 /	16	Surr	16	6	7.5	6	19.5	2	28	5	8.4		JL	7/28 JL
CR-02 /	17	Surr	16	6	7.5	6	19.6	2	28	5	8.3			7/29 BG
CR-02 /	18	Surr	16	6	7.5	6	19.8	2	28	5	8.2	BG	JL	7/30 BG
CR-02 /	19	Surr	16	6	7.6	6	19.7	2	28	5	8.2			MMB 7/31
CR-02 /	20	Surr	16	6	7.6	6	19.8	2	28	5	8.2			CR 8/1

① WC HE ~~8~~ 7/24

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20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	START TIME/ END TIME 1040 /	DILUTION WATER BATCH FSW071113.01	PROTOCOL PSEP 1995	TEST START DATE 12-Jul-2013
JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	NEWFIELDS LABORATORY	TEMP. RECDR./HOBO#	TEST SPECIES *Neanthes arenaceodentata*	TEST END DATE 1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	WATER RENEWAL	Feeding	TECH/DATE
SD0001 /	0	Surr	64	6	7.5	6	19.9	2	28	5	7.9		CR	7.1213 AH
SD0001 /	1	Surr	64	6	7.4	6	20.0	2	29	5	7.9			7/13 JL
SD0001 /	2	Surr	64	6	7.5	6	19.7	2	29	5	8.0		JL	JL 7/14
SD0001 /	3	Surr	64	6	7.4	6	19.7	2	28	5	7.8	JL		BG 7/15
SD0001 /	4	Surr	64	6	7.4	6	19.7	2	27	5	8.0		BG	BG 7/16
SD0001 /	5	Surr	64	6	7.3	6	19.8	2	27	5	7.9			BG 7/17
SD0001 /	6	Surr	64	6	7.4	6	19.8	2	28	5	8.0	JL	BG	7/18 BG
SD0001 /	7	Surr	64	6	7.2	6	19.8	2	28	5	7.9			7/19 BG
SD0001 /	8	Surr	64	6	7.4	6	19.9	2	28	5	8.0		JL	7/20 JL
SD0001 /	9	Surr	64	6	7.3	6	20.0	2	28	5	7.9	JL		7/21 JL
SD0001 /	10	Surr	64	6	7.4	6	19.8	2	28	5	8.1		JL	7/22 BG
SD0001 /	11	Surr	64	6	7.5	6	19.7	2	28	5	8.2			7/23 BG
SD0001 /	12	Surr	64	6	7.5	6	19.6	2	28	5	8.2	HE	HE	7/24 HE
SD0001 /	13	Surr	64	6	7.6	6	19.6	2	28	5	8.0			7/25 BG
SD0001 /	14	Surr	64	6	7.5	6	19.7	2	28	5	8.1		JL	7/26 MMB
SD0001 /	15	Surr	64	6	7.5	6	19.9	2	28	5	8.2	JL		7/27 JL
SD0001 /	16	Surr	64	6	7.5	6	19.6	2	28	5	8.2		JL	7/28 JL
SD0001 /	17	Surr	64	6	7.5	6	19.7	2	28	5	8.2			7/29 BG
SD0001 /	18	Surr	64	6	7.5	6	19.8	2	28	5	8.0	BG	JL	7/30 BG
SD0001 /	19	Surr	64	6	7.5	6	19.7	2	28	5	7.9			MMB 7/31
SD0001 /	20	Surr	64	6	7.6	6	19.9	2	28	5	8.0			CR 8/1

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20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
Integral Consulting Inc.	WPAH	1040 /	FSW071113.01	PSEP 1995	12-Jul-2013
JOB NUMBER	**PROJECT MANAGER**	**NEWFIELDS LABORATORY**	**TEMP. RECDR./HOBO#**	**TEST SPECIES**	**TEST END DATE**
860.0074.000	B. Gardiner			*Neanthes arenaceodentata*	1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WATER RENEWAL	Feeding	TECH/DATE
SD0002 /	0	Surr	61	6	7.5	6	19.9	2	28	5	7.9		CR	7.12.13 BH
SD0002 /	1	Surr	61	6	7.3	6	20.2	2	28	5	7.8			7/13 JL
SD0002 /	2	Surr	61	6	7.4	6	19.7	2	29	5	8.0		JL	7/14 JL
SD0002 /	3	Surr	61	6	7.3	6	19.7	2	28	5	7.8	JL		7/15 BG
SD0002 /	4	Surr	61	6	7.3	6	19.7	2	27	5	7.9		BG	7/16 BG
SD0002 /	5	Surr	61	6	7.1	6	19.8	2	27	5	7.9			7/17 BG
SD0002 /	6	Surr	61	6	7.2	6	19.9	2	28	5	8.0	JL	BG	7/18 BG
SD0002 /	7	Surr	61	6	7.0	6	19.8	2	28	5	7.9			7/19 BG
SD0002 /	8	Surr	61	6	7.2	6	19.9	2	28	5	8.2		JL	7/20 JL
SD0002 /	9	Surr	61	6	7.1	6	20.0	2	28	5	8.0	JL		7/21 JL
SD0002 /	10	Surr	61	6	7.4	6	19.8	2	28	5	8.2		JL	7/22 BG
SD0002 /	11	Surr	61	6	7.4	6	19.6	2	28	5	8.4			7/23 BG
SD0002 /	12	Surr	61	6	7.4	6	19.7	2	28	5	8.4	HE	HE	7/24 HE
SD0002 /	13	Surr	61	6	7.5	6	19.6	2	28	5	8.1			7/25 BG
SD0002 /	14	Surr	61	6	7.5	6	19.7	2	28	5	8.2		JL	MMB 7/26
SD0002 /	15	Surr	61	6	7.4	6	19.8	2	28	5	8.3	JL		7/27 JL
SD0002 /	16	Surr	61	6	7.6	6	19.6	2	28	5	8.2		JL	7/28 JL
SD0002 /	17	Surr	61	6	7.5	6	19.8	2	28	5	8.1			7/29 BG
SD0002 /	18	Surr	61	6	7.5	6	19.7	2	28	5	7.9	BG	JL	7/30 BG
SD0002 /	19	Surr	61	6	7.5	6	19.7	2	28	5	7.9			MMB 7/31
SD0002 /	20	Surr	61	6	7.6	6	19.9	2	28	5	7.9			CR 8/1

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20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	START TIME/ END TIME 1040 /	DILUTION WATER BATCH FSW071113.01	PROTOCOL PSEP 1995	TEST START DATE 12-Jul-2013
JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	NEWFIELDS LABORATORY	TEMP. RECDR./HOBO#	TEST SPECIES *Neanthes arenaceodentata*	TEST END DATE 1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	WATER RENEWAL	Feeding	TECH/DATE
SD0003 /	0	Surr	19	6	7.5	6	20.3	2	29	5	8.0		CR	7.12.13 BH
SD0003 /	1	Surr	19	6	7.3	6	19.9	2	29	5	7.9			7/13 JL
SD0003 /	2	Surr	19	6	7.5	6	19.8	2	29	5	8.0		JL	7/14 JL
SD0003 /	3	Surr	19	6	7.4	6	19.8	2	28	5	7.8	JL		7/15 BG
SD0003 /	4	Surr	19	6	7.4	6	19.8	2	28	5	7.9		BG	7/16 BG
SD0003 /	5	Surr	19	6	7.1	6	19.9	2	28	5	7.9			7/17 BG
SD0003 /	6	Surr	19	6	7.3	6	19.9	2	28	5	8.1	JL	BG	7/18 BG
SD0003 /	7	Surr	19	6	7.2	6	19.9	2	28	5	8.1			7/19 BG
SD0003 /	8	Surr	19	6	7.3	6	20.0	2	28	5	8.3		JL	7/20 JL
SD0003 /	9	Surr	19	6	7.2	6	20.0	2	28	5	8.2	JL		7/21 JL
SD0003 /	10	Surr	19	6	7.3	6	19.8	2	28	5	8.3		JL	7/22 BG
SD0003 /	11	Surr	19	6	7.4	6	19.7	2	28	5	8.3			7/23 BG
SD0003 /	12	Surr	19	6	7.5	6	19.7	2	28	5	8.3	HE	HE	7/24 HE
SD0003 /	13	Surr	19	6	7.3	6	19.7	2	28	5	8.1			7/25 BG
SD0003 /	14	Surr	19	6	7.6	6	19.8	2	28	5	8.3		JL	7/26 MMB
SD0003 /	15	Surr	19	6	7.5	6	19.8	2	28	5	8.3	JL		7/27 [illegible]
SD0003 /	16	Surr	19	6	7.5	6	19.6	2	28	5	8.3		JL	7/28 JL
SD0003 /	17	Surr	19	6	7.5	6	19.7	2	28	5	8.2			7/29 BG
SD0003 /	18	Surr	19	6	7.6	6	19.8	2	28	5	8.1	BG	JL	7/30 BG
SD0003 /	19	Surr	19	6	7.5	6	19.7	2	28	5	8.1			MMB 7/31
SD0003 /	20	Surr	19	6	7.7	6	19.8	2	28	5	8.1			CR 8/1

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
Integral Consulting Inc.	WPAH	1040 /	FSW071113.01	PSEP 1995	12-Jul-2013
JOB NUMBER	**PROJECT MANAGER**	**NEWFIELDS LABORATORY**	**TEMP. RECDR./HOBO#**	**TEST SPECIES**	**TEST END DATE**
860.0074.000	B. Gardiner			*Neanthes arenaceodentata*	1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	D.O. meter	mg/L	TEMP meter	°C	SALINITY meter	ppt	pH meter	unit	WATER RENEWAL	Feeding	TECH/DATE
SD0004 /	0	Surr	41	6	7.5	6	20.1	2	28	5	7.9		CR	7.12.13 BH
SD0004 /	1	Surr	41	6	7.4	6	19.9	2	29	5	7.9			7/13 JL
SD0004 /	2	Surr	41	6	7.5	6	19.8	2	29	5	8.0		JL	7/14 JL
SD0004 /	3	Surr	41	6	7.2	6	19.8	2	28	5	7.8	JL		7/15 BG
SD0004 /	4	Surr	41	6	7.2	6	19.8	2	28	5	8.1		BG	7/16 BG
SD0004 /	5	Surr	41	6	7.0	6	19.9	2	28	5	8.1			7/17 BG
SD0004 /	6	Surr	41	6	7.1	6	19.9	2	28	5	8.3	JL	BG	7/18 BG
SD0004 /	7	Surr	41	6	7.0	6	19.9	2	28	5	8.2			7/19 BG
SD0004 /	8	Surr	41	6	7.3	6	20.0	2	28	5	8.5		JL	7/20 JL
SD0004 /	9	Surr	41	6	7.1	6	20.0	2	28	5	8.3	JL		7/21 JL
SD0004 /	10	Surr	41	6	7.4	6	19.8	2	28	5	8.4		JL	7/22 BG
SD0004 /	11	Surr	41	6	7.4	6	19.7	2	28	5	8.4			7/23 BG
SD0004 /	12	Surr	41	6	7.5	6	19.6	2	28	5	8.5	HE	HE	7/24 HE
SD0004 /	13	Surr	41	6	7.5	6	19.6	2	28	5	8.2			7/25 BG
SD0004 /	14	Surr	41	6	7.5	6	19.8	2	28	5	8.4		JL	7/26 MMB
SD0004 /	15	Surr	41	6	7.5	6	19.8	2	28	5	8.5	JL		7/27 HE
SD0004 /	16	Surr	41	6	7.6	6	19.6	2	28	5	8.4		JL	7/28 JL
SD0004 /	17	Surr	41	6	7.5	6	19.7	2	28	5	8.4			7/29 BG
SD0004 /	18	Surr	41	6	7.6	6	19.8	2	28	5	8.2	BG	JL	7/30 BG
SD0004 /	19	Surr	41	6	7.5	6	19.7	2	28	5	8.2			MMB 7/31
SD0004 /	20	Surr	41	6	7.7	6	19.8	2	28	5	8.2			CR 8/1

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	START TIME/ END TIME 1040 /	DILUTION WATER BATCH FSW071113.01	PROTOCOL PSEP 1995	TEST START DATE 12-Jul-2013
JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	NEWFIELDS LABORATORY	TEMP. RECDR./HOBO#	TEST SPECIES *Neanthes arenaceodentata*	TEST END DATE 1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	WATER RENEWAL	Feeding	TECH/DATE
SD0005 /	0	Surr	127	6	7.5	6	20.4	2	28	5	8.0		GR	7.12.13 BH
SD0005 /	1	Surr	127	6	7.6	6	20.0	2	29	5	8.0			7/13 JL
SD0005 /	2	Surr	127	6	7.6	6	20.0	2	29	5	8.1		JL	7/14 JL
SD0005 /	3	Surr	127	6	7.6	6	19.8	2	28	5	7.9	JL		7/15 BG
SD0005 /	4	Surr	127	6	7.5	6	19.9	2	28	5	8.0		BG	7/16 BG
SD0005 /	5	Surr	127	6	7.4	6	19.9	2	28	5	8.0			7/17 BG
SD0005 /	6	Surr	127	6	7.5	6	20.0	2	27	5	8.1	JL	BG	7/18 BG
SD0005 /	7	Surr	127	6	7.3	6	20.0	2	28	5	8.0			7/18 BG
SD0005 /	8	Surr	127	6	7.5	6	20.1	2	28	5	8.1		JL	7/20 JL
SD0005 /	9	Surr	127	6	7.4	6	20.1	2	28	5	8.0	JL		7/21 JL
SD0005 /	10	Surr	127	6	7.4	6	19.9	2	28	5	8.1		JL	7/22 BG
SD0005 /	11	Surr	127	6	7.6	6	19.8	2	28	5	8.2			7/23 BG
SD0005 /	12	Surr	127	6	7.6	6	19.7	2	28	5	8.2	HE	HE	7/24 HE
SD0005 /	13	Surr	127	6	7.6	6	19.7	2	28	5	8.0			7/25 BG
SD0005 /	14	Surr	127	6	7.7	6	19.7	2	28	5	8.1		JL	7/26 MMB
SD0005 /	15	Surr	127	6	7.6	6	19.9	2	28	5	8.3	JL		7/27 JL
SD0005 /	16	Surr	127	6	7.6	6	19.7	2	28	5	8.3		JL	7/28 JL
SD0005 /	17	Surr	127	6	7.5	6	19.8	2	28	5	8.2			7/29 BG
SD0005 /	18	Surr	127	6	7.6	6	19.8	2	28	5	8.1	BG	JL	7/30 BG
SD0005 /	19	Surr	127	6	7.6	6	19.8	2	28	5	8.1			MMB 7/31
SD0005 /	20	Surr	127	6	7.6	6	19.9	2	28	5	8.1			GR 8/1

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
Integral Consulting Inc.	WPAH	1040 /	FSW071113.01	PSEP 1995	12-Jul-2013
JOB NUMBER	**PROJECT MANAGER**	**NEWFIELDS LABORATORY**	**TEMP. RECDR./HOBO#**	**TEST SPECIES**	**TEST END DATE**
860.0074.000	B. Gardiner			*Neanthes arenaceodentata*	1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	D.O.		TEMP		SALINITY		pH		WATER RENEWAL	Feeding	TECH/DATE
				meter	mg/L	meter	°C	meter	ppt	meter	unit			
SD0006 /	0	Surr	128	6	7.5	6	20.4	2	28	5	8.0		CR	7.12.13 BH
SD0006 /	1	Surr	128	6	7.6	6	20.0	2	29	5	8.0			7/13 JL
SD0006 /	2	Surr	128	6	7.7	6	20.0	2	29	5	8.2		JL	7/14 JL
SD0006 /	3	Surr	128	6	7.5	6	19.8	2	28	5	8.0	JL		7/15 BG
SD0006 /	4	Surr	128	6	7.5	6	19.8	2	28	5	8.2		BG	7/16 BG
SD0006 /	5	Surr	128	6	7.4	6	19.9	2	28	5	8.1			7/17 BG
SD0006 /	6	Surr	128	6	7.5	6	20.0	2	28	5	8.2	JL	BG	7/18 BG
SD0006 /	7	Surr	128	6	7.4	6	19.9	2	28	5	8.1			7/19 BG
SD0006 /	8	Surr	128	6	7.4	6	20.1	2	28	5	8.2		JL	7/20 JL
SD0006 /	9	Surr	128	6	7.4	6	20.1	2	28	5	8.1	JL		7/21 JL
SD0006 /	10	Surr	128	6	7.4	6	19.9	2	28	5	8.3		JL	7/22 BG
SD0006 /	11	Surr	128	6	7.6	6	19.8	2	28	5	8.4			7/23 BG
SD0006 /	12	Surr	128	6	7.6	6	19.7	2	28	5	8.4	HE	HE	7/24 HE
SD0006 /	13	Surr	128	6	7.6	6	19.7	2	28	5	8.1			7/25 BG
SD0006 /	14	Surr	128	6	7.6	6	19.8	2	28	5	8.3		JL	7/26 MMB
SD0006 /	15	Surr	128	6	7.6	6	20.0	2	28	5	8.4	JL		7/27 JL
SD0006 /	16	Surr	128	6	7.5	6	19.7	2	28	5	8.4		JL	7/28 JL
SD0006 /	17	Surr	128	6	7.5	6	19.8	2	28	5	8.3			7/29 BG
SD0006 /	18	Surr	128	6	7.6	6	19.8	2	28	5	8.2	BG	JL	7/30 BG
SD0006 /	19	Surr	128	6	7.6	6	19.8	2	28	5	8.1			MMB 7/31
SD0006 /	20	Surr	128	6	7.6	6	19.9	2	28	5	8.2			CR 8/1

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
Integral Consulting Inc.	WPAH	1040 /	FSW071113.01	PSEP 1995	12-Jul-2013
JOB NUMBER	**PROJECT MANAGER**	**NEWFIELDS LABORATORY**	**TEMP. RECDR./HOBO#**	**TEST SPECIES**	**TEST END DATE**
860.0074.000	B. Gardiner			*Neanthes arenaceodentata*	1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	WATER RENEWAL	Feeding	TECH/DATE
SD0007 /	0	Surr	129	6	7.5	6	20.5	2	28	5	8.1		CR	7.12.13 BH
SD0007 /	1	Surr	129	6	7.5	6	20.1	2	29	5	8.1			7/13 JL
SD0007 /	2	Surr	129	6	7.6	6	20.0	2	29	5	8.2		JL	JL 7/14
SD0007 /	3	Surr	129	6	7.4	6	19.9	2	28	5	8.0	JL		BG 7/15
SD0007 /	4	Surr	129	6	7.4	6	20.0	2	28	5	8.2		BG	BG 7/16
SD0007 /	5	Surr	129	6	7.2	6	20.1	2	28	5	8.2			BG 7/17
SD0007 /	6	Surr	129	6	7.3	6	20.1	2	28	5	8.4	JL	BG	7/18 BG
SD0007 /	7	Surr	129	6	7.2	6	20	2	28	5	8.2			7/19 BG
SD0007 /	8	Surr	129	6	7.4	6	20.2	2	28	2	8.3		JL	7/20 JL
SD0007 /	9	Surr	129	6	7.3	6	20.2	2	28	5	8.2	JL		7/21 JL
SD0007 /	10	Surr	129	6	7.4	6	19.9	2	28	5	8.3		JL	7/22 BG
SD0007 /	11	Surr	129	6	7.5	6	19.9	2	28	5	8.5			7/23 BG
SD0007 /	12	Surr	129	6	7.5	6	19.7	2	28	5	8.5	HE	HE	7/24 HE
SD0007 /	13	Surr	129	6	7.5	6	19.8	2	28	5	8.2			7/25 BG
SD0007 /	14	Surr	129	6	7.6	6	19.8	2	28	5	8.3		JL	7/26 MMB
SD0007 /	15	Surr	129	6	7.5	6	20.0	2	28	5	8.4	JL		7/27 JL
SD0007 /	16	Surr	129	6	7.5	6	19.7	2	28	5	8.3		JL	7/28 JL
SD0007 /	17	Surr	129	6	7.5	6	19.9	2	28	5	8.2			7/29 BG
SD0007 /	18	Surr	129	6	7.6	6	19.9	2	28	5	8.1	BG	JL	7/30 BG
SD0007 /	19	Surr	129	6	7.6	6	19.9	2	28	5	8.1			MMB 7/31
SD0007 /	20	Surr	129	6	7.7	6	19.9	2	28	5	8.1			GR 8/1

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20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
Integral Consulting Inc.	WPAH	1040 /	FSW071113.01	PSEP 1995	12-Jul-2013
JOB NUMBER	**PROJECT MANAGER**	**NEWFIELDS LABORATORY**	**TEMP. RECDR./HOBO#**	**TEST SPECIES**	**TEST END DATE**
860.0074.000	B. Gardiner			*Neanthes arenaceodentata*	1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	D.O.		TEMP		SALINITY		pH		WATER RENEWAL	Feeding	TECH/DATE
				meter	mg/L	meter	°C	meter	ppt	meter	unit			
SD0008 /	0	Surr	103	6	7.4	6	20.5	2	28	5	7.9		CR	7.12.13 BH
SD0008 /	1	Surr	103	6	7.4	6	19.9	2	29	5	7.9			7/13 JL
SD0008 /	2	Surr	103	6	7.5	6	19.9	2	29	5	8.0		JL	7/14 JL
SD0008 /	3	Surr	103	6	7.2	6	19.7	2	28	5	7.8	JL		7/15 BG
SD0008 /	4	Surr	103	6	7.1	6	19.8	2	28	5	8.3		BG	7/16 BG
SD0008 /	5	Surr	103	6	6.7	6	19.9	2	28	5	8.3			7/17 BG
SD0008 /	6	Surr	103	6	7.0	6	19.9	2	28	5	8.5	JL	BG	7/18 BG
SD0008 /	7	Surr	103	6	6.7	6	19.9	2	28	5	8.4			7/19 BG
SD0008 /	8	Surr	103	6	7.1	6	20.0	2	28	5	8.5		JL	7/20 JL
SD0008 /	9	Surr	103	6	6.9	6	20.0	2	28	5	8.3	JL		7/21 JL
SD0008 /	10	Surr	103	6	7.0	6	19.8	2	28	5	8.4		JL	7/22 BG
SD0008 /	11	Surr	103	6	7.2	6	19.8	2	28	5	8.6			7/23 BG
SD0008 /	12	Surr	103	6	7.4	6	19.7	2	28	5	8.8	HE	HE	7/24 HE
SD0008 /	13	Surr	103	6	7.2	6	19.7	2	28	5	8.6			7/25 BG
SD0008 /	14	Surr	103	6	7.3	6	19.7	2	28	5	8.6		JL	7/26 MMB
SD0008 /	15	Surr	103	6	7.4	6	19.8	2	28	5	8.6	JL		7/27 JL
SD0008 /	16	Surr	103	6	7.4	6	19.7	2	28	5	8.5		JL	7/28 JL
SD0008 /	17	Surr	103	6	7.5	6	19.7	2	28	5	8.4			7/29 BG
SD0008 /	18	Surr	103	6	7.5	6	19.8	2	28	5	8.3	BG	JL	7/30 BG
SD0008 /	19	Surr	103	6	7.6	6	19.8	2	28	5	8.2			MMB 7/31
SD0008 /	20	Surr	103	6	7.6	6	19.8	2	28	5	8.2			CR 8/1

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
Integral Consulting Inc.	WPAH	1040 /	FSW071113.01	PSEP 1995	12-Jul-2013
JOB NUMBER	**PROJECT MANAGER**	**NEWFIELDS LABORATORY**	**TEMP. RECDR./HOBO#**	**TEST SPECIES**	**TEST END DATE**
860.0074.000	B. Gardiner			*Neanthes arenaceodentata*	1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	WATER RENEWAL	Feeding	TECH/DATE
SD0009 /	0	Surr	46	6	7.6	6	20.0	2	28	5	8.0		CR	7.12.13 BH
SD0009 /	1	Surr	46	6	7.4	6	19.9	2	29	5	8.0			7/13 JL
SD0009 /	2	Surr	46	6	7.5	6	19.8	2	29	5	8.1		JL	7/14 JL
SD0009 /	3	Surr	46	6	7.4	6	19.8	2	28	5	7.8	JL		7/15 BG
SD0009 /	4	Surr	46	6	7.4	6	19.8	2	28	5	8.1		BG	7/16 BG
SD0009 /	5	Surr	46	6	7.2	6	19.8	2	28	5	8.0			7/17 BG
SD0009 /	6	Surr	46	6	7.4	6	19.9	2	28	5	8.2	JL	BG	7/18 BG
SD0009 /	7	Surr	46	6	7.1	6	19.9	2	28	5	8.1			7/19 BG
SD0009 /	8	Surr	46	6	7.3	6	20.0	2	28	5	8.2		JL	7/20 JL
SD0009 /	9	Surr	46	6	7.2	6	20.0	2	28	5	8.1	JL		7/21 JL
SD0009 /	10	Surr	46	6	7.4	6	19.8	2	28	5	8.2		JL	7/22 BG
SD0009 /	11	Surr	46	6	7.5	6	19.7	2	28	5	8.4			7/23 BG
SD0009 /	12	Surr	46	6	7.6	6	19.6	2	20 6	5	8.3	HE	HE	7/24
SD0009 /	13	Surr	46	6	7.5	6	19.7	2	28	5	8.0			7/25 BG
SD0009 /	14	Surr	46	6	7.6	6	19.7	2	28	5	8.1		JL	7/26 MMB
SD0009 /	15	Surr	46	6	7.6	6	19.8	2	28	5	8.2	JL		7/27
SD0009 /	16	Surr	46	6	7.6	6	19.6	2	28	5	8.2		JL	7/28 JL
SD0009 /	17	Surr	46	6	7.6	6	19.7	2	28	5	8.1			7/29 BG
SD0009 /	18	Surr	46	6	7.6	6	19.8	2	28	5	8.0	BG	JL	7/30 BG
SD0009 /	19	Surr	46	6	7.6	6	19.7	2	28	5	8.0			MMB 7/31
SD0009 /	20	Surr	46	6	7.6	6	19.8	2	28	5	8.0			CR 8/1

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
Integral Consulting Inc.	WPAH	1040 /	FSW071113.01	PSEP 1995	12-Jul-2013
JOB NUMBER	**PROJECT MANAGER**	**NEWFIELDS LABORATORY**	**TEMP. RECDR./HOBO#**	**TEST SPECIES**	**TEST END DATE**
860.0074.000	B. Gardiner			*Neanthes arenaceodentata*	1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	WATER RENEWAL	Feeding	TECH/DATE
SD0010 /	0	Surr	90	6	7.6	6	20.2	2	28	5	8.0		CR	7.12.13 BH
SD0010 /	1	Surr	90	6	7.5	6	20.0	2	29	5	7.9			7/13 JL
SD0010 /	2	Surr	90	6	7.6	6	19.9	2	29	5	8.0		JL	7/14 JL
SD0010 /	3	Surr	90	6	7.5	6	19.7	2	28	5	7.8	JL		7/15 BG
SD0010 /	4	Surr	90	6	7.4	6	19.8	2	28	5	7.9		BG	7/16 BG
SD0010 /	5	Surr	90	6	7.2	6	19.9	2	28	5	7.8			7/17 BG
SD0010 /	6	Surr	90	6	7.4	6	19.9	2	28	5	8.0	JL	BG	7/18 BG
SD0010 /	7	Surr	90	6	7.2	6	19.9	2	28	5	7.9			7/19 BG
SD0010 /	8	Surr	90	6	7.4	6	20.0	2	28	5	8.1		JL	7/20 JL
SD0010 /	9	Surr	90	6	7.2	6	20.1	2	28	5	8.0	JL		7/21 JL
SD0010 /	10	Surr	90	6	7.4	6	19.8	2	28	5	8.2		JL	7/22 BG
SD0010 /	11	Surr	90	6	7.5	6	19.7	2	28	5	8.1			7/23 BG
SD0010 /	12	Surr	90	6	7.6	6	19.6	2	28	5	8.1	HE	HE	7/24 HE
SD0010 /	13	Surr	90	6	7.5	6	19.7	2	28	5	7.9			7/25 BG
SD0010 /	14	Surr	90	6	7.6	6	19.8	2	28	5	8.1		JL	7/26 MMB
SD0010 /	15	Surr	90	6	7.6	6	19.8	2	28	5	8.1	JL		7/27 JL
SD0010 /	16	Surr	90	6	7.6	6	19.7	2	28	5	8.1		JL	7/28 JL
SD0010 /	17	Surr	90	6	7.6	6	19.7	2	28	5	8.1			7/29 BG
SD0010 /	18	Surr	90	6	7.6	6	19.8	2	28	5	8.0	BG	JL	7/30 BG
SD0010 /	19	Surr	90	6	7.6	6	19.8	2	28	5	8.0			MMB 7/31
SD0010 /	20	Surr	90	6	7.7	6	19.8	2	28	5	8.0			CR 8/1

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	START TIME/ END TIME 1040 / 0955	DILUTION WATER BATCH FSW071113.01	PROTOCOL PSEP 1995	TEST START DATE 12-Jul-2013
JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	NEWFIELDS LABORATORY	TEMP. RECDR./HOBO#	TEST SPECIES *Neanthes arenaceodentata*	TEST END DATE 1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	WATER RENEWAL	Feeding	TECH/DATE
SD0011 /	0	Surr	56	6	7.4	6	19.9	2	28	5	7.9		CR	7.12.13 BH
SD0011 /	1	Surr	56	6	7.0	6	20.1	2	29	5	7.8			7/13 JL
SD0011 /	2	Surr	56	6	7.0	6	19.9	2	29	5	7.8		JL	7/14 JL
SD0011 /	3	Surr	56	6	7.3	6	19.8	2	28	5	7.8	JL		7/15 BG
SD0011 /	4	Surr	56	6	7.3	6	19.9	2	28	5	8.0		BG	7/16 BG
SD0011 /	5	Surr	56	6	7.0	6	19.9	2	28	5	7.9			7/17 BG
SD0011 /	6	Surr	56	6	7.1	6	20.0	2	28	5	8.0	JL	BG	7/18 BG
SD0011 /	7	Surr	56	6	6.9	6	19.9	2	28	5	7.9			7/19 BG
SD0011 /	8	Surr	56	6	7.2	6	20.0	2	28	5	8.0		JL	7/20 JL
SD0011 /	9	Surr	56	6	7.0	6	20.1	2	28	5	7.9	JL		7/21 JL
SD0011 /	10	Surr	56	6	7.2	6	19.9	2	28	5	8.1		JL	7/22 BG
SD0011 /	11	Surr	56	6	7.5	6	19.7	2	28	5	8.3			7/23 BG
SD0011 /	12	Surr	56	6	7.5	6	19.6	2	28	6	8.2	HE	HE	7/24 HE
SD0011 /	13	Surr	56	6	7.5	6	19.6	2	28	5	8.0			7/25 BG
SD0011 /	14	Surr	56	6	7.6	6	19.7	2	28	5	8.1		JL	7/26 MMB
SD0011 /	15	Surr	56	6	7.5	6	19.9	2	28	5	8.2	JL		7/27 HE
SD0011 /	16	Surr	56	6	7.5	6	19.6	2	28	5	8.1		JL	7/28 JL
SD0011 /	17	Surr	56	6	7.5	6	19.7	2	28	5	8.0			7/29 BG
SD0011 /	18	Surr	56	6	7.5	6	19.8	2	28	5	8.0	BG	JL	7/30 BG
SD0011 /	19	Surr	56	6	7.6	6	19.7	2	28	5	7.9			MMB 7/31
SD0011 /	20	Surr	56	6	7.6	6	19.9	2	28	5	7.9			CR 8/1

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	START TIME/ END TIME 1040 /	DILUTION WATER BATCH FSW071113.01	PROTOCOL PSEP 1995	TEST START DATE 12-Jul-2013
JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	NEWFIELDS LABORATORY	TEMP. RECDR./HOBO#	TEST SPECIES *Neanthes arenaceodentata*	TEST END DATE 1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	WATER RENEWAL	Feeding	TECH/DATE
SD0012 /	0	Surr	49	6	7.6	6	20.0	2	28	5	8.0		CR	7.12.13 BH
SD0012 /	1	Surr	49	6	7.4	6	19.9	2	29	5	8.0			7/13 JL
SD0012 /	2	Surr	49	6	7.5	6	19.8	2	29	5	8.1		JL	7/14 JL
SD0012 /	3	Surr	49	6	7.6	6	19.8	2	28	5	7.9	JL		7/15 BG
SD0012 /	4	Surr	49	6	7.4	6	19.8	2	28	5	8.0		BG	7/16 BG
SD0012 /	5	Surr	49	6	7.3	6	19.8	2	28	5	8.0			7/17 BG
SD0012 /	6	Surr	49	6	7.4	6	19.9	2	28	5	8.2	JL	BG	7/18 BG
SD0012 /	7	Surr	49	6	7.3	6	19.9	2	28	5	8.2			7/19 BG
SD0012 /	8	Surr	49	6	7.4	6	20.0	2	28	5	8.3		JL	7/20 JL
SD0012 /	9	Surr	49	6	7.2	6	20.0	2	28	5	8.2	JL		7/21 JL
SD0012 /	10	Surr	49	6	7.4	6	19.8	2	28	5	8.3		JL	7/22 BG
SD0012 /	11	Surr	49	6	7.5	6	19.7	2	28	5	8.3			7/23 BG
SD0012 /	12	Surr	49	6	7.6	6	19.6	2	28	5	8.4	HE	HE	7/24 HE
SD0012 /	13	Surr	49	6	7.5	6	19.7	2	28	5	8.1			7/25 BG
SD0012 /	14	Surr	49	6	7.5	6	19.8	2	28	5	8.3		JL	7/26 MMB
SD0012 /	15	Surr	49	6	7.5	6	19.9	2	28	5	8.4	JL		7/27 HE
SD0012 /	16	Surr	49	6	7.5	6	19.6	2	28	5	8.4		JL	7/28 JL
SD0012 /	17	Surr	49	6	7.5	6	19.7	2	28	5	8.3			7/29 BG
SD0012 /	18	Surr	49	6	7.6	6	19.8	2	28	5	8.2	BG	JL	7/30 BG
SD0012 /	19	Surr	49	6	7.6	6	19.7	2	28	5	8.2			MMB 7/31
SD0012 /	20	Surr	49	6	7.6	6	19.8	2	28	5	8.2			CR 8/1

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	START TIME/ END TIME 1040 /	DILUTION WATER BATCH FSW071113.01	PROTOCOL PSEP 1995	TEST START DATE 12-Jul-2013
JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	NEWFIELDS LABORATORY	TEMP. RECDR./HOBO#	TEST SPECIES *Neanthes arenaceodentata*	TEST END DATE 1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	WATER RENEWAL	Feeding	TECH/DATE
SD0013 /	0	Surr	28	6	7.5	6	20.2	2	28	5	8.0		CR	7.12.13 BH
SD0013 /	1	Surr	28	6	7.3	6	20.0	2	29	5	7.9			7/13 JL
SD0013 /	2	Surr	28	6	7.6	6	19.9	2	29	5	8.0		JL	7/14 JL
SD0013 /	3	Surr	28	6	7.4	6	19.8	2	28	5	7.7	JL		7/15 BG
SD0013 /	4	Surr	28	6	7.4	6	19.8	2	28	5	7.8		BG	7/16 BG
SD0013 /	5	Surr	28	6	7.0	6	19.9	2	28	5	7.7			7/17 BG
SD0013 /	6	Surr	28	6	7.4	6	20.0	2	28	5	7.9	JL	BG	7/18 BG
SD0013 /	7	Surr	28	6	7.2	6	19.9	2	28	5	8.0			7/19 BG
SD0013 /	8	Surr	28	6	7.3	6	20.0	2	28	5	8.2		JL	7/20 JL
SD0013 /	9	Surr	28	6	6.9	6	20.1	2	28	5	8.1	JL		7/21 JL
SD0013 /	10	Surr	28	6	7.3	6	19.9	2	28	5	8.3		JL	7/22 BG
SD0013 /	11	Surr	28	6	7.5	6	19.7	2	28	5	8.0			7/23 BG
SD0013 /	12	Surr	28	6	7.6	6	19.7	2	28	5	8.1	HE	HE	7/24 HE
SD0013 /	13	Surr	28	6	7.5	6	19.7	2	28	5	8.0			7/25 BG
SD0013 /	14	Surr	28	6	7.6	6	19.7	2	28	5	8.2		JL	7/26 MMB
SD0013 /	15	Surr	28	6	7.4	6	19.9	2	28	5	8.3	JL		7/27 HE
SD0013 /	16	Surr	28	6	7.6	6	19.6	2	28	5	8.3		JL	7/28 JL
SD0013 /	17	Surr	28	6	7.5	6	19.7	2	28	5	8.2			7/29 BG
SD0013 /	18	Surr	28	6	7.6	6	19.8	2	28	5	8.1	BG	JL	7/30 BG
SD0013 /	19	Surr	28	6	7.6	6	19.7	2	28	5	8.1			MMB 7/31
SD0013 /	20	Surr	28	6	7.6	6	19.8	2	28	5	8.1			CR 8/1

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
Integral Consulting Inc.	WPAH	1040 /	FSW071113.01	PSEP 1995	12-Jul-2013
JOB NUMBER	**PROJECT MANAGER**	**NEWFIELDS LABORATORY**	**TEMP. RECDR./HOBO#**	**TEST SPECIES**	**TEST END DATE**
860.0074.000	B. Gardiner			*Neanthes arenaceodentata*	1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WATER RENEWAL	Feeding	TECH/DATE
SD0014 /	0	Surr	52	6	7.5	6	20.0	2	28	5	7.9		CR	7.12.13 BH
SD0014 /	1	Surr	52	6	7.2	6	19.8	2	29	5	7.9			7/13 JL
SD0014 /	2	Surr	52	6	7.5	6	19.8	2	29	5	8.0		JL	7/14 JL
SD0014 /	3	Surr	52	6	6.9	6	19.8	2	28	5	7.6	JL		7/15 BG
SD0014 /	4	Surr	52	6	7.2	6	19.8	2	27	5	7.8		BG	7/16 BG
SD0014 /	5	Surr	52	6	6.7	6	19.8	2	27	5	7.7			7/17 BG
SD0014 /	6	Surr	52	6	7.0	6	19.9	2	28	5	7.8	JL	BG	7/18 BG
SD0014 /	7	Surr	52	6	6.9	6	19.9	2	28	5	7.7			7/19 BG
SD0014 /	8	Surr	52	6	7.1	6	20.0	2	28	5	7.9		JL	7/20 JL
SD0014 /	9	Surr	52	6	7.0	6	20.0	2	28	5	7.8	JL		7/21 JL
SD0014 /	10	Surr	52	6	7.0	6	19.8	2	28	5	7.9		JL	7/22 BG
SD0014 /	11	Surr	52	6	7.4	6	19.7	2	28	5	8.3			7/23 BG
SD0014 /	12	Surr	52	6	7.4	6	19.6	2	28	5	8.4	HE	HE	7/24 HE
SD0014 /	13	Surr	52	6	7.3	6	19.7	2	28	5	8.2			7/25 BG
SD0014 /	14	Surr	52	6	7.4	6	19.9	2	28	5	8.5		JL	7/26 MMB
SD0014 /	15	Surr	52	6	7.4	6	19.9	2	28	5	8.6	JL		7/27 HE
SD0014 /	16	Surr	52	6	7.4	6	19.6	2	28	5	8.5		JL	7/28 JL
SD0014 /	17	Surr	52	6	7.4	6	19.8	2	28	5	8.4			7/29 BG
SD0014 /	18	Surr	52	6	7.5	6	19.8	2	28	5	8.3	BG	JL	7/30 BG
SD0014 /	19	Surr	52	6	7.4	6	19.7	2	28	5	8.2			MMB 7/31
SD0014 /	20	Surr	52	6	7.6	6	19.8	2	28	5	8.1			CR 8/1

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
Integral Consulting Inc.	WPAH	1040 /	FSW071113.01	PSEP 1995	12-Jul-2013
JOB NUMBER	**PROJECT MANAGER**	**NEWFIELDS LABORATORY**	**TEMP. RECDR./HOBO#**	**TEST SPECIES**	**TEST END DATE**
860.0074.000	B. Gardiner			*Neanthes arenaceodentata*	1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	WATER RENEWAL	Feeding	TECH/DATE
SD0015 /	0	Surr	124	6	7.3	6	20.5	2	28	5	7.9		CR	7.12.13 BH
SD0015 /	1	Surr	124	6	7.6	6	20.2	2	29	5	8.0			7/13 JL
SD0015 /	2	Surr	124	6	7.6	6	20.1	2	29	5	8.1		JL	7/14 JL
SD0015 /	3	Surr	124	6	7.5	6	19.9	2	28	5	7.8	JL		7/15 BG
SD0015 /	4	Surr	124	6	7.5	6	19.9	2	28	5	7.9		BG	7/16 BG
SD0015 /	5	Surr	124	6	7.4	6	20.0	2	28	5	7.8			7/17 BG
SD0015 /	6	Surr	124	6	7.5	6	20.1	2	28	5	7.9	JL	BG	7/18 BG
SD0015 /	7	Surr	124	6	7.4	6	20.1	2	28	5	7.9			7/19 BG
SD0015 /	8	Surr	124	6	7.5	6	20.2	2	29	5	8.0		JL	7/20 JL
SD0015 /	9	Surr	124	6	7.3	6	20.2	2	29	5	7.9	JL		7/21 JL
SD0015 /	10	Surr	124	6	7.4	6	20.0	2	28	5	8.1		JL	7/22 BG
SD0015 /	11	Surr	124	6	7.6	6	19.8	2	28	5	8.0			7/23 BG
SD0015 /	12	Surr	124	6	7.6	6	19.7	2	28	5	~~7~~ ① 8.0	HE	HE	7/24
SD0015 /	13	Surr	124	6	7.6	6	19.7	2	28	5	8.4			7/25 BG
SD0015 /	14	Surr	124	6	7.7	6	19.7	2	28	5	8.0		JL	7/26 MMB
SD0015 /	15	Surr	124	6	7.6	6	19.9	2	28	5	8.1	JL		7/27 JL
SD0015 /	16	Surr	124	6	7.6	6	19.7	2	28	5	8.2		JL	7/28 JL
SD0015 /	17	Surr	124	6	7.6	6	19.8	2	28	5	8.1			7/29 BG
SD0015 /	18	Surr	124	6	7.6	6	19.8	2	28	5	8.1	BG	JL	7/30 BG
SD0015 /	19	Surr	124	6	7.6	6	19.8	2	28	5	8.1			MMB 7/31
SD0015 /	20	Surr	124	6	7.7	6	19.9	2	28	5	8.1			CR 8/1

① TE 7/24

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	START TIME/ END TIME 1040 /	DILUTION WATER BATCH FSW071113.01	PROTOCOL PSEP 1995	TEST START DATE 12-Jul-2013
JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	NEWFIELDS LABORATORY	TEMP. RECDR./HOBO#	TEST SPECIES *Neanthes arenaceodentata*	TEST END DATE 1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	WATER RENEWAL	Feeding	TECH/DATE
SD0017 /	0	Surr	17	6	7.5	6	20.2	2	29	5	7.9		CR	7.12.13 BH
SD0017 /	1	Surr	17	6	7.4	6	19.9	2	29	5	8.0			7/13 JL
SD0017 /	2	Surr	17	6	7.5	6	19.8	2	29	5	8.0		JL	7/14 JL
SD0017 /	3	Surr	17	6	7.4	6	19.7	2	28	5	7.8	JL		7/15 BG
SD0017 /	4	Surr	17	6	7.4	6	19.8	2	28	5	7.9		BG	7/16 BG
SD0017 /	5	Surr	17	6	7.2	6	19.8	2	28	5	7.8			7/17 BG
SD0017 /	6	Surr	17	6	7.3	6	19.9	2	28	5	7.9	JL	BG	7/18 BG
SD0017 /	7	Surr	17	6	7.1	6	19.8	2	28	5	7.9			7/19 BG
SD0017 /	8	Surr	17	6	7.2	6	20.0	2	28	5	8.1		JL	7/20 JL
SD0017 /	9	Surr	17	6	7.1	6	20.0	2	28	5	8.0	JL		7/21 JL
SD0017 /	10	Surr	17	6	7.3	6	19.8	2	28	5	8.1		JL	7/22 BG
SD0017 /	11	Surr	17	6	7.5	6	19.6	2	28	5	8.2			7/23 BG
SD0017 /	12	Surr	17	6	7.5	6	19.6	2	28	6	8.2	HE	HE	7/24 ZK
SD0017 /	13	Surr	17	6	6.8	6	19.6	2	28	5	7.9			7/25 BG
SD0017 /	14	Surr	17	6	7.4	6	19.7	2	28	5	8.1		JL	7/26 MMB
SD0017 /	15	Surr	17	6	7.4	6	19.8	2	28	5	8.2	JL		7/27 ZK
SD0017 /	16	Surr	17	6	7.5	6	19.6	2	28	5	8.2		JL	7/28 JL
SD0017 /	17	Surr	17	6	7.4	6	19.7	2	28	5	8.2			7/29 BG
SD0017 /	18	Surr	17	6	7.5	6	19.8	2	28	5	8.1	BG	JL	7/30 BG
SD0017 /	19	Surr	17	6	7.5	6	19.7	2	28	5	8.1			MMB 7/31
SD0017 /	20	Surr	17	6	7.6	6	19.8	2	28	5	8.1			CR 8/1

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
Integral Consulting Inc.	WPAH	1040 /	FSW071113.01	PSEP 1995	12-Jul-2013
JOB NUMBER	**PROJECT MANAGER**	**NEWFIELDS LABORATORY**	**TEMP. RECDR./HOBO#**	**TEST SPECIES**	**TEST END DATE**
860.0074.000	B. Gardiner			*Neanthes arenaceodentata*	1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	WATER RENEWAL	Feeding	TECH/DATE
SD0018 /	0	Surr	8	6	7.6	6	20.3	2	29	5	8.0		CR	7.12.13 BH
SD0018 /	1	Surr	8	6	7.6	6	19.9	2	29	5	8.0			7/13 JL
SD0018 /	2	Surr	8	6	7.7	6	19.7	2	29	5	8.1		JL	7/14 JL
SD0018 /	3	Surr	8	6	7.6	6	19.8	2	28	5	7.8	JL		7/15 BG
SD0018 /	4	Surr	8	6	7.5	6	19.9	2	28	5	7.9		BG	7/16 BG
SD0018 /	5	Surr	8	6	7.4	6	19.9	2	28	5	7.9			7/17 BG
SD0018 /	6	Surr	8	6	7.4	6	20.0	2	28	5	8.0	JL	BG	7/18 BG
SD0018 /	7	Surr	8	6	7.3	6	20.0	2	28	5	8.0			7/19 DG
SD0018 /	8	Surr	8	6	7.4	6	20.0	2	28	5	8.2		JL	7/20 JL
SD0018 /	9	Surr	8	6	7.3	6	20.0	2	28	5	8.1	JL		7/21 JL
SD0018 /	10	Surr	8	6	7.5	6	19.8	2	28	5	8.3		JL	7/22 BG
SD0018 /	11	Surr	8	6	7.5	6	19.6	2	28	5	8.1			7/23 BG
SD0018 /	12	Surr	8	6	7.6	6	19.8	2	28	5	8.1	HE	HE	7/24 HE
SD0018 /	13	Surr	8	6	7.5	6	19.6	2	28	5	8.0			7/25 BG
SD0018 /	14	Surr	8	6	7.7	6	19.7	2	28	5	8.2		JL	7/26 MMB
SD0018 /	15	Surr	8	6	7.4	6	19.9	2	28	5	8.3	JL		7/27 AE
SD0018 /	16	Surr	8	6	7.6	6	19.4	2	28	5	8.3		JL	7/28 JL
SD0018 /	17	Surr	8	6	7.4	4	19.6	2	28	5	8.1			7/29 BG
SD0018 /	18	Surr	8	6	7.4	6	19.8	2	28	5	8.0	BG	JL	7/30 BG
SD0018 /	19	Surr	8	6	7.5	6	19.7	2	28	5	8.1			MMB 7/31
SD0018 /	20	Surr	8	6	7.6	6	19.8	2	28	5	8.1			GR 8/1

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	START TIME/ END TIME 1040 /	DILUTION WATER BATCH FSW071113.01	PROTOCOL PSEP 1995	TEST START DATE 12-Jul-2013
JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	NEWFIELDS LABORATORY	TEMP. RECDR./HOBO#	TEST SPECIES *Neanthes arenaceodentata*	TEST END DATE 1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	D.O.		TEMP		SALINITY		pH		WATER RENEWAL	Feeding	TECH/DATE
				meter	mg/L	meter	°C	meter	ppt	meter	unit			
SD0019 /	0	Surr	118	6	7.6	6	20.4	2	29	5	8.0		CR	7.12.13 BH
SD0019 /	1	Surr	118	6	7.6	6	20.0	2	29	5	8.0			7/13 JL
SD0019 /	2	Surr	118	6	7.7	6	19.9	2	29	5	8.2		JL	7/14 JL
SD0019 /	3	Surr	118	6	7.6	6	19.8	2	28	5	8.1	JL		7/15 BG
SD0019 /	4	Surr	118	6	7.5	6	19.9	2	28	5	8.3		BG	7/16 BG
SD0019 /	5	Surr	118	6	7.4	6	20.0	2	28	5	8.3			7/17 BG
SD0019 /	6	Surr	118	6	7.5	6	20.0	2	28	5	8.4	JL	BG	7/18 BG
SD0019 /	7	Surr	118	6	7.4	6	19.9	2	29	5	8.4			7/19 BG
SD0019 /	8	Surr	118	6	7.5	6	20.1	2	29	5	8.4		JL	7/20 JL
SD0019 /	9	Surr	118	6	7.4	6	20.1	2	29	5	8.4	JL		7/21 JL
SD0019 /	10	Surr	118	6	7.5	6	19.9	2	28	5	8.5		JL	7/22 BG
SD0019 /	11	Surr	118	6	7.5	6	19.8	2	28	5	8.4			7/23 BG
SD0019 /	12	Surr	118	6	7.6	6	19.7	2	28	5	8.4	HF	HE	7/24 ZK
SD0019 /	13	Surr	118	6	7.6	6	19.7	2	28	5	8.1			7/25 BG
SD0019 /	14	Surr	118	6	7.7	6	19.7	2	28	5	8.2		JL	7/26 MMB
SD0019 /	15	Surr	118	6	7.6	6	19.9	2	28	5	8.4	JL		7/27 JL
SD0019 /	16	Surr	118	6	7.6	6	19.6	2	28	5	8.4		JL	7/28 JL
SD0019 /	17	Surr	118	6	7.5	6	19.8	2	28	5	8.3			7/29 BG
SD0019 /	18	Surr	118	6	7.6	6	19.8	2	28	5	8.2	BG	JL	7/30 BG
SD0019 /	19	Surr	118	6	7.6	6	19.8	2	28	5	8.2			MMB 7/31
SD0019 /	20	Surr	118	6	7.6	6	19.9	2	28	5	8.2			CR 8/1

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT Integral Consulting Inc.	PROJECT WPAH	START TIME/ END TIME 1040 /	DILUTION WATER BATCH FSW071113.01	PROTOCOL PSEP 1995	TEST START DATE 12-Jul-2013
JOB NUMBER 860.0074.000	PROJECT MANAGER B. Gardiner	NEWFIELDS LABORATORY	TEMP. RECDR./HOBO#	TEST SPECIES *Neanthes arenaceodentata*	TEST END DATE 1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
				D.O.		TEMP		SALINITY		pH				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	meter	mg/L	meter	°C	meter	ppt	meter	unit	WATER RENEWAL	Feeding	TECH/DATE
SD0020 /	0	Surr	110	6	7.5	6	20.3	2	28	5	7.9		CR	7.12.13 BH
SD0020 /	1	Surr	110	6	7.4	6	19.9	2	29	5	7.8			7/13 JL
SD0020 /	2	Surr	110	6	7.5	6	19.9	2	29	5	7.9		JL	7/14 JL
SD0020 /	3	Surr	110	6	7.4	6	19.7	2	28	5	7.7	JL		7/15 BG
SD0020 /	4	Surr	110	6	7.3	6	19.8	2	27	5	7.8		BG	7/16 BG
SD0020 /	5	Surr	110	6	7.2	6	19.9	2	28	5	7.8			7/17 BG
SD0020 /	6	Surr	110	6	7.3	6	19.9	2	28	5	8.0	JL	BG	7/18 BG
SD0020 /	7	Surr	110	6	7.1	6	19.8	2	28	5	8.0			7/19 BG
SD0020 /	8	Surr	110	6	7.3	6	20.0	2	28	5	8.1		JL	7/20 JL
SD0020 /	9	Surr	110	6	7.1	6	20.0	2	28	5	8.0	JL		7/21 JL
SD0020 /	10	Surr	110	6	7.3	6	19.8	2	28	5	8.2		JL	7/22 BG
SD0020 /	11	Surr	110	6	7.4	6	19.8	2	28	5	8.2			7/23 BG
SD0020 /	12	Surr	110	6	7.5	6	19.7	2	28	5	8.4	HE	HE	7/24 HE
SD0020 /	13	Surr	110	6	7.4	6	19.7	2	28	5	8.2			7/25 BG
SD0020 /	14	Surr	110	6	7.5	6	19.8	2	28	5	8.4		JL	7/26 MMB
SD0020 /	15	Surr	110	6	7.5	6	19.8	2	28	5	8.5	JL		7/27 JL
SD0020 /	16	Surr	110	6	7.5	6	19.7	2	28	5	8.4		JL	7/28 JL
SD0020 /	17	Surr	110	6	7.5	6	19.8	2	28	5	8.3			7/29 BG
SD0020 /	18	Surr	110	6	7.5	6	20.1	2	28	5	8.2	BG	JL	7/30 BG
SD0020 /	19	Surr	110	6	7.5	6	19.8	2	28	5	8.2			MMB 7/31
SD0020 /	20	Surr	110	6	7.7	6	20.0	2	28	5	8.2			CR 8/1

NewFields

20 DAY SOLID PHASE BIOASSAY
WATER QUALITY DATASHEET

CLIENT	PROJECT	START TIME/ END TIME	DILUTION WATER BATCH	PROTOCOL	TEST START DATE
Integral Consulting Inc.	WPAH	1040 /	FSW071113.01	PSEP 1995	12-Jul-2013
JOB NUMBER	**PROJECT MANAGER**	**NEWFIELDS LABORATORY**	**TEMP. RECDR./HOBO#**	**TEST SPECIES**	**TEST END DATE**
860.0074.000	B. Gardiner			*Neanthes arenaceodentata*	1-Aug-2013

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) > 4.6		TEMP (C) 20 ± 1		SALINITY (ppt) 28 ± 2		pH 8.0±1.0				
CLIENT/NEWFIELDS ID	DAY	REP	JAR	D.O. meter	D.O. mg/L	TEMP meter	TEMP °C	SALINITY meter	SALINITY ppt	pH meter	pH unit	WATER RENEWAL	Feeding	TECH/DATE
SD0021 /	0	Surr	78	6	7.6	6	20.0	2	29	5	8.0		CR	7.12.13 BH
SD0021 /	1	Surr	78	6	7.5	6	19.9	2	29	5	7.9			JL 7/13
SD0021 /	2	Surr	78	6	7.5	6	19.8	2	29	5	8.0		JL	JL 7/14
SD0021 /	3	Surr	78	6	7.4	6	19.7	2	28	5	7.8	JL		BG 7/15
SD0021 /	4	Surr	78	6	7.3	6	19.7	2	28	5	8.0		BG	BG 7/16
SD0021 /	5	Surr	78	6	7.0	6	19.7	2	28	5	7.9			BG 7/17
SD0021 /	6	Surr	78	6	7.2	6	19.8	2	28	5	8.0	JL	BG	7/18 BG
SD0021 /	7	Surr	78	6	7.6	6	19.8	2	28	5	7.9			7/19 BG
SD0021 /	8	Surr	78	6	7.2	6	19.9	2	28	5	8.0		JL	7/20 JL
SD0021 /	9	Surr	78	6	7.1	6	19.9	2	28	5	7.8	JL		7/21 JL
SD0021 /	10	Surr	78	6	7.2	6	19.8	2	28	5	8.0		JL	7/22 BG
SD0021 /	11	Surr	78	6	7.4	6	19.7	2	28	5	8.3			7/23 BG
SD0021 /	12	Surr	78	6	7.5	6	19.6	2	28	5	8.5	HE	HE	7/24 HE
SD0021 /	13	Surr	78	6	7.4	6	19.6	2	28	5	8.3			7/25 BG
SD0021 /	14	Surr	78	6	7.5	6	19.7	2	28	5	8.4		JL	MMB 7/26
SD0021 /	15	Surr	78	6	7.5	6	19.8	2	28	5	8.5	JL		JL 7/27
SD0021 /	16	Surr	78	6	7.5	6	19.7	2	28	5	8.4		JL	JL 7/28
SD0021 /	17	Surr	78	6	7.6	6	19.7	2	28	5	8.3			7/29 BG
SD0021 /	18	Surr	78	6	7.6	6	19.7	2	28	5	8.2	BG	JL	7/30 BG
SD0021 /	19	Surr	78	6	7.6	6	19.7	2	28	5	8.2			MMB 7/31
SD0021 /	20	Surr	78	6	7.6	6	19.8	2	28	5	8.2			CR 8/1

NewFields

Ammonia and Sulfide Analysis Record

Page 1 of 1

Client/Project: WPAH	**Organism:** Neanthes	**Test Duration (days):** 20

PRETEST / [✓ INITIAL] / FINAL / OTHER (circle one) **DAY of TEST:** 0

[✓ OVERLYING (OV)] / POREWATER (PW) (circle one) / Comments:

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date: 7/12/13	**Temperature:** 21.3	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (mg/L)	Multi-plier	Calc-ulated Sulf. (mg/L)
Control	Surr.	7/12/13 JL	0.831	21.6	7/12/13 JL	N	NA	NA	10	0.017	NA	NA
CR-12			1.18							0.036		
CARR-20			1.37							0.023		
CR-02			0.560							0.042		
SD0001			0.782							0.104		
SD0002			0.758							0.059		
SD0003			0.902							0.160		
SD0004			0.396							0.070		
SD0005			0.340							0.047		
SD0006			0.380							0.034		
SD0007			0.671							0.096		
SD0008			0.390							0.079		
SD0009			0.172							0.052		
SD0010			0.326							0.086		
SD0011			0.335							0.112		
SD0012			0.276							0.042		
SD0013			0.177							0.081		
SD0014			0.183							0.067		
SD0015			0.162							0.109		
SD0017			0.496							0.078		
SD0018			0.275							0.061		
SD0019			0.152							0.041		
SD0020			0.363							0.086		
SD0021			0.224							0.086		

NewFields

Ammonia and Sulfide Analysis Record

Page 1 of 1

Client/Project: WPAH	**Organism:** Neanthes	**Test Duration (days):** 20

PRETEST / [✓ INITIAL] / FINAL / OTHER (circle one) DAY of TEST: 0

OVERLYING (OV) / [✓ POREWATER (PW)] (circle one) / Comments:

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date: 7/12/13	**Temperature:** 21.3	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (mg/L)	Multi-plier	Calc-ulated Sulf. (mg/L)
Control	Surv.	7/12/13 JL	5.73	22.3	7/12/13 JL	N	7.4	29	NM			
CR-12			9.32				7.7	29	NM			
CARR-20			6.76				7.7	30	NM			
CR-02			3.19				7.5	29	10	0.053	1	0.053
SD0001			4.81				7.4	30	2	0.492	5	2.46
SD0002			5.25				7.4	30	5	0.239	2	0.478
SD0003			5.85				7.6	31	2	0.499	5	2.50
SD0004			2.74				7.3	32	5	0.439	2	0.898
SD0005			2.21				7.5	31	10	0.133	1	0.133
SD0006			2.24				7.6	31	5	0.137	2	0.274
SD0007			4.54				7.6	31	5	0.090	2	0.180
SD0008			2.67				7.5	31	5	0.357	2	0.714
SD0009			1.36				7.4	31	5	0.382	2	0.764
SD0010			2.55				7.4	31	2	0.298	5	1.49
SD0011			1.61				7.6	31	2	0.175	5	0.875
SD0012			1.65				7.6	31	5	0.148	2	0.296
SD0013			1.41				7.2	32	10	0.092	1	0.092
SD0014			1.02				7.4	31	10	0.181	1	0.181
SD0015			1.35				7.2	32	10	0.107	1	0.107
SD0017			3.18				7.3	32	5	0.144	2	0.288
SD0018			2.61				7.4	32	10	0.162	1	0.162
SD0019			2.06				7.5	32	10	0.184	1	0.184
SD0020			2.63				7.3	31	5	0.741	2	1.48
SD0021			1.43				7.5	31	10	0.121	1	0.121

NM: not measured, not enough PW collected. MMB 7/12/13.

NewFields Ammonia and Sulfide Analysis Record

Page 1 of 2

Client/Project: WPAH	**Organism:** Neanthes avenaceodentata	**Test Duration (days):** 20

PRETEST / INITIAL / FINAL / [✓ OTHER] (circle one) DAY of TEST: 10

[✓ OVERLYING (OV)] / POREWATER (PW) (circle one) / Comments:

Calibration Standards Temperature		
Date: 7/22/13	**Temperature:** 22.3°C	Sample temperature should be within ±1°C of standards temperature at time and date of analysis.

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (mg/L)	Multi-plier	Calc-ulated Sulf. (mg/L)
OV. Control	Surv.	7/22/13 BG	0.105	21.8	7/22/13 JC	N	NA	NA	5	0.011	2	
CR-12			2.65						10	0.002		
CAPR-20			2.90							0.021		
CR-02			0.266							0.008		
1			3.16							0.017		
2			3.39							0.002		
3			3.10							0.005		
4			0.798							0.001		
5			0.837							0.033		
6			1.15							0.007		
7			1.68							0.018		
8			1.60							0.019		
9			0.946							0.014		
10			0.985							0.012		
11			1.35							0.005		
12			1.51							0.005		
13			0.432							0.011		
14			1.07							0.014		
15			0.303							0.007		
17			0.634							0.033		
18			0.193							0.003		
19			0.343							0.003		

NewFields

Ammonia and Sulfide Analysis Record

Page 2 of 2

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (mg/L)	Multi-plier	Calc-ulated Sulf. (mg/L)
OV 20	surf	7/22/13 BG	203	21.8	7/22/13 HE	W	—	—	10	0.004		
21		7/22/13 BG	0.923	21.8	7/22/13 HE	N	—	—	10	0.023		
PW Control		7/22/13 JL	1.03	22.5	7/22/13 JL	N	7.6	26	5	0.017		
CK-12			4.97				7.5	25	2.5	0.013		
CARR20			5.30				7.5	26	2.5	0.054		
CK-02			4.00				7.4	27	10	0.014		
1			2.55				7.4	26	10	0.006		
2			3.33				7.4	26	10	0.017		
3			5.48				7.2	27	5	0.001		
4			2.17				6.8	27	10	0.033		
5			0.782				7.3	26		0.016		
6			1.13				6.9	26		0.006		
7			1.61				6.9	26		0.002		
8			1.77				6.7	27		0.013		
9			1.61				6.7	28		0.031		
10			1.38				6.7	27		0.029		
11			1.55				7.0	27		0.024		
12			1.75				7.2	28		0.017		
13			0.863		7/22/13 HE		7.1	28		0.016		
14			0.807				6.9	28		0.015		
15			1.16				7.3	27		0.016		
17			0.941				7.1	27		0.015		
18			1.05 ~~0.985~~ ①				7.0	27		0.019		
19			1.90 ~~1.05~~				6.8	28		0.017		
20			2.57 ~~1.90~~				6.8	27		0.004		
21			1.41 ~~2.57~~				6.9	28		0.005		
			~~1.41~~									

① WC. JL 7/22/13.

NewFields

Ammonia and Sulfide Analysis Record

Page 1 of 1

Client/Project: Port Angeles	**Organism:** Neanthes	**Test Duration (days):** 20 day

~~PRETEST~~ / INITIAL / [✓ FINAL] / OTHER (circle one)

DAY of TEST: 20

[✓ OVERLYING (OV)] / POREWATER (PW) (circle one) / Comments:

Calibration Standards Temperature		
Date: 8.2.13	**Temperature:** 22.0	Sample temperature should be within ±1°C of standards temperature at time and date of analysis.

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (mg/L)	Multi-plier	Calc-ulated Sulf. (mg/L)
Control		8.2.13 mRP	0.111	22.5	8.2.13 mRP	N			10	0.005		
CR-12			0.0866							0.023		
CARR-20			0.0512							0.025		
CR-02			0.0406							0.005		
SD0001			0.0957							0.013		
SD0002			0.0469							0.004		
SD0003			0.0488							0.016		
SD0004			0.0357							0.004		
SD0005			0.0325							0.019		
SD0006			0.0287							0.002		
SD0007			0.0246							0.013		
SD0008			0.0237							0.014		
SD0009			0.0259							0.026		
SD0010			0.0254							0.017		
SD0011			0.0253							0.006		
SD0012			0.0265							0.014		
SD0013			0.0274							0.015		
SD0014			0.0262							0.004		
SD0015			0.026~~2~~9							0.008		
SD0017			0.0267							0.004		
SD0018			0.0258							0.013		
SD0019			0.0261							0.005		
SD0020			0.0247							0.019		
SD0021			0.0240							0.000		

NewFields

Ammonia and Sulfide Analysis Record

Page 1 of 1

Client/Project: Port Angeles	**Organism:** Neanthes	**Test Duration (days):** 20 days

PRETEST / INITIAL / [✓ FINAL] / OTHER (circle one) DAY of TEST: 20

OVERLYING (OV) / [✓ POREWATER (PW)] (circle one) / Comments:

Calibration Standards Temperature		
Date: 8.2.13	Temperature: 22.6	Sample temperature should be within ±1°C of standards temperature at time and date of analysis.

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sample Volume (mL)	Measured Sulf. (mg/L)	Multi-plier	Calc-ulated Sulf. (mg/L)
Control		8.2.13 MRP	0.557	22.5	8.2.13 MRP	N	7.41	27	① ~~10~~ 5	0.014	2	0.028
CR-12			0.656				7.01	28	10	0.019		
CARR-20			3.70				6.92	27	5	0.019	2	0.038
CR-02			~~0.374~~	0.539			6.65	28	10	0.029		
SD0001			0.224				6.52	28		0.016		
SD0002			0.164				6.55	28		0.030		
SD0003			0.582				6.59	28		0.016		
SD0004			0.191				6.62	27		0.011		
SD0005			0.136				7.11	28		0.007		
SD0006			0.236				6.76	27		0.009		
SD0007			0.145				6.89	27		0.024		
SD0008			0.147				6.81	28		0.022		
SD0009			0.151				6.64	27		0.025		
SD0010			0.111				6.75	26		0.008		
SD0011			0.0968				6.95	27		0.022		
SD0012			0.0774				6.66	27		0.025		
SD0013			0.0654				6.79	28		0.019		
SD0014			0.0601				6.83	28		0.014		
SD0015			0.0563				6.79	28		0.021		
SD0017			0.0552				6.64	28		0.017		
SD0018			0.0615				6.64	28		0.017		
SD0019			0.0638				6.78	27		0.020		
SD0020			0.550				6.31	28		0.025		
SD0021		↓	0.563	↓	↓	↓	6.25	27	↓	0.017		

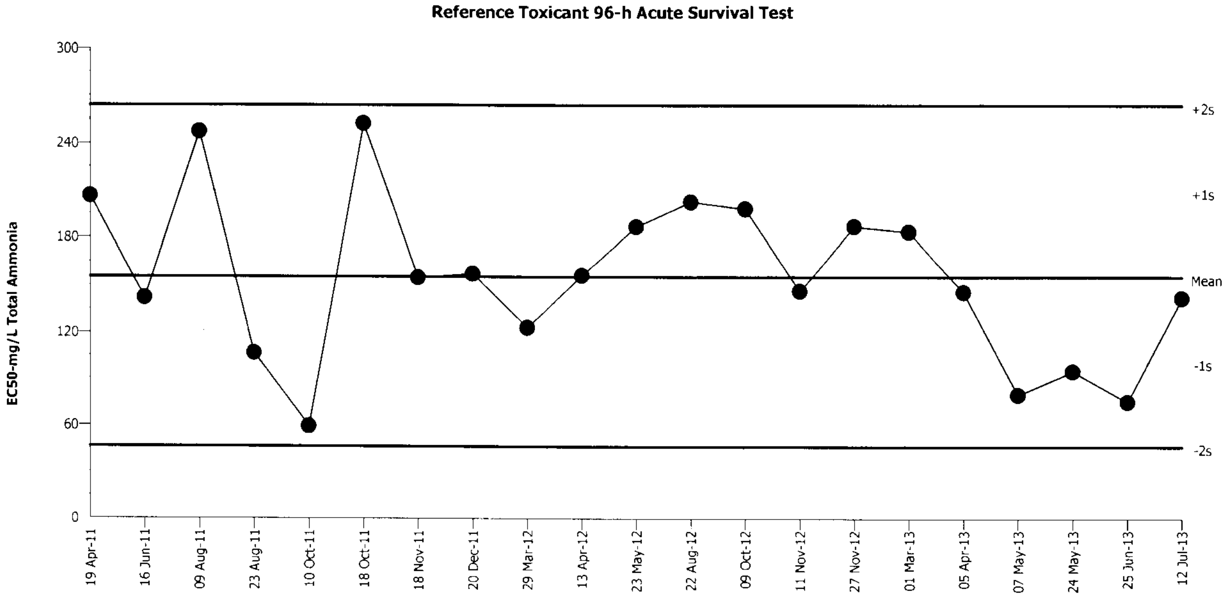
① IE, MWS 8/6/13

CETIS QC Plot

Report Date: 21 Aug-13 16:40 (1 of 1)

Reference Toxicant 96-h Acute Survival Test **NewFields**

Test Type:	Survival	**Organism:**	Neanthes arenaceodentata (Polycha	**Material:**	Total Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	155.3	**Count:**	20	**-1s Warning Limit:**	100.9	**-2s Action Limit:**	46.48
Sigma:	54.41	**CV:**	35.00%	**+1s Warning Limit:**	209.7	**+2s Action Limit:**	264.1

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2011	Apr	19	14:55	206.2	50.94	0.9362			09-3617-4279	06-7713-4574
2		Jun	16	17:40	141.9	-13.39	-0.2461			19-0037-4539	19-9050-3573
3		Aug	9	15:30	247.5	92.24	1.695	(+)		03-1197-4176	17-1966-7852
4			23	11:00	106.6	-48.74	-0.8958			19-2308-3344	15-0713-7604
5		Oct	10	15:35	59.38	-95.92	-1.763	(-)		06-7843-9085	12-6856-6267
6			18	14:35	252.7	97.36	1.789	(+)		20-2964-2236	02-6630-2269
7		Nov	18	14:45	154.8	-0.4581	-0.00842			07-1336-6281	16-3327-5847
8		Dec	20	14:25	157.3	2.031	0.03733			13-2009-7329	09-6676-8731
9	2012	Mar	29	14:15	123	-32.33	-0.5943			09-7385-3936	17-7765-0407
10		Apr	13	14:00	156.2	0.9266	0.01703			19-8365-3565	12-2419-3140
11		May	23	13:50	186.8	31.5	0.5789			07-1703-6447	03-0067-3412
12		Aug	22	11:00	202.7	47.36	0.8704			02-2456-0921	14-8617-5684
13		Oct	9	14:00	198.3	42.96	0.7896			09-2476-6828	10-7898-4816
14		Nov	11	16:00	146.3	-8.987	-0.1652			05-7907-0031	15-4959-5175
15			27	16:05	187.1	31.8	0.5844			11-0295-5053	21-1714-9848
16	2013	Mar	1	14:40	183.7	28.41	0.5221			16-0938-7761	05-5518-0938
17		Apr	5	10:40	145.7	-9.636	-0.1771			12-4084-6308	11-0088-3368
18		May	7	13:00	79.7	-75.6	-1.389	(-)		03-6682-4675	04-2369-0564
19			24	11:30	94.89	-60.41	-1.11	(-)		19-1651-0673	18-8601-2491
20		Jun	25	14:13	75.13	-80.17	-1.473	(-)		08-9049-5052	01-8172-0753
21		Jul	12	13:20	141.9	-13.37	-0.2457			14-1288-0905	06-4191-8012

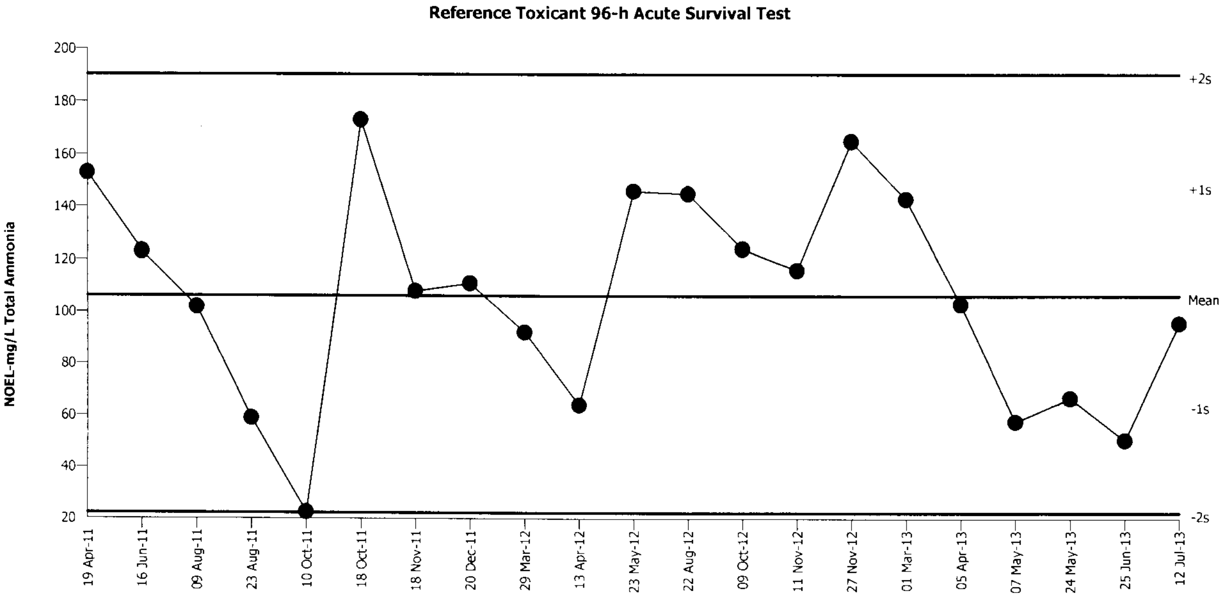
Analyst:________ QA:________

CETIS QC Plot

Report Date: 21 Aug-13 16:40 (1 of 1)

Reference Toxicant 96-h Acute Survival Test **NewFields**

Test Type:	Survival	**Organism:**	Neanthes arenaceodentata (Polycha	**Material:**	Total Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	106.2	**Count:**	20	**-1s Warning Limit:**	64.17	**-2s Action Limit:**	22.14
Sigma:	42.03	**CV:**	39.60%	**+1s Warning Limit:**	148.2	**+2s Action Limit:**	190.3

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2011	Apr	19	14:55	153	46.8	1.113	(+)		09-3617-4279	00-3274-1559
2		Jun	16	17:40	123	16.8	0.3997			19-0037-4539	07-2127-0891
3		Aug	9	15:30	102	-4.2	-0.09993			03-1197-4176	21-2173-4671
4			23	11:00	58.9	-47.3	-1.125	(-)		19-2308-3344	00-4985-4824
5		Oct	10	15:35	22.5	-83.7	-1.991	(-)		06-7843-9085	04-4902-3567
6			18	14:35	173	66.8	1.589	(+)		20-2964-2236	18-1232-0295
7		Nov	18	14:45	108	1.8	0.04283			07-1336-6281	00-5718-5578
8		Dec	20	14:25	111	4.8	0.1142			13-2009-7329	14-4698-1316
9	2012	Mar	29	14:15	92.2	-14	-0.3331			09-7385-3936	12-4682-6521
10		Apr	13	14:00	63.9	-42.3	-1.006	(-)		19-8365-3565	05-2732-2674
11		May	23	13:50	146	39.8	0.9469			07-1703-6447	01-7113-3932
12		Aug	22	11:00	145	38.8	0.9232			02-2456-0921	08-5116-1008
13		Oct	9	14:00	124	17.8	0.4235			09-2476-6828	01-8486-9232
14		Nov	11	16:00	116	9.8	0.2332			05-7907-0031	20-7001-2062
15			27	16:05	165	58.8	1.399	(+)		11-0295-5053	20-4892-3773
16	2013	Mar	1	14:40	143	36.8	0.8756			16-0938-7761	07-7870-4978
17		Apr	5	10:40	103	-3.2	-0.07614			12-4084-6308	12-0348-0416
18		May	7	13:00	57.6	-48.6	-1.156	(-)		03-6682-4675	13-3264-9963
19			24	11:30	66.7	-39.5	-0.9398			19-1651-0673	19-7443-7088
20		Jun	25	14:13	50.4	-55.8	-1.328	(-)		08-9049-5052	06-0503-5931
21		Jul	12	13:20	95.6	-10.6	-0.2522			14-1288-0905	07-0996-7321

Analyst:________ QA:________

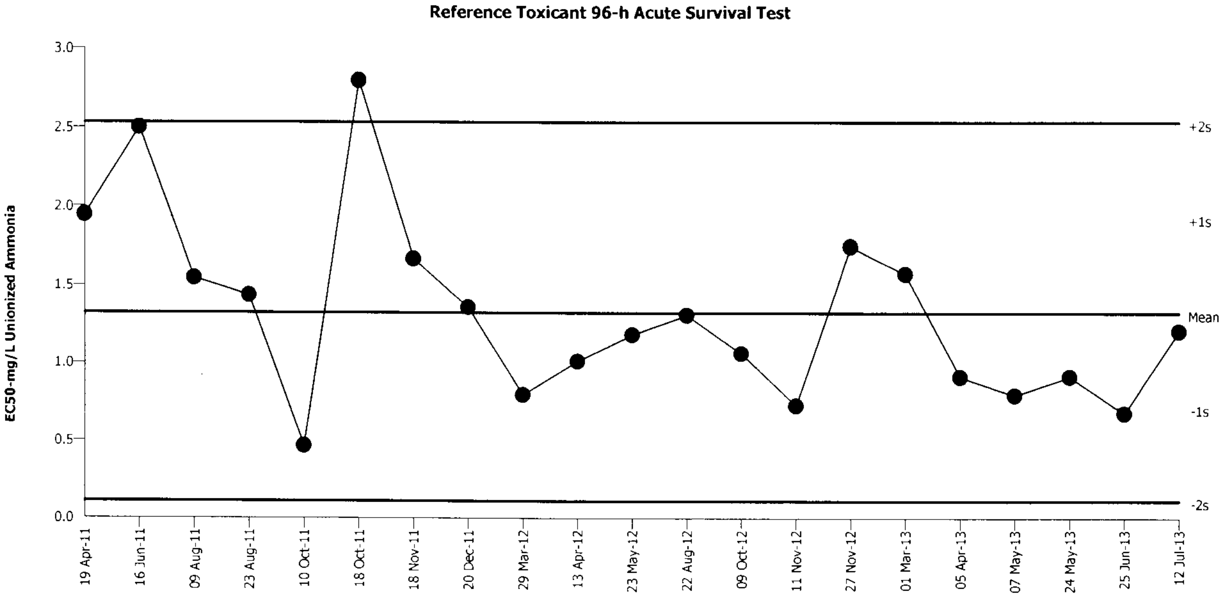
CETIS QC Plot

Report Date: 21 Aug-13 16:41 (1 of 1)

Reference Toxicant 96-h Acute Survival Test

NewFields

Test Type:	Survival	**Organism:**	Neanthes arenaceodentata (Polycha	**Material:**	Unionized Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	1.322	**Count:**	20	**-1s Warning Limit:**	0.7169	**-2s Action Limit:**	0.1118
Sigma:	0.6051	**CV:**	45.80%	**+1s Warning Limit:**	1.927	**+2s Action Limit:**	2.532

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2011	Apr	19	14:55	1.945	0.6228	1.029	(+)		02-6580-6357	08-0700-2079
2		Jun	16	17:40	2.503	1.181	1.952	(+)		19-7724-1701	13-2075-9938
3		Aug	9	15:30	1.547	0.2247	0.3713			03-9854-4015	07-2063-2491
4			23	11:00	1.436	0.1141	0.1886			09-3666-1661	07-6184-3703
5		Oct	10	15:35	0.4667	-0.8553	-1.414	(-)		04-4548-8932	08-5329-1975
6			18	14:35	2.797	1.475	2.437	(+)	(+)	05-4042-6561	09-4508-3623
7		Nov	18	14:45	1.667	0.3451	0.5704			07-2418-7894	04-3530-8185
8		Dec	20	14:25	1.359	0.03697	0.0611			01-5692-9953	01-3178-0533
9	2012	Mar	29	14:15	0.7959	-0.5261	-0.8694			11-8184-4663	15-1974-6098
10		Apr	13	14:00	1.012	-0.3101	-0.5124			19-8413-7608	13-2594-7323
11		May	23	13:50	1.183	-0.1387	-0.2292			00-6722-3532	08-3889-1635
12		Aug	22	11:00	1.31	-0.01179	-0.01948			12-2636-9338	18-2386-8444
13		Oct	9	14:00	1.063	-0.2589	-0.4278			11-5377-0688	17-8993-7878
14		Nov	11	16:00	0.7276	-0.5944	-0.9823			14-7469-3886	03-0259-8994
15			27	16:05	1.746	0.4236	0.7001			08-6061-4466	00-3182-3735
16	2013	Mar	1	14:40	1.573	0.2514	0.4154			18-8051-2966	06-9085-4102
17		Apr	5	10:40	0.9122	-0.4098	-0.6773			03-5469-7681	20-0412-7755
18		May	7	13:00	0.794	-0.528	-0.8725			11-4883-5754	10-2519-8358
19			24	11:30	0.9143	-0.4077	-0.6738			03-1268-0321	17-3627-5339
20		Jun	25	14:30	0.6782	-0.6438	-1.064	(-)		07-6412-1006	01-8270-7142
21		Jul	12	13:20	1.207	-0.1148	-0.1897			06-2793-5359	03-5477-0692

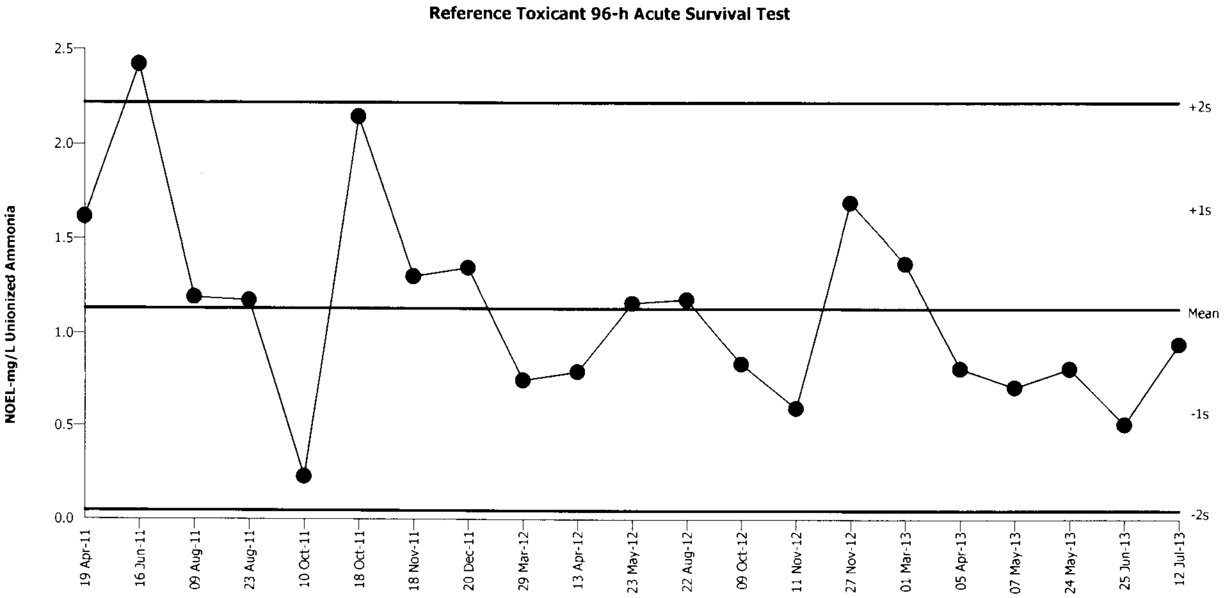
Analyst: BH QA: BH

CETIS QC Plot

Report Date: 21 Aug-13 16:41 (1 of 1)

Reference Toxicant 96-h Acute Survival Test **NewFields**

Test Type:	Survival	**Organism:**	Neanthes arenaceodentata (Polycha	**Material:**	Unionized Ammonia
Protocol:	PSEP (1995)	**Endpoint:**	Proportion Survived	**Source:**	Reference Toxicant-REF



Mean:	1.133	**Count:**	20	**-1s Warning Limit:**	0.5896	**-2s Action Limit:**	0.0462
Sigma:	0.5434	**CV:**	48.00%	**+1s Warning Limit:**	1.676	**+2s Action Limit:**	2.22

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2011	Apr	19	14:55	1.617	0.484	0.8907			02-6580-6357	12-6447-3293
2		Jun	16	17:40	2.421	1.288	2.37	(+)	(+)	19-7724-1701	13-8173-2038
3		Aug	9	15:30	1.193	0.06	0.1104			03-9854-4015	01-1263-9916
4			23	11:00	1.176	0.043	0.07913			09-3666-1661	00-3462-6374
5		Oct	10	15:35	0.228	-0.905	-1.665	(-)		04-4548-8932	20-7967-8150
6			18	14:35	2.146	1.013	1.864	(+)		05-4042-6561	09-7290-5956
7		Nov	18	14:45	1.303	0.17	0.3128			07-2418-7894	02-8881-3753
8		Dec	20	14:25	1.35	0.217	0.3993			01-5692-9953	10-0045-4747
9	2012	Mar	29	14:15	0.747	-0.386	-0.7103			11-8184-4663	00-5057-1480
10		Apr	13	14:00	0.793	-0.34	-0.6257			19-8413-7608	05-2899-5573
11		May	23	13:50	1.162	0.029	0.05337			00-6722-3532	11-8382-8902
12		Aug	22	11:00	1.183	0.05	0.09201			12-2636-9338	02-6993-9000
13		Oct	9	14:00	0.836	-0.297	-0.5466			11-5377-0688	14-5701-8660
14		Nov	11	16:00	0.596	-0.537	-0.9882			14-7469-3886	17-5882-8497
15			27	16:05	1.693	0.56	1.031	(+)		08-6061-4466	05-8355-5463
16	2013	Mar	1	14:40	1.373	0.24	0.4417			18-8051-2966	09-6023-4535
17		Apr	5	10:40	0.811	-0.322	-0.5926			03-5469-7681	20-7653-9268
18		May	7	13:00	0.71	-0.423	-0.7784			11-4883-5754	20-7240-7121
19			24	11:30	0.81	-0.323	-0.5944			03-1268-0321	20-4684-2719
20		Jun	25	14:30	0.51	-0.623	-1.146	(-)		07-6412-1006	18-2969-6397
21		Jul	12	13:20	0.943	-0.19	-0.3497			06-2793-5359	18-9450-4090

Analyst:______ QA:______

CETIS Summary Report

Report Date: 21 Aug-13 16:42 (p 1 of 1)
Test Code: 5436DA09 | 14-1288-0905

Reference Toxicant 96-h Acute Survival Test **NewFields**

Batch ID:	18-0761-6537	**Test Type:**	Survival	**Analyst:**	
Start Date:	12 Jul-13 13:20	**Protocol:**	PSEP (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	16 Jul-13 15:15	**Species:**	Neanthes arenaceodentata	**Brine:**	Not Applicable
Duration:	4d 2h	**Source:**	Aquatic Toxicology Support	**Age:**	

Sample ID:	11-3302-8593	**Code:**	4388A4F1	**Client:**	Internal Lab
Sample Date:	27 Sep-11	**Material:**	Total Ammonia	**Project:**	Reference Toxicant
Receive Date:	27 Sep-11	**Source:**	Reference Toxicant		
Sample Age:	654d 13h	**Station:**	P110927.138		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
07-0996-7321	Proportion Survived	95.6	184	132.6	8.38%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
06-4191-8012	Proportion Survived	EC50	141.9	131.8	152.9		Spearman-Kärber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	1	1	1	1	1	0	0	0.0%	0.0%
25.5		3	1	1	1	1	1	0	0	0.0%	0.0%
48.7		3	1	1	1	1	1	0	0	0.0%	0.0%
95.6		3	1	1	1	1	1	0	0	0.0%	0.0%
184		3	0.1	0	0.3484	0	0.2	0.05774	0.1	100.0%	90.0%
371		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	1	1
25.5		1	1	1
48.7		1	1	1
95.6		1	1	1
184		0	0.2	0.1
371		0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	11/11	10/10	10/10
25.5		10/10	10/10	10/10
48.7		10/10	10/10	10/10
95.6		10/10	10/10	10/10
184		0/10	2/10	1/10
371		0/10	0/10	0/10

Analyst:________ QA:________

CETIS Test Data Worksheet

Report Date: 21 Aug-13 16:42 (p 1 of 1)
Test Code: 14-1288-0905/5436DA09

Reference Toxicant 96-h Acute Survival Test **NewFields**

Start Date:	12 Jul-13 13:20	**Species:**	Neanthes arenaceodentata	**Sample Code:**	4388A4F1
End Date:	16 Jul-13 15:15	**Protocol:**	PSEP (1995)	**Sample Source:**	Reference Toxicant
Sample Date:	27 Sep-11	**Material:**	Total Ammonia	**Sample Station:**	P110927.138

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	2	11	11	
0	D	2	3	10	10	
0	D	3	12	10	10	
25.5		1	8	10	10	
25.5		2	18	10	10	
25.5		3	15	10	10	
48.7		1	17	10	10	
48.7		2	5	10	10	
48.7		3	4	10	10	
95.6		1	16	10	10	
95.6		2	13	10	10	
95.6		3	1	10	10	
184		1	11	10	0	
184		2	10	10	2	
184		3	6	10	1	
371		1	9	10	0	
371		2	14	10	0	
371		3	7	10	0	

Analyst:________ QA:________

CETIS Summary Report

Report Date: 21 Aug-13 16:42 (p 1 of 1)
Test Code: 256D887F | 06-2793-5359

Reference Toxicant 96-h Acute Survival Test **NewFields**

Batch ID:	18-0761-6537	**Test Type:**	Survival	**Analyst:**	
Start Date:	12 Jul-13 13:20	**Protocol:**	PSEP (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	16 Jul-13 15:15	**Species:**	Neanthes arenaceodentata	**Brine:**	Not Applicable
Duration:	4d 2h	**Source:**	Aquatic Toxicology Support	**Age:**	

Sample ID:	20-6339-3533	**Code:**	7AFCE2FD	**Client:**	Internal Lab
Sample Date:	27 Sep-11	**Material:**	Unionized Ammonia	**Project:**	Reference Toxicant
Receive Date:	27 Sep-11	**Source:**	Reference Toxicant		
Sample Age:	654d 13h	**Station:**	P110927.138		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
18-9450-4090	Proportion Survived	0.943	1.445	1.167	8.38%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
03-5477-0692	Proportion Survived	EC50	1.207	1.164	1.252		Spearman-Kärber

Proportion Survived Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	1	1	1	1	1	0	0	0.0%	0.0%
0.497		3	1	1	1	1	1	0	0	0.0%	0.0%
0.757		3	1	1	1	1	1	0	0	0.0%	0.0%
0.943		3	1	1	1	1	1	0	0	0.0%	0.0%
1.445		3	0.1	0	0.3484	0	0.2	0.05774	0.1	100.0%	90.0%
1.846		3	0	0	0	0	0	0	0		100.0%

Proportion Survived Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	1	1
0.497		1	1	1
0.757		1	1	1
0.943		1	1	1
1.445		0	0.2	0.1
1.846		0	0	0

Proportion Survived Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	11/11	10/10	10/10
0.497		10/10	10/10	10/10
0.757		10/10	10/10	10/10
0.943		10/10	10/10	10/10
1.445		0/10	2/10	1/10
1.846		0/10	0/10	0/10

Analyst: BH QA: BH

CETIS Test Data Worksheet

Report Date: 21 Aug-13 16:42 (p 1 of 1)
Test Code: 06-2793-5359/256D887F

Reference Toxicant 96-h Acute Survival Test **NewFields**

Start Date:	12 Jul-13 13:20	**Species:**	Neanthes arenaceodentata	**Sample Code:**	7AFCE2FD
End Date:	16 Jul-13 15:15	**Protocol:**	PSEP (1995)	**Sample Source:**	Reference Toxicant
Sample Date:	27 Sep-11	**Material:**	Unionized Ammonia	**Sample Station:**	P110927.138

C-mg/L	Code	Rep	Pos	# Exposed	# Survived	Notes
0	D	1	8	11	11	
0	D	2	15	10	10	
0	D	3	7	10	10	
0.497		1	6	10	10	
0.497		2	16	10	10	
0.497		3	5	10	10	
0.757		1	11	10	10	
0.757		2	12	10	10	
0.757		3	14	10	10	
0.943		1	17	10	10	
0.943		2	9	10	10	
0.943		3	1	10	10	
1.445		1	13	10	0	
1.445		2	4	10	2	
1.445		3	10	10	1	
1.846		1	3	10	0	
1.846		2	2	10	0	
1.846		3	18	10	0	

Analyst: BH QA: BH

NewFields 96-H JR REFERENCE TOXICANT EST
OBSERVATION DATASHEET

SPECIES
Neanthes arenaceodentata

CLIENT	PROJECT	NEWFIELDS JOB #	PROJECT MANAGER	NEWFIELDS LAB	PROTOCOL
Integral Consulting Inc.	WPAH	860.0074.000	B. Gardiner	Port Gamble Bath 6	PSEP 1995

SURVIVAL & BEHAVIOR DATA

OBSERVATIONS KEY
N = normal
Q = quiescent
D = Discolored
F = Floating on surface

INITIAL # OF ORGANISMS: 10

					DAY 1			DAY 2			DAY 3			DAY 4		
					DATE 7/13/13			DATE 7/14/13			DATE 7/15/13			DATE 7/16/13		
					TECHNICIAN JL			TECHNICIAN JL			TECHNICIAN JL			TECHNICIAN BG		
CLIENT/ NEWFIELDS ID	CONC. value	units	REP	INITIAL # if differs	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS	#ALIVE	#DEAD	OBS
Ref.Tox.- ammonia - TAN	0	mg/L	1	11	11	0	N	11	0	N	11	0	N	11	0	N
			2	10	10	0	|	10	0	|	10	0	|	10	0	N
			3	|	10	0	↓	10	0	↓	10	0	↓	10	0	N
Ref.Tox.- ammonia - TAN	15	mg/L	1	|	10	0	N	10	0	N	10	0	N	10	0	N
			2	|	10	0	|	10	0	|	10	0	|	10	0	N
			3	|	10	0	↓	10	0	↓	10	0	↓	10	0	N
Ref.Tox.- ammonia - TAN	30	mg/L	1	|	10	0	N	10	0	N	10	0	N	10	0	N
			2	|	10	0	|	10	0	|	10	0	|	10	0	N
			3	|	10	0	↓	10	0	↓	10	0	↓	10	0	N
Ref.Tox.- ammonia - TAN	60	mg/L	1	|	10	0	N	10	0	N	10	0	Q	10	0	Q
			2	|	10	0	|	10	0	|	10	0	|	10	0	Q
			3	|	10	0	↓	10	0	↓	10	0	↓	10	0	Q
Ref.Tox.- ammonia - TAN	120	mg/L	1	|	10	0	Q	10	0	Q	10	0	Q	0	10	
			2	|	10	0	|	10	0	|	10	0	|	2	8	Q
			3	|	10	0	↓	10	0	↓	10	0	↓	1	9	Q
Ref.Tox.- ammonia - TAN	240	mg/L	1	|	10	0	Q	0	10	NA						
			2	|	10	0	|	0	10	|						
			3	↓	10	0	↓	0	10	↓						

NewFields

96-HOUR REFERENCE TOXICANT TEST WATER QUALITY DATASHEET

CLIENT	PROJECT	SPECIES	NEWFIELDS LABORATORY		PROTOCOL
Integral Consulting Inc.	WPAH	*Neanthes arenaceodentata*	Port Gamble Bath 6		PSEP 1995
NEWFIELDS JOB NUMBER	**PROJECT MANAGER**	**TEST START DATE:**	**TIME**	**TEST END DATE**	**TIME**
860.0074.000	B. Gardiner	12Jul13	1320	16Jul13	1515
Test ID	**LOT #:**				
P110927.138	111079				

WATER QUALITY DATA

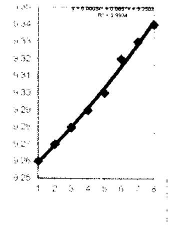
DILTIN.WAT.BATCH	TEMP REC#	REFERENCE TOX. MATERIAL	REFERENCE TOXICANT
FSW071113.01		ammonium chloride	ammonia - TAN

TEST CONDITIONS						DO (mg/L)		TEMP(C)		SAL (ppt)		pH		TECHNICIAN
						> 4.6		20 ± 1		28 ± 2		7 - 9		
CLIENT/ NEWFIELDS ID		CONCENTRATION		DAY	REP	D.O.		TEMP.		SALINITY		pH		WQ TECH
		value	units			meter	mg/L	meter	°C	meter	ppt	meter	unit	
Ref.Tox.- ammonia - TAN	Target:	0	mg/L	0	Stock	6	7.6	6	19.5	2	28	5	7.9	7/12 MMB
	Actual:	0.0548		4	Rep									
Ref.Tox.- ammonia - TAN	Target:	15	mg/L	0	Stock	6	7.8	6	19.2	2	28	5	7.8	7/12 MMB
	Actual:	25.5		4	Rep									
Ref.Tox.- ammonia - TAN	Target:	30	mg/L	0	Stock	6	7.8	6	19.2	2	28	5	7.7	7/12 MMB
	Actual:	48.7		4	Rep									
Ref.Tox.- ammonia - TAN	Target:	60	mg/L	0	Stock	6	7.8	6	19.2	2	28	5	7.5	7/12 MMB
	Actual:	95.6		4	Rep									
Ref.Tox.- ammonia - TAN	Target:	120	mg/L	0	Stock	6	7.8	6	19.2	2	28	5	7.4	7/12 MMB
	Actual:	184		4	Rep									
Ref.Tox.- ammonia - TAN	Target:	240	mg/L	0	Stock	6	7.8	6	19.3	2	29	5	7.2	7/12 MMB
	Actual:	371		4	Rep									

CLIENT:	Internal	Date of Test:	25-Jun-13
PROJECT:	RT	Test Type:	*Neanthes*
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding [illegible], and [illegible]

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34



	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	temp (K)	i-factor	Mod **NH3U (mg/L)**
	Target / Sample Name	Actual	22.8	8.0	24.1	**297.26**	**9.3053**	**#VALUE!**
	Example 3.5	2.000	10.0	7.5	5.0	**278.16**	**9.2750**	**0.008**
1								
2	15	25.500				292.36	9.3187	**0.497**
3	30	48.700				292.36	9.3187	**0.757**
4	60	95.600				292.36	9.3187	**0.943**
5	120	184.000				292.36	9.3187	**1.445**
6	240	371.000				292.46	9.3214	**1.846**
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
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39								
40								
41								
42								
43								
44								
45								
46								

NewFields

ORGANISM RECEIPT LOG

Date: 7.12.13

Time: 0845

NewFields Batch No. ATS

Organism / Project: Neanthes / Port Angeles

Invoice Attached Yes [✓ No]

Source / Supplier: Aquatic Toxicology Support

Contact: Mary Ann

No. Ordered: 1050

No. Received: 1100

Source Batch: (Collection date, hatch date, etc.):

Condition of Organisms: (Good, fair, poor; describe.): Good

Approximate Size or Age: (Days from hatch, life stage, size class, etc.): 2-3wks

Shipper: NF Carrier

B of L (Tracking No.) NA

Condition of Container: (Good, fair, poor; describe.): Good

Received By: BH

Container	D.O. (mg/L)	Temp. (°C)	Cond. or [✓ Sal.] (Include Units)	pH (Units)	Number Dead or Moribund	Technician (Initials)
Corp	16.7	20.0	31	7.1	—	BH

Notes:

Appendix A.3

Benthic Larval Test with *Mytilus galloprovincialis*

Test Batch 1

LARVAL DEVELOPMENT TEST
ENDPOINT DATA

SPECIES: *Mytilus galloprovincialis*

CLIENT	PROJECT	JOB NUMBER	PROJECT MANAGER	NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	860.0074.000	B. Hester	Port Gamble /	PSEP (1995)

ORGANISM BATCH	TEST START DATE:	TIME	TEST END DATE:	TIME
	7.1.13			

LARVAL OBSERVATION DATA

CLIENT/ NEWFIELDS ID	REP	NUMBER NORMAL	NUMBER	DATE	TECHNICIAN	COMMENTS
STOCKING DENSITY	1	196				
	2	238				
	3	262				
	4	250				
	5	185				
Control /	1	215	8			
	2	237	8			
	3	225	8			
	4	255	19			
	5	250	4			
CR-12 /	1	182	3			
	2	245	8			
	3	182	3			
	4	180	13			
	5	193	3			
CARR-20 /	1	206	5			
	2	174	18			
	3	188	21			
	4	176	29			
	5	201	10			
CR-02 /	1	201	9			
	2	143	29			
	3	169	6			
	4	163	18			
	5	202	8			

NewFields

LARVAL DEVELOPMENT TEST
ENDPOINT DATA

			SPECIES *Mytilus galloprovincialis*		
CLIENT Integral Consulting Inc.	PROJECT Port Angeles	JOB NUMBER 860.0074.000	PROJECT MANAGER B. Hester	NEWFIELDS LAB / LOCATION Port Gamble /	PROTOCOL PSEP (1995)
ORGANISM BATCH		TEST START DATE: 7.1.13	TIME	TEST END DATE:	TIME

LARVAL OBSERVATION DATA

CLIENT/ NEWFIELDS ID	REP	NUMBER NORMAL	NUMBER	DATE	TECHNICIAN	COMMENTS
SD005 /	1	155	7			
	2	139	3			
	3	161	7			
	4	168	5			
	5	171	4			
SD006 /	1	142	6			
	2	129	9			
	3	134	14			
	4	167	10			
	5	138	10			
SD007 /	1	180	7			
	2	170	5			
	3	173	3			
	4	132	7			
	5	160	11			
SD0023 /	1	137	10			
	2	~~137~~ 139 ①	21			
	3	147	3			
	4	154	17			
	5	158	8			
SD0024 /	1	149	8			
	2	162	10			
	3	158	4			
	4	176	8			
	5	145	2			

wrong entry

NewFields

LARVAL DEVELOPMENT TEST
ENDPOINT DATA

SPECIES: *Mytilus galloprovincialis*

CLIENT: Integral Consulting Inc.
PROJECT: Port Angeles
JOB NUMBER: 860.0074.000
PROJECT MANAGER: B. Hester
NEWFIELDS LAB / LOCATION: Port Gamble /
PROTOCOL: PSEP (1995)
ORGANISM BATCH:
TEST START DATE: 7·1·13
TIME:
TEST END DATE:
TIME:

LARVAL OBSERVATION DATA

CLIENT/ NEWFIELDS ID	REP	NUMBER NORMAL	NUMBER	DATE	TECHNICIAN	COMMENTS
SD0025 /	1	138	18			
	2	133	19			
	3	145	23			
	4	101	35			
	5	97	25			
SD0026 /	1	182	3			
	2	177	2			
	3	161	4			
	4	166	5			
	5	219	3			
SD0027 /	1	138	1			
	2	126	6			
	3	166	10			
	4	122	10			
	5	111	11			
SD0028 /	1	171	10			
	2	178	10			
	3	172	12			
	4	183	8			
	5	172	15			
SD0029 /	1	157	4			
	2	137	22			
	3	164	4			
	4	114	15			
	5	137	25			

NewFields

LARVAL DEVELOPMENT TEST
ENDPOINT DATA

			SPECIES *Mytilus galloprovincialis*		
CLIENT Integral Consulting Inc.	PROJECT Port Angeles	JOB NUMBER 860.0074.000	PROJECT MANAGER B. Hester	NEWFIELDS LAB / LOCATION Port Gamble /	PROTOCOL PSEP (1995)
ORGANISM BATCH	TEST START DATE: 7.1.13	TIME	TEST END DATE:	TIME	

LARVAL OBSERVATION DATA

CLIENT/ NEWFIELDS ID	REP	NUMBER NORMAL	NUMBER	DATE	TECHNICIAN	COMMENTS
SD0030 /	1	156	2			
	2	166	3			
	3	172	5			
	4	156	3			
	5	152	3			
SD0031 /	1	154	0			
	2	190	10			
	3	164	14			
	4	156	3			
	5	167	4			
SD0032 /	1	169	4			
	2	184	11			
	3	181	9			
	4	216	4			
	5	192	16			
SD0033 /	1	186	8			
	2	179	6			
	3	175	5			
	4	108	13			
	5	155	6			
SD0034 /	1	159	6			
	2	162	13			
	3	156	15			
	4	131	4			
	5	181	9			

NewFields

LARVAL DEVELOPMENT TEST
ENDPOINT DATA

SPECIES: *Mytilus galloprovincialis*

CLIENT	PROJECT	JOB NUMBER	PROJECT MANAGER	NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	860.0074.000	B. Hester	Port Gamble /	PSEP (1995)

ORGANISM BATCH	TEST START DATE:	TIME	TEST END DATE:	TIME
	7.1.13			

LARVAL OBSERVATION DATA

CLIENT/ NEWFIELDS ID	REP	NUMBER NORMAL	NUMBER	DATE	TECHNICIAN	COMMENTS
SD0035 /	1	164	9			
	2	185	3			
	3	194	2			
	4	192	4			
	5	151	2			
SD0036 /	1	179	11			
	2	201	11			
	3	170	6			
	4	200	7			
	5	167	6			
SD0037 /	1	184	4			
	2	190	4			
	3	168	3			
	4	155	8			
	5	184	4			
SD0038 /	1	190	15			
	2	165	12			
	3	186	25			
	4	231	15			
	5	166	8			
SD0039 /	1	161	56			
	2	154	52			
	3	169	31			
	4	167	31			
	5	152	45			

NewFields

LARVAL DEVELOPMENT TEST
ENDPOINT DATA

			SPECIES *Mytilus galloprovincialis*		
CLIENT Integral Consulting Inc.	PROJECT Port Angeles	JOB NUMBER 860.0074.000	PROJECT MANAGER B. Hester	NEWFIELDS LAB / LOCATION Port Gamble /	PROTOCOL PSEP (1995)
ORGANISM BATCH		TEST START DATE: 7.1.13	TIME	TEST END DATE:	TIME

LARVAL OBSERVATION DATA

CLIENT/ NEWFIELDS ID	REP	NUMBER NORMAL	NUMBER	DATE	TECHNICIAN	COMMENTS
SD0040 /	1	189	4			
	2	180	4			
	3	178	2			
	4	180	6			
	5	164	7			
SD0042 /	1	170	16			
	2	174	2			
	3	145	9			
	4	183	13			
	5	179	3			
SD0043 /	1	221	2			
	2	203	8			
	3	175	9			
	4	193	10			
	5	205	8			
SD0044 /	1	167	8			
	2	196	5			
	3	181	4			
	4	—	—			no vial - overturned jar
	5	217	4			
SD0045 /	1	186	6			
	2	154	3			
	3	163	6			
	4	155	12			
	5	147	3			

NewFields

LARVAL DEVELOPMENT TEST
ENDPOINT DATA

			SPECIES *Mytilus galloprovincialis*		
CLIENT Integral Consulting Inc.	PROJECT Port Angeles	JOB NUMBER 860.0074.000	PROJECT MANAGER B. Hester	NEWFIELDS LAB / LOCATION Port Gamble /	PROTOCOL PSEP (1995)
ORGANISM BATCH	TEST START DATE: 7·1·13	TIME	TEST END DATE:	TIME	

LARVAL OBSERVATION DATA

CLIENT/ NEWFIELDS ID	REP	NUMBER NORMAL	NUMBER	DATE	TECHNICIAN	COMMENTS
SD0046 /	1	193	11			
	2	171	10			
	3	211	6			
	4	212	7			
	5	196	6			
SD0047 /	1	166	3			
	2	186	4			
	3	194	7			
	4	220	10			
	5	159	5			
SD0048 /	1	192	8			
	2	215	14			
	3	193	10			
	4	209	11			
	5	200	14			
SD0049 /	1	220	3			
	2	212	5			
	3	214	7			
	4	198	7			
	5	185	6			

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT Integral Consulting Inc.	PROJECT Port Angeles	SPECIES *Mytilus galloprovincialis*	NEWFIELDS LAB / LOCATION Port Gamble /	PROTOCOL PSEP (1995)
JOB NUMBER 860.0074.000	PROJECT MANAGER B. Hester	TEST START DATE 01Jul13	TIME 1900	TEST END DATE 7.3.13	TIME 1700

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
				D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
Control /	0	179	WQ Surr	6	7.3	6	16.7	2	29	5	8.0	CR	0.080	JL	0.026 ~~0.070~~ ①	JL	7/01
Control /	1		WQ Surr	6	7.8	6	15.0	2	29	5	8.1					Kz	7/2
Control /	2		WQ Surr	6	7.3	6	15.8	2	29	5	7.9	CR	0.968	CR	0.033	MMB	7/3
Control /	3		WQ Surr														
Control /	4		WQ Surr														
CR-12 /	0	185	WQ Surr	6	7.7	6	16.0	2	29	5	8.1	CR	0.065	JL	0.070 ~~0.026~~ ①	JL	7/01
CR-12 /	1		WQ Surr	6	7.7	6	15.5	2	29	5	8.0					Kz	7/2
CR-12 /	2		WQ Surr	6	7.3	6	16.6	2	29	5	7.9	CR	0.210	CR	0.047	MMB	7/3
CR-12 /	3		WQ Surr														
CR-12 /	4		WQ Surr														
CARR-20 /	0	95	WQ Surr	6	7.3	6	16.4	2	29	5	8.0	CR	0.079	L	0.106	JL	7/01
CARR-20 /	1		WQ Surr	6	6.6	6	15.8	2	29	5	8.0					Kz	7/2
CARR-20 /	2		WQ Surr	6	4.4	6	15.6	2	29	5	7.7	CR	0.171	CR	0.041	MMB	7/3
CARR-20 /	3		WQ Surr														
CARR-20 /	4		WQ Surr														

①WC JL 7/1

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT	PROJECT	SPECIES		NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	*Mytilus galloprovincialis*		Port Gamble /	PSEP (1995)
JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Hester	01Jul13	1900		

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
				D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
CR-02 /	0	81	WQ Surr	6	6.8	6	16.6	2	29	5	8.0	CR	0.073	[illegible]	0.173	JL	7/01
CR-02 /	1	↓	WQ Surr	6	6.7	6	15.9	2	29	5	8.0	—				[illegible]	7/2
CR-02 /	2		WQ Surr	6	5.3	6	16.3	2	29	5	7.8	CR	0.171	GR	0.082	NMB	7/3
CR-02 /	3		WQ Surr														
CR-02 /	4		WQ Surr														
SD005 /	0	77	WQ Surr	6	6.0	6	16.5	2	29	5	8.0	CR	0.089	[illegible]	0.286	JL	7/01
SD005 /	1	↓	WQ Surr	6	7.3	6	16.5	2	29	5	8.0	—				[illegible]	7/2
SD005 /	2		WQ Surr	6	4.1	6	16.1	2	29	5	7.7	CR	0.080	GR	0.116	NMB	7/3
SD005 /	3		WQ Surr														
SD005 /	4		WQ Surr														
SD006 /	0	152	WQ Surr	6	5.9	6	16.1	2	28	5	7.9	CR	0.064	[illegible]	0.239	JL	7/01
SD006 /	1	↓	WQ Surr	6	6.6	6	15.7	2	29	5	7.8	—				[illegible]	7/2
SD006 /	2		WQ Surr	6	4.3	6	16.0	2	29	5	7.7	CR	0.065	GR	0.082	NMB	7/3
SD006 /	3		WQ Surr														
SD006 /	4		WQ Surr														

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT	PROJECT	SPECIES		NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	*Mytilus galloprovincialis*		Port Gamble /	PSEP (1995)
JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Hester	01Jul13	1900		

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA			
				D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)	TECH	DATE
SD007 /	0	27	WQ Surr	6	6.1	6	16.6	2	29	5	8.0	CR	0.217	L	0.274	JL	7/01
SD007 /	1		WQ Surr	6	6.3	6	15.4	2	29	5	8.1					[illegible]	7/2
SD007 /	2		WQ Surr	6	4.4	6	16.2	2	29	5	7.7	CR	0.100	CR	0.112	MMB	7/3
SD007 /	3		WQ Surr														
SD007 /	4	↓	WQ Surr														
SD0023 /	0	190	WQ Surr	6	6.8	6	16.4	2	29	5	8.0	CR	0.077	L	0.300	JL	7/01
SD0023 /	1		WQ Surr	6	7.8	6	16.1	2	29	5	8.0					[illegible]	7/2
SD0023 /	2		WQ Surr	6	4.4	6	16.4	2	29	5	7.7	CR	0.069	CR	0.084	MMB	7/3
SD0023 /	3		WQ Surr														
SD0023 /	4	↓	WQ Surr														
SD0024 /	0	57	WQ Surr	6	6.3	6	16.8	2	29	5	7.9	CR	0.071	L	0.126	JL	7/01
SD0024 /	1		WQ Surr	6	7.5	6	16.0	2	29	5	8.0					[illegible]	7/2
SD0024 /	2		WQ Surr	6	3.6	6	15.9	2	29	5	7.7	CR	0.065	CR	0.052	MMB	7/3
SD0024 /	3		WQ Surr														
SD0024 /	4	↓	WQ Surr														

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT	PROJECT	SPECIES		NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	*Mytilus galloprovincialis*		Port Gamble /	PSEP (1995)
JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Hester	01Jul13	1900		

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA			
				D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)	TECH	DATE
SD0025 /	0	197	WQ Surr	6	5.8	6	17.0	2	29	5	7.9	CR	0.190	JL	0.219	JL	7/01
SD0025 /	1		WQ Surr	6	6.9	6	16.2	2	29	5	7.9	—	—	—	—	BH	7.2
SD0025 /	2		WQ Surr	6	4.8	6	16.8	2	29	5	7.7	CR	0.118	CR	0.093	MMB	7/3
SD0025 /	3		WQ Surr														
SD0025 /	4		WQ Surr														
SD0026 /	0	181	WQ Surr	6	5.3	6	16.4	2	28	5	8.0	CR	0.153	JL	0.199	JL	7/01
SD0026 /	1		WQ Surr	6	5.0①	6	15.7	2	29	5	7.9	—	—	—	—	BH	7/2
SD0026 /	2		WQ Surr	6	8.0	6	15.3	2	29	5	7.9	CR	0.114	CR	0.090	MMB	7/3
SD0026 /	3		WQ Surr														
SD0026 /	4		WQ Surr														

① Aeration initiated 7.2.13 BH

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT	PROJECT	SPECIES		NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	*Mytilus galloprovincialis*		Port Gamble /	PSEP (1995)
JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Hester	01Jul13	1900		

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
				D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
SD0027 /	0	53	WQ Surr	6	7.0	6	16.7	2	29	5	8.0	CR	0.052	JL	0.284	JL	7/01
SD0027 /	1		WQ Surr	6	6.2	6	15.4	2	29	5	7.9	—	—	—	—	HL	7/2
SD0027 /	2		WQ Surr	6	4.7	6	15.8	2	29	5	7.6	CR	0.067	CR	0.084	MMB	7/3
SD0027 /	3		WQ Surr														
SD0027 /	4	↓	WQ Surr														
SD0028 /	0	38	WQ Surr	6	6.5	6	16.7	2	29	5	8.0	CR	0.059	JL	0.202	JL	7/01
SD0028 /	1		WQ Surr	6	7.2	6	15.8	2	29	5	8.1	—	—	—	—	HL	7/2
SD0028 /	2		WQ Surr	6	4.3	6	15.8	2	29	5	7.7	CR	0.059	CR	0.046	MMB	7/3
SD0028 /	3		WQ Surr														
SD0028 /	4	↓	WQ Surr														

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT Integral Consulting Inc.	PROJECT Port Angeles	SPECIES *Mytilus galloprovincialis*	NEWFIELDS LAB / LOCATION Port Gamble /	PROTOCOL PSEP (1995)
JOB NUMBER 860.0074.000	PROJECT MANAGER B. Hester	TEST START DATE 01Jul13 TIME 1900	TEST END DATE	TIME

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
				meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
SD0029 /	0	116	WQ Surr	6	5.9	6	15.8	2	28	5	8.0	CR	0.056	L	0.153	JL	7/01
SD0029 /	1	↓	WQ Surr	6	7.0	6	15.9	2	29	5	8.0	—	—	—	—	HE	7/2
SD0029 /	2		WQ Surr	6	5.5	6	16.2	2	29	5	7.7	CR	0.052	CR	0.055	MMB	7/3
SD0029 /	3		WQ Surr														
SD0029 /	4		WQ Surr														
SD0030 /	0	8	WQ Surr	6	7.1	6	17.0	2	29	5	8.0	CR	0.043	L	0.243	JL	7/01
SD0030 /	1	↓	WQ Surr	6	6.7	6	16.3	2	29	5	8.0	—	—	—	—	HE	7/2
SD0030 /	2		WQ Surr	6	5.6	6	16.6	2	29	5	7.8	CR	0.051	CR	0.085	MMB	7/3
SD0030 /	3		WQ Surr														
SD0030 /	4		WQ Surr														
SD0031 /	0	4	WQ Surr	6	7.0	6	17.0	2	29	5	7.8	CR	0.023	L	0.220	JL	7/01
SD0031 /	1	↓	WQ Surr	6	6.8	6	16.4	2	29	5	8.1	—	—	—	—	HE	7/12
SD0031 /	2		WQ Surr	6	5.2	6	17.0	2	29	5	7.7	CR	0.045	CR	0.099	MMB	7/3
SD0031 /	3		WQ Surr														
SD0031 /	4		WQ Surr														

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT	PROJECT	SPECIES		NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	*Mytilus galloprovincialis*		Port Gamble /	PSEP (1995)
JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Hester	01Jul13	1900		

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
				meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
SD0032 /	0	110	WQ Surr	6	6.7	6	16.2	2	29	5	8.0	CR	0.021	JL	0.306	JL	7/01
SD0032 /	1		WQ Surr	6	7.4	6	16.0	2	29	5	8.1					[illegible]	7/2
SD0032 /	2		WQ Surr	6	4.2	6	16.0	2	29	5	7.7	CR	0.041	CR	0.127	MMB	7/3
SD0032 /	3		WQ Surr														
SD0032 /	4		WQ Surr														

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT	PROJECT	SPECIES		NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	*Mytilus galloprovincialis*		Port Gamble /	PSEP (1995)
JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Hester	01Jul13	1900		

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
				D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
SD0033 /	0	31	WQ Surr	6	6.4	6	16.3	2	29	5	8.0	CR	0.023	JL	0.211	JL	7/01
SD0033 /	1	↓	WQ Surr	6	6.1	6	15.4	2	29	5	8.1	—	—	—	—	Hz	7/2
SD0033 /	2	↓	WQ Surr	6	4.0	6	16.0	2	29	5	7.7	CR	0.036	CR	0.077	NMB	7/3
SD0033 /	3	↓	WQ Surr														
SD0033 /	4	↓	WQ Surr														
SD0034 /	0	173	WQ Surr	6	6.0	6	17.0	2	29	5	7.9	CR	0.025	JL	0.220	JL	7/01
SD0034 /	1	↓	WQ Surr	6	7.2	6	16.4	2	29	5	7.9	—	—	—	—	Hz	7/2
SD0034 /	2	↓	WQ Surr	6	3.6	6	16.0	2	29	5	7.6	CR	0.034	CR	0.068	NMB	7/3
SD0034 /	3	↓	WQ Surr														
SD0034 /	4	↓	WQ Surr														
SD0035 /	0	63	WQ Surr	6	6.0	6	16.9	2	29	5	8.0	CR	0.027	JL	0.214	JL	7/01
SD0035 /	1	↓	WQ Surr	6	~~7.7~~ 7.1	6	15.6	2	29	5	8.0	—	—	—	—	Hz	7/2
SD0035 /	2	↓	WQ Surr	6	3.1	6	15.6	2	29	5	7.7	CR	0.035	CR	0.061	NMB	7/3
SD0035 /	3	↓	WQ Surr														
SD0035 /	4	↓	WQ Surr														

①JG Hz 7/2

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT	PROJECT	SPECIES		NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	*Mytilus galloprovincialis*		Port Gamble /	PSEP (1995)
JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Hester	01Jul13	1900		

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
				D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
SD0036 /	0	1	WQ Surr	6	7.1	6	17.0	2	29	5	8.0	CR	0.037	JL	0.190	JL	① ~~9/01~~ 7/01
SD0036 /	1	↓	WQ Surr	6	6.6	6	16.7	2	29	5	8.1	—	—	—	—	[illegible]	7/2
SD0036 /	2		WQ Surr	6	4.8	6	16.6	2	29	5	7.7	CR	0.033	CR	0.058	MMB	7/3
SD0036 /	3		WQ Surr														
SD0036 /	4		WQ Surr														
SD0037 /	0	74	WQ Surr	6	6.5	6	16.9	2	29	5	8.0	CR	0.031	JL	0.235	JL	7/01
SD0037 /	1	↓	WQ Surr	6	7.6	6	16.0	2	29	5	8.1	—	—	—	—	[illegible]	7/2
SD0037 /	2		WQ Surr	6	3.5	6	15.6	2	29	5	7.7	CR	0.034	CR	0.073	MMB	7/3
SD0037 /	3		WQ Surr														
SD0037 /	4		WQ Surr														
SD0038 /	0	33	WQ Surr	6	6.8	6	16.8	2	29	5	8.0	CR	0.034	JL	0.266	JL	7/01
SD0038 /	1	↓	WQ Surr	6	7.3	6	15.8	2	29	5	8.1	—	—	—	—	[illegible]	7/2
SD0038 /	2		WQ Surr	6	4.2	6	16.2	2	29	5	7.7	CR	0.040	CR	0.076	MMB	7/3
SD0038 /	3		WQ Surr														
SD0038 /	4		WQ Surr														

① Wrong Date. JL 7/01/13.

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT Integral Consulting Inc.	PROJECT Port Angeles	SPECIES *Mytilus galloprovincialis*		NEWFIELDS LAB / LOCATION Port Gamble /	PROTOCOL PSEP (1995)
JOB NUMBER 860.0074.000	PROJECT MANAGER B. Hester	TEST START DATE 01Jul13	TIME 1900	TEST END DATE	TIME

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
				meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
SD0039 /	0	189	WQ Surr	6	6.7	6	16.3	2	29	5	8.0	CR	0.106	Lr	0.214	JL	7/01
SD0039 /	1	↓	WQ Surr	6	7.5	6	16.2	2	29	5	7.9	—	—	—	—	JH	7/2
SD0039 /	2		WQ Surr	6	4.7	6	16.7	2	29	5	7.7	CR	0.120	CR	0.059	MMB	7/3
SD0039 /	3		WQ Surr														
SD0039 /	4		WQ Surr														

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT	PROJECT	SPECIES		NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	*Mytilus galloprovincialis*		Port Gamble /	PSEP (1995)
JOB NUMBER	**PROJECT MANAGER**	**TEST START DATE**	**TIME**	**TEST END DATE**	**TIME**
860.0074.000	B. Hester	01Jul13	1900		

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
				D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
SD0040 /	0	128	WQ Surr	6	5.9	6	17.0	2	29	5	8.0	CR	0.049	JL	0.198	JL	7/01
SD0040 /	1	↓	WQ Surr	6	7.4	6	16.6	2	29	5	8.0	—	—	—	—	Hk	① 7/2 ~~7/4~~
SD0040 /	2		WQ Surr	6	3.7	6	15.9	2	29	5	7.8	CR	0.069	CR	0.081	MMB	7/3
SD0040 /	3		WQ Surr														
SD0040 /	4		WQ Surr														
SD0042 /	0	121	WQ Surr	6	5.9	6	17.0	2	29	5	8.1	CR	0.075	JL	0.138	JL	7/01
SD0042 /	1	↓	WQ Surr	6	6.2	6	16.0	2	29	5	8.0	—	—	—	—	Hk	7/2
SD0042 /	2		WQ Surr	6	3.1	6	16.1	2	29	5	7.8	CR	0.067	CR	0.099	MMB	7/3
SD0042 /	3		WQ Surr														
SD0042 /	4		WQ Surr														
SD0043 /	0	79	WQ Surr	6	6.3	6	16.1	2	29	5	8.0	CR	0.042	JL	0.197	JL	7/01
SD0043 /	1	↓	WQ Surr	6	6.8	6	16.2	2	29	5	8.1	—	—	—	—	Hk	7/2
SD0043 /	2		WQ Surr	6	4.4	6	15.4	2	29	5	7.7	CR	0.059	CR	0.108	MMB	7/3
SD0043 /	3		WQ Surr														
SD0043 /	4		WQ Surr														

① wrong date Hk 7/2

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT Integral Consulting Inc.	PROJECT Port Angeles	SPECIES *Mytilus galloprovincialis*		NEWFIELDS LAB / LOCATION Port Gamble /	PROTOCOL PSEP (1995)
JOB NUMBER 860.0074.000	PROJECT MANAGER B. Hester	TEST START DATE 01Jul13	TIME 1900	TEST END DATE	TIME

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
				D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
SD0044 /	0	75	WQ Surr	6	6.8	6	16.7	2	29	5	8.0	CR	~~0.200~~ 0.020	Ju	0.338	JL	7/01
SD0044 /	1		WQ Surr	6	7.5	6	15.9	2	29	5	8.0	—	—	—	—		7/2
SD0044 /	2		WQ Surr	6	3.8	6	15.4	2	29	5	7.7	CR	0.047	CR	0.106	MMB	7/3
SD0044 /	3		WQ Surr														
SD0044 /	4	↓	WQ Surr														
SD0045 /	0	191	WQ Surr	6	6.2	6	16.8	2	29	5	8.0	CR	0.013	Ju	0.260	JL	7/01
SD0045 /	1		WQ Surr	6	6.3	6	15.4	2	29	5	8.0	—	—	—	—		7/2
SD0045 /	2		WQ Surr	6	4.2	6	16.1	2	29	5	7.7	CR	0.041	CR	0.112	MMB	7/3
SD0045 /	3		WQ Surr														
SD0045 /	4	↓	WQ Surr														

①IE 7/1/13

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT	PROJECT	SPECIES		NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	*Mytilus galloprovincialis*		Port Gamble /	PSEP (1995)
JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Hester	01Jul13	1900		

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
				meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
SD0046 /	0	131	WQ Surr	6	5.9	6	16.1	2	29	5	8.0	CR	0.022	kw	0.146	JL	7/01
SD0046 /	1		WQ Surr	6	7.4	6	16.6	2	29	5	7.9					HE	7/2
SD0046 /	2		WQ Surr	6	3.8	6	15.8	2	29	5	7.7	CR	0.058	CR	0.098	MMB	7/3
SD0046 /	3		WQ Surr														
SD0046 /	4	↓	WQ Surr														
SD0047 /	0	122	WQ Surr	6	6.4	6	17.0	2	29	5	8.0	CR	0.016	kw	0.194	JL	7/01
SD0047 /	1		WQ Surr	6	7.5	6	16.6	2	29	5	8.0					HE	7/2
SD0047 /	2		WQ Surr	6	4.0	6	15.9	2	29	5	7.8	CR	0.050	CR	0.121	MMB	7/3
SD0047 /	3		WQ Surr														
SD0047 /	4	↓	WQ Surr														
SD0048 /	0	124	WQ Surr	6	7.0	6	17.0	2	29	5	8.0	CR	0.011	kw	0.216	JL	7/01
SD0048 /	1		WQ Surr	6	7.6	6	16.6	2	29	5	8.0					HE	7/2
SD0048 /	2		WQ Surr	6	5.2	6	16.3	2	29	5	7.8	CR	0.047	CR	0.054	MMB	7/3
SD0048 /	3		WQ Surr														
SD0048 /	4	↓	WQ Surr														

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT	PROJECT	SPECIES		NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	*Mytilus galloprovincialis*		Port Gamble /	PSEP (1995)
JOB NUMBER	**PROJECT MANAGER**	**TEST START DATE**	**TIME**	**TEST END DATE**	**TIME**
860.0074.000	B. Hester	01Jul13	1960		

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
				D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
SD0049 /	0	14	WQ Surr	6	7.4	6	16.3	2	29	5	8.0	CR	0.008	Lu	0.225	JL	7/01
SD0049 /	1		WQ Surr	6	7.8	6	16.2	2	29	5	8.1	—	—	—	—	JH	7/2
SD0049 /	2		WQ Surr	6	6.6	6	16.2	2	29	5	7.8	CR	① [illegible]	CR	0.079	MMB	7/3
SD0049 /	3		WQ Surr														
SD0049 /	4	↓	WQ Surr														

①Illegible correct entry = 0.047mg/L CR 7/3

NewFields

LARVAL DEVELOPMENT TEST INITIATION DATA SHEET

CLIENT	PROJECT	JOB NUMBER	PROJECT MANAGER	LABORATORY	PROTOCOL
Integral Consulting Inc.	Port Angeles	860.0074.000	B. Hester	Port Gamble	PSEP (1995)

TEST ORGANISM SPAWNING DATA

SPECIES *Mytilus galloprovincialis*			
SUPPLIER Taylor shellfish			ORGANISM BATCH TS070113
DATE RECEIVED 7.1.13		TIME RECEIVED 0900	DATE USED 7.1.13
SPAWNING METHOD feed / heatshock		INITIAL SPAWNING TIME 1430	FINAL SPAWNING TIME 1620
MALES 10	FEMALES 8	SPERM VIABILITY ✓	EGG CONDITION Good
BEGIN FERTILIZATION 1620		END FERTILIZATION 1900	CONDITION OF EMBRYOS >90% d.V

SAMPLE STORAGE 4 Degrees Celsius - dark
SEDIMENT TREATMENT none
TEST CHAMBERS 1 L Mason Jars
EXPOSURE VOLUME 900mL seawater / 18g Sediment
TIME OF SHAKE 1330-1440
TIME OF INITIATION

SPECIAL CONDITIONS

UV LIGHT EXPOSURE (YES/NO)	AERATION FROM TEST INITIATION (YES/NO)
No	No
SCREEN TUBE TEST (YES/NO)	**OTHER (EXPLAIN)**
No	—

EMBRYO DENSITY CALCULATIONS

PSEP Target 27,000 eggs/mL in 900mL (30 eggs/mL)

~~42×100 = 4200~~

~~$\frac{27000}{4200} = 6.4$ mL~~

55·100 = 5500

$\frac{27000}{5500} = 4.9$

RT 200mL = 27 eggs/mL = 5400 Target

$\frac{5400}{5500} = 0.98$

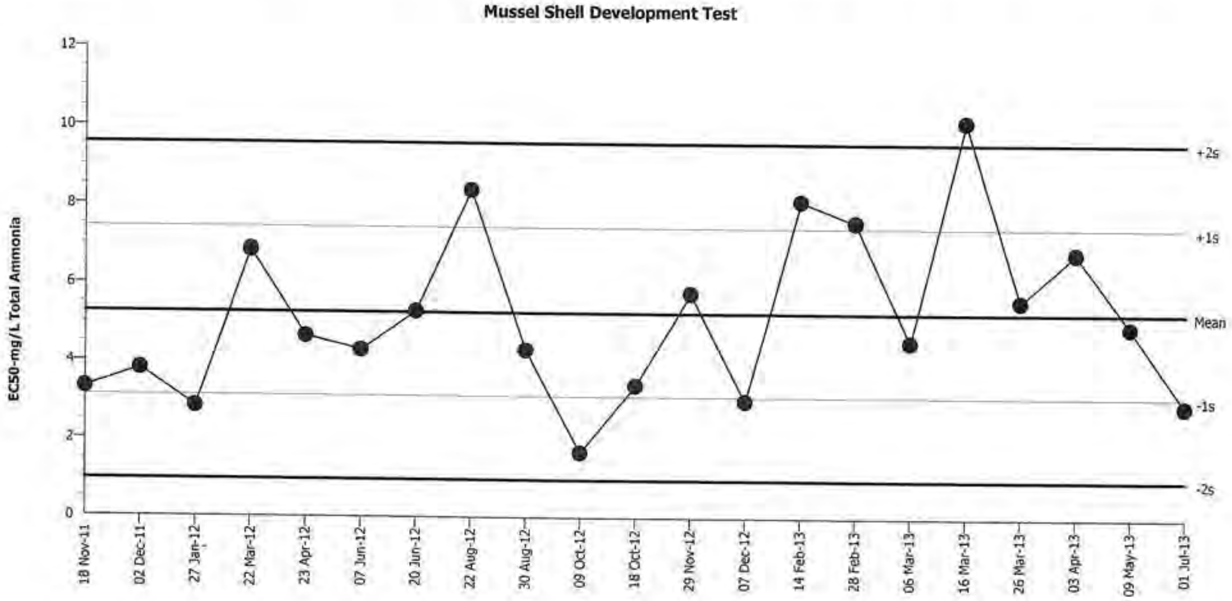
CETIS QC Plot

Report Date: 28 Aug-13 10:32 (1 of 1)

Mussel Shell Development Test

NewFields

Test Type:	Development-Survival	**Organism:**	Mytilus galloprovincialis (Bay Mussel	**Material:**	Total Ammonia
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



Mean:	5.266	**Count:**	20	**-1s Warning Limit:**	3.114	**-2s Action Limit:**	0.962
Sigma:	2.152	**CV:**	40.90%	**+1s Warning Limit:**	7.418	**+2s Action Limit:**	9.57

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2011	Nov	18	17:30	3.323	-1.943	-0.9029			15-5702-8405	04-5641-1567
2		Dec	2	18:25	3.806	-1.46	-0.6785			06-3989-5500	09-5166-6282
3	2012	Jan	27	17:30	2.846	-2.42	-1.125	(-)		17-8035-0885	06-4475-5873
4		Mar	22	12:15	6.852	1.586	0.7368			08-5068-3541	09-7191-1867
5		Apr	23	18:45	4.66	-0.6056	-0.2814			02-7458-4371	07-2969-7564
6		Jun	7	18:15	4.304	-0.9625	-0.4472			20-4612-5080	14-0164-5214
7			20	17:50	5.296	0.02976	0.01383			21-1169-3016	00-2068-7937
8		Aug	22	16:05	8.376	3.11	1.445	(+)		03-0988-3309	14-8872-2540
9			30	17:50	4.311	-0.9552	-0.4439			00-6833-5106	09-9193-8473
10		Oct	9	18:00	1.678	-3.588	-1.668	(-)		06-6024-3093	07-1414-6248
11			18	18:00	3.41	-1.856	-0.8625			07-3550-9263	15-5292-9085
12		Nov	29	17:45	5.775	0.5085	0.2363			04-0681-3114	00-7625-5304
13		Dec	7	18:50	3.016	-2.25	-1.045	(-)		15-7850-6619	03-0562-1566
14	2013	Feb	14	17:40	8.112	2.846	1.322	(+)		02-6193-4857	04-9672-9086
15			28	21:20	7.574	2.308	1.072	(+)		06-9403-7957	07-8992-4017
16		Mar	6	16:45	4.538	-0.7283	-0.3384			20-1267-3706	09-5346-5604
17			16	17:45	10.13	4.861	2.259	(+)	(+)	14-2253-0526	18-0087-0374
18			26	18:15	5.579	0.3131	0.1455			03-8532-3895	00-6308-0782
19		Apr	3	0:00	6.805	1.539	0.7153			10-3604-5723	04-8356-0800
20		May	9	17:15	4.927	-0.3393	-0.1577			00-6360-9095	16-4147-0802
21		Jul	1	19:00	2.895	-2.371	-1.102	(-)		19-5961-2730	13-0986-6895

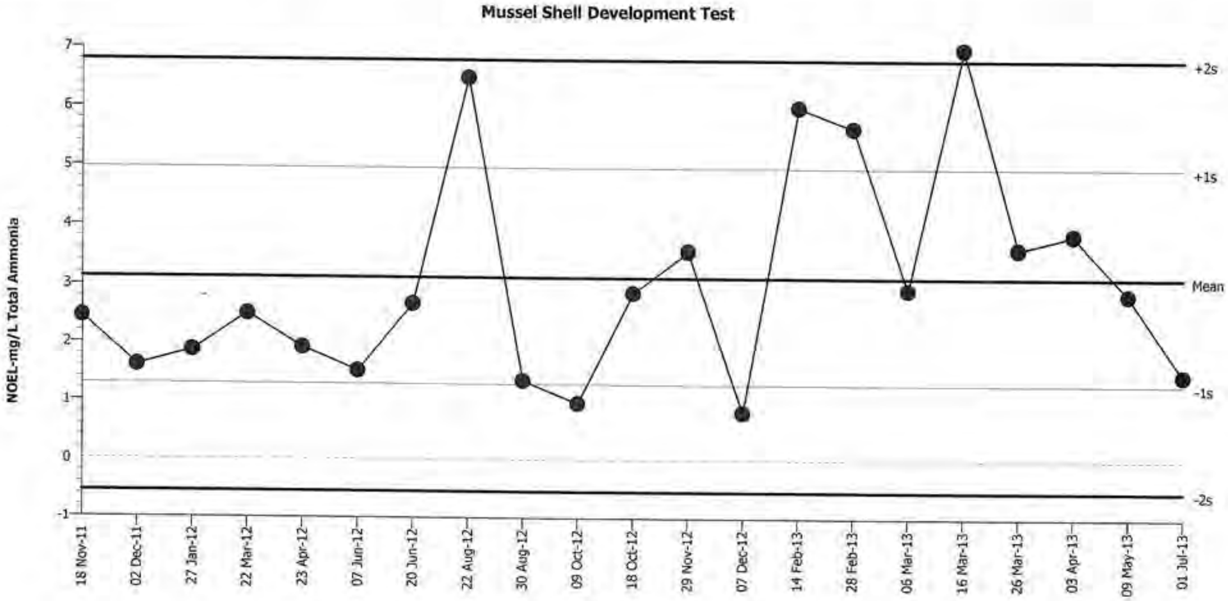
Analyst:________ QA:________

CETIS QC Plot

Report Date: 28 Aug-13 10:39 (1 of 1)

Mussel Shell Development Test **NewFields**

Test Type:	Development-Survival	**Organism:**	Mytilus galloprovincialis (Bay Mussel	**Material:**	Total Ammonia
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



Mean:	3.127	**Count:**	20	**-1s Warning Limit:**	1.29	**-2s Action Limit:**	-0.547
Sigma:	1.837	**CV:**	58.70%	**+1s Warning Limit:**	4.964	**+2s Action Limit:**	6.801

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2011	Nov	18	17:30	2.45	-0.677	-0.3685			15-5702-8405	17-4774-1775
2		Dec	2	18:25	1.61	-1.517	-0.8258			06-3989-5500	05-9587-4977
3	2012	Jan	27	17:30	1.87	-1.257	-0.6843			17-8035-0885	19-6006-6064
4		Mar	22	12:15	2.5	-0.627	-0.3413			08-5068-3541	14-6034-1614
5		Apr	23	18:45	1.92	-1.207	-0.657			02-7458-4371	11-3829-0609
6		Jun	7	18:15	1.52	-1.607	-0.8748			20-4612-5080	06-0541-2169
7			20	17:50	2.68	-0.447	-0.2433			21-1169-3016	01-0499-1137
8		Aug	22	16:05	6.5	3.373	1.836	(+)		03-0988-3309	04-0917-6749
9			30	17:50	1.36	-1.767	-0.9619			00-6833-5106	03-2629-4542
10		Oct	9	18:00	0.973	-2.154	-1.173	(-)		06-6024-3093	07-8913-5319
11			18	18:00	2.87	-0.257	-0.1399			07-3550-9263	18-1681-7487
12		Nov	29	17:45	3.58	0.453	0.2466			04-0681-3114	19-0538-4174
13		Dec	7	18:50	0.817	-2.31	-1.257	(-)		15-7850-6619	13-6604-7958
14	2013	Feb	14	17:40	6	2.873	1.564	(+)		02-6193-4857	07-3889-4891
15			28	21:20	5.65	2.523	1.373	(+)		06-9403-7957	16-1498-7518
16		Mar	6	16:45	2.93	-0.197	-0.1072			20-1267-3706	13-0769-0097
17			16	17:45	6.99	3.863	2.103	(+)	(+)	14-2253-0526	09-1011-9616
18			26	18:15	3.62	0.493	0.2684			03-8532-3895	01-1639-1779
19		Apr	3	0:00	3.85	0.723	0.3936			10-3604-5723	13-5448-8759
20		May	9	17:15	2.85	-0.277	-0.1508			00-6360-9095	00-7540-8630
21		Jul	1	19:00	1.46	-1.667	-0.9075			19-5961-2730	20-9160-8614

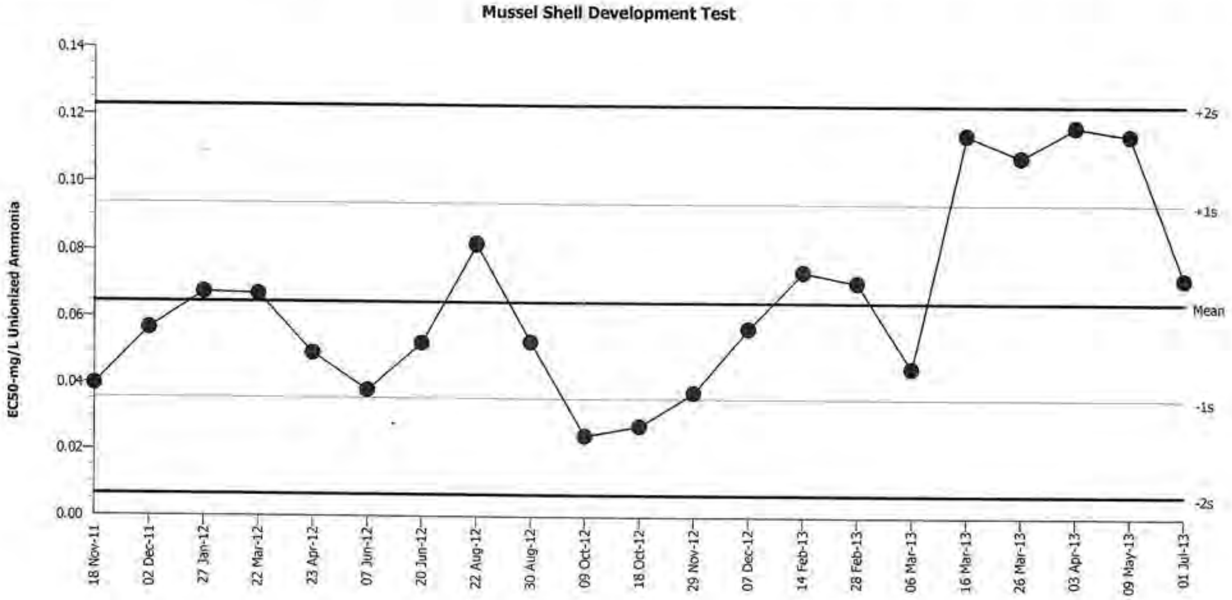
Analyst:________ QA:________

CETIS QC Plot

Report Date: 28 Aug-13 10:08 (1 of 1)

Mussel Shell Development Test **NewFields**

Test Type: Development-Survival
Protocol: EPA/600/R-95/136 (1995)
Organism: Mytilus galloprovincialis (Bay Mussel
Endpoint: Combined Proportion Normal
Material: Unionized Ammonia
Source: Reference Toxicant-REF



Mean:	0.0647	**Count:**	20	**-1s Warning Limit:**	0.03558	**-2s Action Limit:**	0.00646
Sigma:	0.02912	**CV:**	45.00%	**+1s Warning Limit:**	0.09382	**+2s Action Limit:**	0.1229

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2011	Nov	18	17:30	0.03966	-0.02504	-0.86			15-1035-6307	13-1597-7557
2		Dec	2	18:25	0.05664	-0.00806	-0.2766			02-1703-2403	18-2609-9695
3	2012	Jan	27	17:30	0.06751	0.002814	0.09663			17-7315-3313	06-2387-0021
4		Mar	22	12:15	0.0669	0.002198	0.0755			16-8530-3093	20-6643-2329
5		Apr	23	18:45	0.04914	-0.01556	-0.5343			11-9474-8117	17-4324-5637
6		Jun	7	18:15	0.03798	-0.02672	-0.9176			14-3239-7455	05-6059-9571
7			20	17:50	0.05226	-0.01244	-0.4272			16-3362-6154	15-3244-5350
8		Aug	22	16:05	0.08186	0.01716	0.5893			19-7550-7456	08-0736-4891
9			30	17:50	0.05265	-0.01205	-0.4137			18-5169-0947	02-7047-2220
10		Oct	9	18:00	0.02443	-0.04027	-1.383	(-)		08-9570-9100	07-8331-5723
11			18	18:00	0.02739	-0.03731	-1.281	(-)		18-9514-2443	00-3905-9363
12		Nov	29	17:45	0.03751	-0.02719	-0.9337			15-6645-8664	13-4294-0618
13		Dec	7	18:50	0.0569	-0.0078	-0.2678			11-6006-3509	05-8108-8018
14	2013	Feb	14	17:40	0.07388	0.009184	0.3154			14-1890-1951	14-7902-0800
15			28	21:20	0.0707	0.006002	0.2061			19-4434-4552	11-0678-0085
16		Mar	6	16:45	0.04499	-0.01971	-0.6769			18-3418-4255	07-5324-7355
17			16	16:10	0.1144	0.04975	1.708	(+)		11-4894-2693	12-9463-9515
18			26	18:15	0.1079	0.04318	1.483	(+)		10-2444-9875	09-9596-0674
19		Apr	3	0:00	0.1168	0.05215	1.791	(+)		20-6076-9735	05-3848-1619
20		May	9	17:15	0.1144	0.0497	1.707	(+)		14-3450-0734	06-3515-6667
21		Jul	1	19:00	0.07187	0.007171	0.2463			10-8846-7294	05-7595-2849

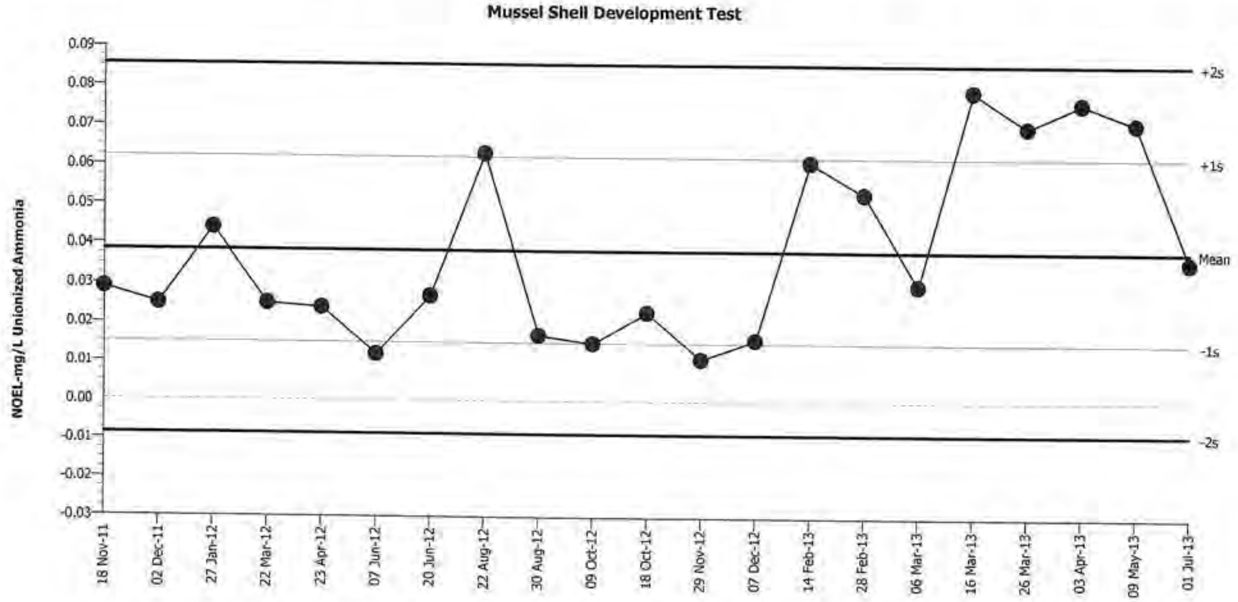
Analyst:______ QA:______

CETIS QC Plot

Report Date: 28 Aug-13 10:39 (1 of 1)

Mussel Shell Development Test **NewFields**

Test Type: Development-Survival
Protocol: EPA/600/R-95/136 (1995)
Organism: Mytilus galloprovincialis (Bay Mussel
Endpoint: Combined Proportion Normal
Material: Unionized Ammonia
Source: Reference Toxicant-REF



Mean: 0.03855 **Count:** 20 **-1s Warning Limit:** 0.01501 **-2s Action Limit:** -0.0085
Sigma: 0.02354 **CV:** 61.10% **+1s Warning Limit:** 0.06209 **+2s Action Limit:** 0.08563

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2011	Nov	18	17:30	0.029	-0.00955	-0.4057			15-1035-6307	02-6656-7352
2		Dec	2	18:25	0.025	-0.01355	-0.5756			02-1703-2403	00-9746-5548
3	2012	Jan	27	17:30	0.044	0.00545	0.2315			17-7315-3313	14-7310-3808
4		Mar	22	12:15	0.025	-0.01355	-0.5756			16-8530-3093	00-2118-8798
5		Apr	23	18:45	0.024	-0.01455	-0.6181			11-9474-8117	16-8822-0741
6		Jun	7	18:15	0.012	-0.02655	-1.128	(-)		14-3239-7455	06-8748-6189
7			20	17:50	0.027	-0.01155	-0.4907			16-3362-6154	07-4796-6258
8		Aug	22	16:05	0.063	0.02445	1.039	(+)		19-7550-7456	17-2049-3239
9			30	17:50	0.017	-0.02155	-0.9155			18-5169-0947	11-3246-0073
10		Oct	9	18:00	0.015	-0.02355	-1	(-)		08-9570-9100	07-1156-4394
11			18	18:00	0.023	-0.01555	-0.6606			18-9514-2443	05-5566-0485
12		Nov	29	17:45	0.011	-0.02755	-1.17	(-)		15-6645-8664	07-1864-3452
13		Dec	7	18:50	0.016	-0.02255	-0.9579			11-6006-3509	00-2066-3271
14	2013	Feb	14	17:40	0.061	0.02245	0.9537			14-1890-1951	16-6372-1200
15			28	21:20	0.053	0.01445	0.6138			19-4434-4552	04-8125-6089
16		Mar	6	16:45	0.03	-0.00855	-0.3632			18-3418-4255	11-0229-7491
17			16	16:10	0.079	0.04045	1.718	(+)		11-4894-2693	17-8368-9370
18			26	18:15	0.07	0.03145	1.336	(+)		10-2444-9875	00-8976-6127
19		Apr	3	0:00	0.076	0.03745	1.591	(+)		20-6076-9735	14-2423-4592
20		May	9	17:15	0.071	0.03245	1.379	(+)		14-3450-0734	19-5425-3899
21		Jul	1	19:00	0.036	-0.00255	-0.1083			10-8846-7294	11-2659-9719

CETIS Summary Report

Report Date: 28 Aug-13 10:36 (p 1 of 1)
Test Code: 74CD513A | 19-5961-2730

Mussel Shell Development Test **NewFields**

Batch ID:	05-2072-4940	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	01 Jul-13 19:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	03 Jul-13 17:00	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	46h	**Source:**	Taylor Shellfish	**Age:**	

Sample ID:	11-7369-9445	**Code:**	45F53B75	**Client:**	Internal Lab
Sample Date:	27 Sep-11	**Material:**	Total Ammonia	**Project:**	Reference Toxicant
Receive Date:	27 Sep-11	**Source:**	Reference Toxicant		
Sample Age:	643d 19h	**Station:**	P110927.151		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
20-9160-8614	Combined Proportion Norm	1.46	3	2.093	11.6%		Dunnett T3 Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
13-0986-6895	Combined Proportion Norm	EC50	2.895	2.775	3.021		Trimmed Spearman-Kärber

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
20-9160-8614	Combined Proportion Norm	PMSD	0.1161	NL - 0.25	No	Passes Acceptability Criteria

Combined Proportion Normal Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.9725	0.9008	1	0.9425	1	0.01665	0.02884	2.97%	0.0%
0.694		3	0.8658	0.6624	1	0.8142	0.9602	0.04727	0.08187	9.46%	10.97%
1.46		3	0.8628	0.707	1	0.8142	0.9336	0.03622	0.06273	7.27%	11.27%
3		3	0.5	0.3373	0.6627	0.4248	0.5442	0.03781	0.06548	13.1%	48.58%
5.99		3	0	0	0	0	0	0	0		100.0%
12.2		3	0	0	0	0	0	0	0		100.0%

Combined Proportion Normal Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	0.9749	0.9425
0.694		0.8142	0.9602	0.823
1.46		0.9336	0.8142	0.8407
3		0.5442	0.4248	0.531
5.99		0	0	0
12.2		0	0	0

Combined Proportion Normal Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	226/226	233/239	213/226
0.694		184/226	217/226	186/226
1.46		211/226	184/226	190/226
3		123/226	96/226	120/226
5.99		0/226	0/226	0/226
12.2		0/226	0/226	0/226

CETIS Test Data Worksheet

Report Date: 28 Aug-13 10:21 (p 1 of 1)
Test Code: 19-5961-2730/74CD513A

Mussel Shell Development Test — **NewFields**

Start Date: 01 Jul-13 19:00
End Date: 03 Jul-13 17:00
Sample Date: 27 Sep-11

Species: Mytilus galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Total Ammonia

Sample Code: 45F53B75
Sample Source: Reference Toxicant
Sample Station: P110927.151

C-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	D	1	1	226	241	241	226	
0	D	2	16	239	239	239	233	
0	D	3	4	226	234	234	213	
0.694		1	12	226	204	204	184	
0.694		2	10	226	244	244	217	
0.694		3	6	226	232	232	186	
1.46		1	3	226	244	244	211	
1.46		2	15	226	218	218	184	
1.46		3	11	226	243	243	190	
3		1	7	226	232	232	123	
3		2	17	226	184	184	96	
3		3	13	226	216	216	120	
5.99		1	9	226	272	272	0	
5.99		2	8	226	213	213	0	
5.99		3	18	226	229	229	0	
12.2		1	14	226	239	239	0	
12.2		2	5	226	235	235	0	
12.2		3	2	226	209	209	0	

Analyst: BH QA: BH

CETIS Summary Report

Report Date: 28 Aug-13 10:36 (p 1 of 1)
Test Code: 40E0B15E | 10-8846-7294

Mussel Shell Development Test

NewFields

Batch ID: 05-2072-4940
Start Date: 01 Jul-13 19:00
Ending Date: 03 Jul-13 17:00
Duration: 46h

Test Type: Development-Survival
Protocol: EPA/600/R-95/136 (1995)
Species: Mytilus galloprovincialis
Source: Taylor Shellfish

Analyst:
Diluent: Laboratory Seawater
Brine: Not Applicable
Age:

Sample ID: 14-7479-4411
Sample Date: 27 Sep-11
Receive Date: 27 Sep-11
Sample Age: 643d 19h

Code: 57E793AB
Material: Unionized Ammonia
Source: Reference Toxicant
Station: P110927.151

Client: Internal Lab
Project: Reference Toxicant

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
11-2659-9719	Combined Proportion Norm	0.036	0.075	0.05196	11.6%		Dunnett T3 Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
05-7595-2849	Combined Proportion Norm	EC50	0.07187	0.06888	0.075		Trimmed Spearman-Kärber

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
11-2659-9719	Combined Proportion Norm	PMSD	0.1161	NL - 0.25	No	Passes Acceptability Criteria

Combined Proportion Normal Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.9725	0.9008	1	0.9425	1	0.01665	0.02884	2.97%	0.0%
0.017		3	0.8658	0.6624	1	0.8142	0.9602	0.04727	0.08187	9.46%	10.97%
0.036		3	0.8628	0.707	1	0.8142	0.9336	0.03622	0.06273	7.27%	11.27%
0.075		3	0.5	0.3373	0.6627	0.4248	0.5442	0.03781	0.06548	13.1%	48.58%
0.147		3	0	0	0	0	0	0	0		100.0%
0.241		3	0	0	0	0	0	0	0		100.0%

Combined Proportion Normal Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1	0.9749	0.9425
0.017		0.8142	0.9602	0.823
0.036		0.9336	0.8142	0.8407
0.075		0.5442	0.4248	0.531
0.147		0	0	0
0.241		0	0	0

Combined Proportion Normal Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	226/226	233/239	213/226
0.017		184/226	217/226	186/226
0.036		211/226	184/226	190/226
0.075		123/226	96/226	120/226
0.147		0/226	0/226	0/226
0.241		0/226	0/226	0/226

CETIS Test Data Worksheet

Report Date: 28 Aug-13 10:05 (p 1 of 1)
Test Code: 10-8846-7294/40E0B15E

Mussel Shell Development Test **NewFields**

Start Date: 01 Jul-13 19:00
End Date: 03 Jul-13 17:00
Sample Date: 27 Sep-11

Species: Mytilus galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Unionized Ammonia

Sample Code: 57E793AB
Sample Source: Reference Toxicant
Sample Station: P110927.151

C-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	D	1	4	226	241	241	226	
0	D	2	15	239	239	239	233	
0	D	3	6	226	234	234	213	
0.017		1	13	226	204	204	184	
0.017		2	18	226	244	244	217	
0.017		3	8	226	232	232	186	
0.036		1	3	226	244	244	211	
0.036		2	14	226	218	218	184	
0.036		3	17	226	243	243	190	
0.075		1	5	226	232	232	123	
0.075		2	11	226	184	184	96	
0.075		3	9	226	216	216	120	
0.147		1	16	226	272	272	0	
0.147		2	1	226	213	213	0	
0.147		3	12	226	229	229	0	
0.241		1	10	226	239	239	0	
0.241		2	2	226	235	235	0	
0.241		3	7	226	209	209	0	

Analyst: rgh QA: rgh

NewFields LARVAL DEVELOPMENT TEST
AMMONIA REF TOX OBSERVATION SHEET

Batch 1

SPECIES *Mytilus galloprovincialis*					
CLIENT Integral Consulting Inc.	PROJECT Port Angeles	JOB NUMBER 860.0074.000	PROJECT MANAGER B. Hester	NEWFIELDS LAB / LOCATION Port Gamble / Incubator	PROTOCOL PSEP (1995)
TEST ID P110927.151	ORGANISM BATCH TS070113	TEST START DATE: 7.1.13	TIME 1900	TEST END DATE: 7.3.13	TIME 1700

LARVAL OBSERVATION DATA

CLIENT/ NEWFIELDS ID	CONC. value	CONC. units	VIAL NUMBER	REP	NUMBER NORMAL	NUMBER ABNORMAL	DATE	TECHNICIAN	COMMENTS
Ref.Tox. - Ammonia - TAN	0	mg/L		1	226	15			
				2	233	6			
				3	213	21			
Ref.Tox. - Ammonia - TAN	0.75	mg/L		1	184	26			
				2	217	27			
				3	186	46			
Ref.Tox. - Ammonia - TAN	1.5	mg/L		1	211	33			
				2	184	34			
				3	190	53			
Ref.Tox. - Ammonia - TAN	3	mg/L		1	123	109			
				2	96	88			
				3	120	96			
Ref.Tox. - Ammonia - TAN	6	mg/L		1	0	272			
				2	0	213			
				3	0	229			
Ref.Tox. - Ammonia - TAN	12	mg/L		1	0	239			
				2	0	235			
				3	0	209			

STOCKING DENSITY		1		225			
		2		225			
		3		228			

$\bar{x} = 226$

NewFields

LARVAL DEVELOPMENT TEST
AMMONIA REF TOX WQ

Batch 1

CLIENT Integral Consulting Inc.	PROJECT Port Angeles	SPECIES *Mytilus galloprovincialis*	NEWFIELDS LAB / LOCATION Port Gamble / Incubator	PROTOCOL PSEP (1995)
JOB NUMBER 860.0074.000	PROJECT MANAGER B. Hester	TEST START DATE: 01Jul13	TIME 1900	TEST END DATE 3July '13
TEST ID P110927.151	LOT #: 111079			TIME 1700

WATER QUALITY DATA

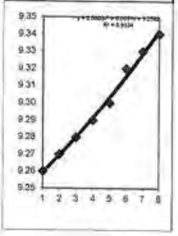
DILTIN.WAT.BATCH	ORGANISM BATCH	REFERENCE TOX. MATERIAL	REFERENCE TOXICANT
FSW070113.01		Ammonium chloride	Ammonia - TAN

					DO (mg/L)		TEMP(C)		SAL (ppt)		pH		TECH.	DATE
					>5.0		16 ± 1		28 ± 1		7 - 9			
CLIENT/ NEWFIELDS ID	CONCENTRATION		DAY	REP	D.O.		TEMP.		SALINITY		pH			
	value	units			meter	mg/L	meter	°C	meter	ppt	meter	unit		
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	6	7.9	6	17.0	2	29	5	8.0	CR	7/1
	0	mg/L	1	Stock										
	Actual:		2	1~~Stock~~	6	7.4	6	16.1	2	29	5	7.9	MMB	7/3
	0.00		3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	6	7.1	6	16.9	2	29	5	8.0	CR	7/1
	0.75	mg/L	1	Stock										
	Actual:		2	1~~Stock~~	6	7.8	6	15.6	2	29	5	8.0	MMB	7/3
	0.694		3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	6	8.0	6	16.7	2	29	5	8.0	CR	7/1
	1.5	mg/L	1	Stock										
	Actual:		2	1~~Stock~~	6	7.9	6	15.4	2	29	5	8.0	MMB	7/3
	1.46		3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	6	8.0	6	16.7	2	29	5	8.0	CR	7/1
	3	mg/L	1	Stock										
	Actual:		2	1~~Stock~~	6	8.1	6	15.2	2	29	5	8.0	MMB	7/3
	3.00		3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	6	8.0	6	16.7	2	29	5	8.0	CR	7/1
	6	mg/L	1	Stock										
	Actual:		2	1~~Stock~~	6	8.1	6	15.3	2	29	5	8.0	MMB	7/3
	5.99		3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	6	8.1	6	16.8	2	29	5	7.9	CR	7/1
	12	mg/L	1	Stock										
	Actual:		2	1~~Stock~~	6	8.1	6	15.2	2	29	5	8.0	MMB	7/3
	12.2		3	Stock										
			4	Stock										

CLIENT:	Internal	Date of Test:	01-Jul-13
PROJECT:	RT	Test Type:	*M. gallo*
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer:	I-factor
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34



	Sample	Mod *NH3T (mg/L)*	*salinity (ppt)*	*pH*	*temp (C)*	temp (K)	i-factor	Mod **NH3U (mg/L)**
	Target / Sample Name	Actual	22.9	8.0	24.1	297.26	9.3053	**#VALUE!**
	Example 3.5	1.000	10.0	7.5	5.0	278.16	9.2750	**0.008**
1								
2	0.75	0.694	29	8.0	16.5	289.66	9.3214	**0.017**
3	1.5	1.460	29	8.0	16.5	289.66	9.3214	**0.036**
4	3	3.000	29	8.0	16.5	289.66	9.3214	**0.075**
5	6	5.990	29	8.0	16.4	289.56	9.3214	**0.148**
6	12	12.200	29	7.9	16.4	289.56	9.3214	**0.241**
7								
8								
9								
10								
11								
12								
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NewFields

ORGANISM RECEIPT LOG

Date: 7.1.13

Time: 0945

NewFields Batch No. TS070113

Organism / Project: Mytilus galloprovincialis

Invoice Attached Yes [✓ No]

Source / Supplier: Taylor Shellfish

Contact: Karen Underwood

No. Ordered: 1 batch

No. Received: 1 batch

Source Batch: (Collection date, hatch date, etc.): Field

Condition of Organisms: (Good, fair, poor; describe.): Good

Approximate Size or Age: (Days from hatch, life stage, size class, etc.): Adult

Shipper: NF Courier

B of L (Tracking No.) NA

Condition of Container: (Good, fair, poor; describe.): Good

Received By: BH

Container	D.O. (mg/L)	Temp. (°C)	Cond. or Sal. (Include Units)	pH (Units)	Number Dead or Moribund	Technician (Initials)
—	—	14.7°	—	—	—	—

Notes: * transported dry

Appendix A.4

Benthic Larval Test with *Mytilus galloprovincialis*

Test Batch 2

NewFields

LARVAL DEVELOPMENT TEST
ENDPOINT DATA

			SPECIES *Mytilus galloprovincialis*		
CLIENT Integral Consulting Inc.	PROJECT Port Angeles	JOB NUMBER 860.0074.000	PROJECT MANAGER B. Hester	NEWFIELDS LAB / LOCATION Port Gamble /	PROTOCOL PSEP (1995)
ORGANISM BATCH	TEST START DATE: 7·17·13	TIME	TEST END DATE:	TIME	

LARVAL OBSERVATION DATA

CLIENT/ NEWFIELDS ID	REP	NUMBER NORMAL	NUMBER	DATE	TECHNICIAN	COMMENTS
STOCKING DENSITY	1	388				
	2	369				
	3	395				
	4	361				
	5	388				
Control /	1	351	17			
	2	326	11			
	3	331	5			
	4	319	11			
	5	357	9			
CR-12 /	1	265	2			
	2	281	5			
	3	306	9			
	4	~~279~~ 297	6	①		
	5	296	8			
CARR-20 /	1	274	15			
	2	289	~~31~~ 8			
	3	281	15			
	4	277	14			
	5	274	24			
CR-02 /	1	278	16	✓		
	2	278	13	✓		
	3	276	22	272/20		
	4	277	14	264/7		
	5	274	24	267/15		

① numerals transposed, BWS

LARVAL DEVELOPMENT TEST
ENDPOINT DATA

SPECIES: *Mytilus galloprovincialis*

CLIENT	PROJECT	JOB NUMBER	PROJECT MANAGER	NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	860.0074.000	B. Hester	Port Gamble /	PSEP (1995)

ORGANISM BATCH	TEST START DATE:	TIME	TEST END DATE:	TIME
	7·17·13			

LARVAL OBSERVATION DATA

CLIENT/ NEWFIELDS ID	REP	NUMBER NORMAL	NUMBER	DATE	TECHNICIAN	COMMENTS
SD0001 /	1	207	16			
	2	179	48			
	3	278	11			
	4	247	31			
	5	219	46			
SD0002 /	1	276	16			
	2	245	26			
	3	179	43			
	4	228	26			
	5	203	31			
SD0003 /	1	153	21			
	2	227	32			
	3	226	49			
	4	240	38			
	5	198	36			
SD0004 /	1	223	18			
	2	227	27			
	3	246	25			
	4	224	27			
	5	229	18			
SD0008 /	1	259	11			
	2	236	6			
	3	247	10			
	4	265	6			
	5	265	11			

NewFields

LARVAL DEVELOPMENT TEST
ENDPOINT DATA

			SPECIES *Mytilus galloprovincialis*		
CLIENT Integral Consulting Inc.	PROJECT Port Angeles	JOB NUMBER 860.0074.000	PROJECT MANAGER B. Hester	NEWFIELDS LAB / LOCATION Port Gamble /	PROTOCOL PSEP (1995)
ORGANISM BATCH		TEST START DATE: 7·17·13	TIME	TEST END DATE:	TIME

LARVAL OBSERVATION DATA

CLIENT/ NEWFIELDS ID	REP	NUMBER NORMAL	NUMBER	DATE	TECHNICIAN	COMMENTS
SD0009 /	1	229	29			
	2	233	13			
	3	190	7			
	4	236	6			
	5	230	12			
SD0010 /	1	215	17			
	2	232	6			
	3	220	13			
	4	180	17			
	5	202	11			
SD0011 /	1	243	7			
	2	256	12			
	3	265	15			
	4	244	20			
	5	235	20			
SD0012 /	1	266	9			
	2	270	8			
	3	261	7			
	4	245	14			
	5	265	12			
SD0013 /	1	233	13			
	2	246	9			
	3	274	7			
	4	260	11			
	5	278	10			

NewFields

LARVAL DEVELOPMENT TEST
ENDPOINT DATA

			SPECIES *Mytilus galloprovincialis*		
CLIENT Integral Consulting Inc.	PROJECT Port Angeles	JOB NUMBER 860.0074.000	PROJECT MANAGER B. Hester	NEWFIELDS LAB / LOCATION Port Gamble /	PROTOCOL PSEP (1995)

ORGANISM BATCH	TEST START DATE: 7·17·13	TIME	TEST END DATE:	TIME

LARVAL OBSERVATION DATA

CLIENT/ NEWFIELDS ID	REP	NUMBER NORMAL	NUMBER	DATE	TECHNICIAN	COMMENTS
SD0014 /	1	270	9			
	2	225	13			
	3	217	7			
	4	229	13			
	5	222	5			
SD0015 /	1	213	6			
	2	223	14			
	3	269	14			
	4	270	14			
	5	243	17			
SD0017 /	1	239	11			
	2	222	14			
	3	267	15			
	4	243	14			
	5	272	11			
SD0018 /	1	274	9			
	2	304	4			
	3	290	5			
	4	275	6			
	5	258	15			
SD0019 /	1	234	4			
	2	276	6			
	3	278	5			
	4	283	9			
	5	259	18			

NewFields

LARVAL DEVELOPMENT TEST
ENDPOINT DATA

SPECIES: *Mytilus galloprovincialis*

CLIENT	PROJECT	JOB NUMBER	PROJECT MANAGER	NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	860.0074.000	B. Hester	Port Gamble /	PSEP (1995)

ORGANISM BATCH	TEST START DATE:	TIME	TEST END DATE:	TIME
	7·17·13			

LARVAL OBSERVATION DATA

CLIENT/ NEWFIELDS ID	REP	NUMBER NORMAL	NUMBER	DATE	TECNNICIAN	COMMENTS
SD0020 /	1	203	21			
	2	248	14			
	3	202	21			
	4	227	16			
	5	280	14			
SD0021 /	1	223	27			
	2	294	6			
	3	331	9			
	4	304	27			
	5	294	7			
SD0022 /	1	244	7			
	2	266	12			
	3	262	7			
	4	279	2			
	5	273	9			
/	1					
	2					
	3					
	4					
	5					
/	1					
	2					
	3					
	4					
	5					

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT	PROJECT	SPECIES		NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	*Mytilus galloprovincialis*		Port Gamble /	PSEP (1995)
JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Hester	17Jul13	1755	7.19.13	1740

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA			
				D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE		TECH	DATE
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
Control /	0	90	WQ Surr	6	7.2	6	15.8	2	28	5	7.8	TK	0.188	MMB	0.009	BG	7/17
Control /	1	↓	WQ Surr	6	7.4	6	16.5	2	28	5	7.8					MMB	7/18
Control /	2		WQ Surr	6	7.3	6	16.5	2	28	5	7.8					JL	7/19
Control /	3		WQ Surr														
Control /	4		WQ Surr														
101 CR-12 /	0	101	WQ Surr	6	7.3	6	16.4	2	28	5	7.9	TK	0.152	MMB	0.077	DG	7/17
CR-12 /	1	↓	WQ Surr	6	7.1	6	16.8	2	28	5	7.8					MMB	7/18
CR-12 /	2		WQ Surr	6	①6.9	6	16.5	2	28	5	7.8					JL	7/19
CR-12 /	3		WQ Surr	6	7.9											BH	7.19 1530
CR-12 /	4		WQ Surr														
CARR-20 /	0	29	WQ Surr	6	7.3	6	16.8	2	28	5	7.8	TK	0.235	MMB	0.127	BG	7/17
CARR-20 /	1	↓	WQ Surr	6	5.9	6	16.9	2	28	5	7.7					MMB	7/18
CARR-20 /	2		WQ Surr	6	5.1	6	16.8	2	28	5	7.6					JC	7/19
CARR-20 /	3		WQ Surr														
CARR-20 /	4		WQ Surr														

① Aeration initiated 7.19.13 BH

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT	PROJECT	SPECIES		NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	*Mytilus galloprovincialis*		Port Gamble /	PSEP (1995)
JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Hester	17Jul13			

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
				D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
CR-02 /	0	45	WQ Surr	6	7.4	6	16.9	2	28	5	7.9	[illegible]	0.206	MWB	0.126	BG	7/17
CR-02 /	1	↓	WQ Surr	6	5.4	6	16.7	2	28	5	7.6					MWB	7/18
CR-02 /	2		WQ Surr	6	②4.3	6	16.6	2	28	5	7.5					JL	7/19
CR-02 /	3		WQ Surr	6	8.0											BH	7.19
CR-02 /	4		WQ Surr														
SD0001 /	0	75	WQ Surr	6	5.9	6	16.2	2	28	5	6.7	[illegible]	0.369	MWB	0.131	BG	7/17
SD0001 /	1	↓	WQ Surr	6	4.8①	6	16.6	2	28	5	7.6					MWB	7/18
SD0001 /	2		WQ Surr	6	7.8	6	16.6	2	28	5	7.7					JL	7/19
SD0001 /	3		WQ Surr														
SD0001 /	4		WQ Surr														
SD0002 /	0	68	WQ Surr	6	6.5	6	16.6 ~~17~~	2	28	5	7.7	[illegible]	0.562	MWB	0.167	BG	7/17
SD0002 /	1	↓	WQ Surr	6	4.2①	6	16.8	2	28	5	7.6					MWB	7/18
SD0002 /	2		WQ Surr	6	7.2	6	16.6	2	28	5	7.7					JL	7/19
SD0002 /	3		WQ Surr														
SD0002 /	4		WQ Surr														

1530

① Initiated aeration for entire treatment, MWB 7/18/13.
② Aeration initiated 7.19.13 BH

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT	PROJECT	SPECIES		NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	*Mytilus galloprovincialis*		Port Gamble /	PSEP (1995)
JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Hester	17Jul13			

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
				D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
SD0003 /	0	35	WQ Surr	6	7.2	6	~~28~~ 16.8 WQ	2	28	5	7.7	Kk	0.298	MMB	0.147	BG	7/17
SD0003 /	1	↓	WQ Surr	6	5.2	6	16.9	2	28	5	7.6					MMB	7/18
SD0003 /	2		WQ Surr	6	①4.7	6	16.9	2	28	5	7.5					JL	7/19
SD0003 /	3		WQ Surr	6	7.9											BH	7.19 1530
SD0003 /	4		WQ Surr														
SD0004 /	0	114	WQ Surr	6	7.0	6	16.5	2	28	5	7.7	Kk	0.188	MMB	0.251	BG	7/17
SD0004 /	1	↓	WQ Surr	6	5.6	6	17.0	2	28	5	7.7					MMB	7/18
SD0004 /	2		WQ Surr	6	①4.9	6	16.5	2	28	5	7.5					JL	7/19
SD0004 /	3		WQ Surr	6	7.9											BH	7.19 1530
SD0004 /	4		WQ Surr														
SD0008 /	0	37	WQ Surr	6	7.2	6	16.9	2	28	5	7.6	Kk	0.150	MMB	0.231	BG	7/17
SD0008 /	1	↓	WQ Surr	6	5.9	6	16.9	2	28	5	7.7					MMB	7/18
SD0008 /	2		WQ Surr	6	①4.8	6	17.0	2	28	5	7.6					JL	7/19
SD0008 /	3		WQ Surr	6	7.9											BH	7.19 1530
SD0008 /	4		WQ Surr														

① Aeration initiated 7.19.13 BH

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT	PROJECT	SPECIES		NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	*Mytilus galloprovincialis*		Port Gamble /	PSEP (1995)
JOB NUMBER	**PROJECT MANAGER**	**TEST START DATE**	**TIME**	**TEST END DATE**	**TIME**
860.0074.000	B. Hester	17Jul13			

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
				D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
SD0009 /	0	6	WQ Surr	6	6.6	6	18.0	2	28	5	7.6	Tk	0.134	MMB	0.272	BG	7/17
SD0009 /	1	↓	WQ Surr	6	5.0 ①	6	17.0	2	28	5	7.6					MMB	7/18
SD0009 /	2		WQ Surr	6	7.9	6	16.4	2	28	5	7.8					JL	7/19
SD0009 /	3		WQ Surr														
SD0009 /	4		WQ Surr														
SD0010 /	0	118	WQ Surr	6	7.1	6	16.9	2	28	5	7.7	Tk	0.108	MMB	0.29	BG	7/17
SD0010 /	1	↓	WQ Surr	6	6.2	6	17.1	2	28	5	7.7					MMB	7/18
SD0010 /	2		WQ Surr	6	5.3	6	16.8	2	28	5	7.5					JL	7/19
SD0010 /	3		WQ Surr														
SD0010 /	4		WQ Surr														
SD0011 /	0	28	WQ Surr	6	6.9	6	16.8	2	28	5	7.7	Tk	0.0989	MMB	0.244	BG	7/17
SD0011 /	1	↓	WQ Surr	6	5.9	6	17.0	2	28	5	7.7					MMB	7/18
SD0011 /	2		WQ Surr	6	4.9 ②	6	16.7	2	28	5	7.5					JL	7/19
SD0011 /	3		WQ Surr	6	7.9											AH	7.19
SD0011 /	4		WQ Surr														

re-read later (befo
inoc
6.1 / 17.2 / 28 / 7.7

1530

① Initiated aeration for entire treatment, MMB 7/18/13.
② " " AH 7.19.13

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT	PROJECT	SPECIES		NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	*Mytilus galloprovincialis*		Port Gamble /	PSEP (1995)
JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Hester	17Jul13			

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
				meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
SD0012 /	0	58	WQ Surr	~~6~~	~~6.5~~	~~6~~	~~17.6~~	~~2~~	~~28~~	~~5~~	~~7.7~~	JL	0.103	MMB	0.163	BG	7/17/13 7.2/16.9/28/7.8 WL
SD0012 /	1	↓	WQ Surr	6	5.6	6	16.9	2	28	5	7.7					MMB	7/18
SD0012 /	2		WQ Surr	6	①4.5	6	16.7	2	28	5	7.6					JL	7/19
SD0012 /	3		WQ Surr	6	7.9											BH	7.19 1530
SD0012 /	4		WQ Surr														
SD0013 /	0	4	WQ Surr	6	6.5	6	17.0	2	28	5	7.8	JL	0.101	MMB	0.214	BG	7/17
SD0013 /	1	↓	WQ Surr	6	5.5	6	16.9	2	28	5	7.7					MMB	7/18
SD0013 /	2		WQ Surr	6	5.1	6	16.7	2	28	5	7.6					JL	7/19
SD0013 /	3		WQ Surr														
SD0013 /	4		WQ Surr														
SD0014 /	0	12	WQ Surr	6	7.1	6	16.6	2	28	5	7.8	JL	0.0874	MMB	0.177	BG	7/17/13
SD0014 /	1	↓	WQ Surr	6	5.6	6	16.7	2	28	5	7.7					MMB	7/18
SD0014 /	2		WQ Surr	6	①4.9	6	16.7	2	28	5	7.6					JL	7/19
SD0014 /	3		WQ Surr	6	7.9											BH	7.19 1530
SD0014 /	4		WQ Surr														

① Aeration initiated 7.19.13 BH

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT Integral Consulting Inc.	PROJECT Port Angeles	SPECIES *Mytilus galloprovincialis*	NEWFIELDS LAB / LOCATION Port Gamble /	PROTOCOL PSEP (1995)
JOB NUMBER 860.0074.000	PROJECT MANAGER B. Hester	TEST START DATE 17Jul13	TIME	TEST END DATE	TIME

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
				D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
SD0015 /	0	16	WQ Surr	6	7.1	6	16.2	2	27	5	7.8	HZ	0.0765	MMB	0.163	BG	7/17
SD0015 /	1		WQ Surr	6	6.8	6	16.5	2	28	5	7.8					MMB	7/18
SD0015 /	2		WQ Surr	6	5.4	6	17.0	2	28	5	7.6					JL	7/19
SD0015 /	3		WQ Surr														
SD0015 /	4		WQ Surr														
SD0017 /	0	112	WQ Surr	6	6.8	6	16.6	2	28	5	7.7	HZ	0.0906	MMB	0.215	BG	7/17
SD0017 /	1		WQ Surr	6	6.8	6	16.9	2	28	5	7.8					MMB	7/18
SD0017 /	2		WQ Surr	6	4.6 ①	6	16.7	2	28	5	7.6					JL	7/19
SD0017 /	3 2		WQ Surr	6	7.7											BH	7.19 1530
SD0017 /	4		WQ Surr														
85 SD0018 /	0	85	WQ Surr	6	6.7	6	15.9	2	28	5	7.8	HZ	0.0989	MMB	0.229	BG	7/17
SD0018 /	1		WQ Surr	6	6.2	6	16.9	2	28	5	7.7					MMB	7/18
SD0018 /	2		WQ Surr	6	5.0	6	16.5	2	28	5	7.6					JL	7/19
SD0018 /	3		WQ Surr														
SD0018 /	4		WQ Surr														

① Aeration initiated 7.19.13 BH

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT	PROJECT	SPECIES		NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	*Mytilus galloprovincialis*		Port Gamble /	PSEP (1995)
JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Hester	17Jul13			

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
				meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
SD0019 /	0	86	WQ Surr	6	6.0	6	16	2	28	5	7.8	tk	0.104	MMB	0.136	BG	7/17
SD0019 /	1		WQ Surr	6	5.5	6	17.0	2	28	5	7.7					MMB	7/18
SD0019 /	2		WQ Surr	6	① 4.5	6	16.5	2	28	5	7.6					JL	7/19
SD0019 /	3		WQ Surr	6	7.9											BH	7.19
SD0019 /	4		WQ Surr														
SD0020 /	0	19	WQ Surr	6	6.7	6	16.4	~~3~~ 2	27	5	7.7	tk	0.0930	MMB	0.192	BG	7/17
SD0020 /	1		WQ Surr	6	5.6	6	16.8	2	28	5	7.6					MMB	7/18
SD0020 /	2		WQ Surr														
SD0020 /	3		WQ Surr														
SD0020 /	4		WQ Surr														
SD0021 /	0	107	WQ Surr	6	7.0	6	16.0	2	28	5	7.7	tk	0.113	MMB	0.213	BG	7/17
SD0021 /	1		WQ Surr	6	5.7	6	16.9	2	28	5	7.6					MMB	7/18
SD0021 /	2		WQ Surr	6	① 4.7	6	16.6	2	28	5	7.5					JL	7/19
SD0021 /	3		WQ Surr	6	8.0											BH	7.19
SD0021 /	4		WQ Surr														

1530

1530

① Aeration initiated 7.19.13 BH

NewFields

LARVAL DEVELOPMENT TEST
WATER QUALITY DATA

CLIENT	PROJECT	SPECIES		NEWFIELDS LAB / LOCATION	PROTOCOL
Integral Consulting Inc.	Port Angeles	*Mytilus galloprovincialis*		Port Gamble /	PSEP (1995)
JOB NUMBER	PROJECT MANAGER	TEST START DATE	TIME	TEST END DATE	TIME
860.0074.000	B. Hester	17Jul13			

* Day 3&4 observations needed only if development endpoint not met by day 2

WATER QUALITY DATA

TEST CONDITIONS				DO (mg/L) >5.0		Temp (°C) 16 ± 1		Sal (ppt) 28 ± 1		pH 7 - 9		Ammonia NA		Sulfide NA		TECH	DATE
				D.O.		TEMP.		SALINITY		pH		AMMONIA		SULFIDE			
CLIENT/ NEWFIELDS ID	DAY	Random #	REP	meter	mg/L	meter	°C	meter	ppt	meter	unit	Techn.	mg/L (total)	Techn.	mg/L (Total)		
SD0022 /	0	120	WQ Surr	6	7.0	6	16.5	2	28	5	7.8	JK	0.109	MMB	0.203	BG	7/17
SD0022 /	1		WQ Surr	6	6.0	6	16.8	2	28	5	7.7					MMB	7/18
SD0022 /	2		WQ Surr	6	①4.8	6	16.7	2	28	5	7.5					JL	7/19
SD0022 /	3		WQ Surr	6	7.9											BH	7.19
SD0022 /	4	↓	WQ Surr														

1550

① Aeration initiated 7.19.13 BH

NewFields

Ammonia and Sulfide Analysis Record

Client/Project: WPAH	**Organism:** Mytilus sp.	**Test Duration (days):** 2

PRETEST / INITIAL / [✓ FINAL] / OTHER (circle one) DAY of TEST: 2
OVERLYING (OV) / POREWATER (PW) (circle one)

Comments: ______

Calibration Standards Temperature		Sample temperature should be within ±1°C of standards temperature at time and date of analysis.
Date: 7/19/13	**Temperature:** 23.9	

Sample ID or Description	Conc. or Rep	Date of Sampling and Initials	Ammonia Value (mg/L)	Temp °C	Date of Reading and Initials	Sample Preserved (Y/N)	pH	Sal (ppt)	Sulf. mg/L
Control	Surv.	7/19/13 BG	0.0443	23.1	7/19/13 JL, BG	N			0.013
CR-02			0.206						0.048
CR-12			0.0452						0.033
CARR-20			0.0365						0.031
1			0.163						0.097
2			0.326						0.077
3			0.129						0.037
4			0.0452						0.079
8			0.0265						0.102
9			0.0144						0.107
10			0.0072						0.102
11			0.0037						0.089
12			0.0006						0.094
13			0.00						0.111
14			0.00						0.086
15			0.00						0.102
17			0.0096						0.140
18			0.0185						0.088
19			0.00						0.022
20			0.00						0.054
21	↓	↓	0.00	↓	↓	↓			0.069
22			0.00						0.061

NewFields

LARVAL DEVELOPMENT TEST INITIATION DATA SHEET

CLIENT	PROJECT	JOB NUMBER	PROJECT MANAGER	LABORATORY	PROTOCOL
Integral Consulting Inc.	Port Angeles	860.0074.000	B. Hester	Port Gamble	PSEP (1995)

TEST ORGANISM SPAWNING DATA

SPECIES *Mytilus galloprovincialis*			
SUPPLIER		ORGANISM BATCH TS071713	
DATE RECEIVED 7.17.13	TIME RECEIVED 1200	DATE USED 7.17.13	
SPAWNING METHOD Feed/heat shock	INITIAL SPAWNING TIME 1450	FINAL SPAWNING TIME 1610	
MALES 4	FEMALES 8	SPERM VIABILITY ✓	EGG CONDITION Good
BEGIN FERTILIZATION 1610	END FERTILIZATION 1755	CONDITION OF EMBRYOS Good	

SAMPLE STORAGE	4 Degrees Celsius - dark
SEDIMENT TREATMENT	none
TEST CHAMBERS	1 L Mason Jars
EXPOSURE VOLUME	900mL seawater / 18g Sediment
TIME OF SHAKE	1235
TIME OF INITIATION	1755

SPECIAL CONDITIONS

UV LIGHT EXPOSURE (YES/NO)	AERATION FROM TEST INITIATION (YES/NO)
No	NO
SCREEN TUBE TEST (YES/NO)	**OTHER (EXPLAIN)**
NO	

EMBRYO DENSITY CALCULATIONS

$69 \times 100 = 6900$

$\frac{27,000}{6900} = 3.9 mL$

RT

$\frac{2700}{6900} = 0.39 \cdot 100 mL =$

39 mL egg stock

71 mL seawater

deliver 0.100 mL

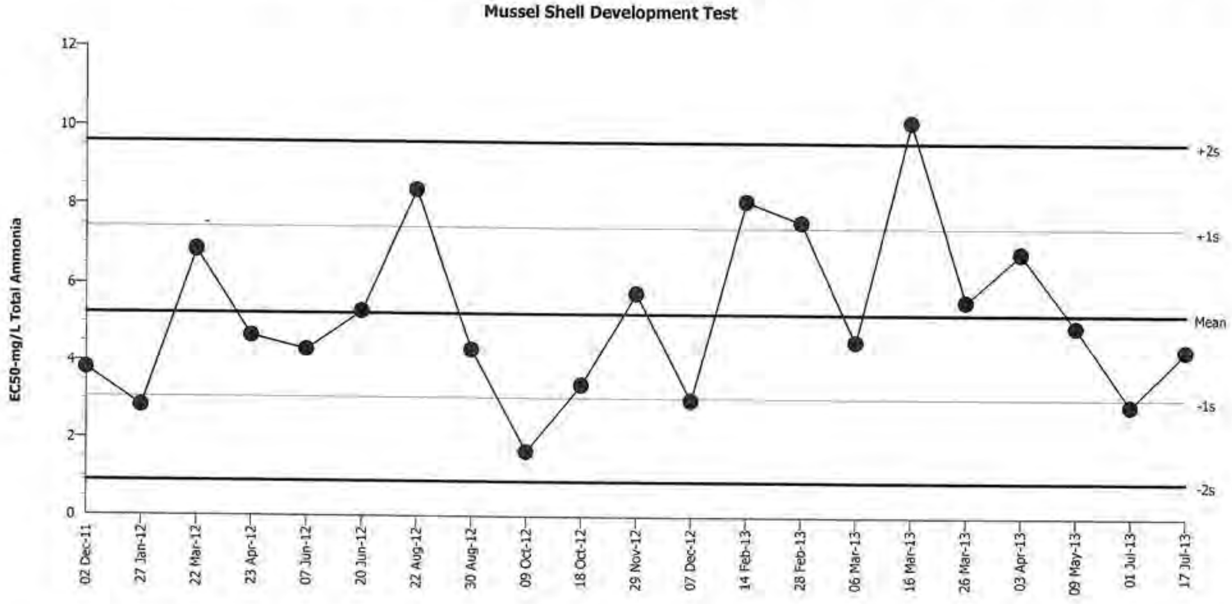
resuspended 7.19
0845-0930

CETIS QC Plot

Report Date: 28 Aug-13 10:31 (1 of 1)

Mussel Shell Development Test **NewFields**

Test Type: Development-Survival **Organism:** Mytilus galloprovincialis (Bay Mussel **Material:** Total Ammonia
Protocol: EPA/600/R-95/136 (1995) **Endpoint:** Combined Proportion Normal **Source:** Reference Toxicant-REF



Mean: 5.244 **Count:** 20 **-1s Warning Limit:** 3.07 **-2s Action Limit:** 0.896
Sigma: 2.174 **CV:** 41.50% **+1s Warning Limit:** 7.418 **+2s Action Limit:** 9.592

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2011	Dec	2	18:25	3.806	-1.438	-0.6615			06-3989-5500	09-5166-6282
2	2012	Jan	27	17:30	2.846	-2.398	-1.103	(-)		17-8035-0885	06-4475-5873
3		Mar	22	12:15	6.852	1.608	0.7395			08-5068-3541	09-7191-1867
4		Apr	23	18:45	4.66	-0.5836	-0.2685			02-7458-4371	07-2969-7564
5		Jun	7	18:15	4.304	-0.9405	-0.4326			20-4612-5080	14-0164-5214
6			20	17:50	5.296	0.05176	0.02381			21-1169-3016	00-2068-7937
7		Aug	22	16:05	8.376	3.132	1.441	(+)		03-0988-3309	14-8872-2540
8			30	17:50	4.311	-0.9332	-0.4293			00-6833-5106	09-9193-8473
9		Oct	9	18:00	1.678	-3.566	-1.641	(-)		06-6024-3093	07-1414-6248
10			18	18:00	3.41	-1.834	-0.8436			07-3550-9263	15-5292-9085
11		Nov	29	17:45	5.775	0.5305	0.244			04-0681-3114	00-7625-5304
12		Dec	7	18:50	3.016	-2.228	-1.025	(-)		15-7850-6619	03-0562-1566
13	2013	Feb	14	17:40	8.112	2.868	1.319	(+)		02-6193-4857	04-9672-9086
14			28	21:20	7.574	2.33	1.072	(+)		06-9403-7957	07-8992-4017
15		Mar	6	16:45	4.538	-0.7063	-0.3249			20-1267-3706	09-5346-5604
16			16	17:45	10.13	4.883	2.246	(+)	(+)	14-2253-0526	18-0087-0374
17			26	18:15	5.579	0.3351	0.1542			03-8532-3895	00-6308-0782
18		Apr	3	0:00	6.805	1.561	0.7181			10-3604-5723	04-8356-0800
19		May	9	17:15	4.927	-0.3173	-0.1459			00-6360-9095	16-4147-0802
20		Jul	1	19:00	2.895	-2.349	-1.08	(-)		19-5961-2730	13-0986-6895
21			17	17:55	4.313	-0.9306	-0.4281			18-2536-1347	00-8750-2223

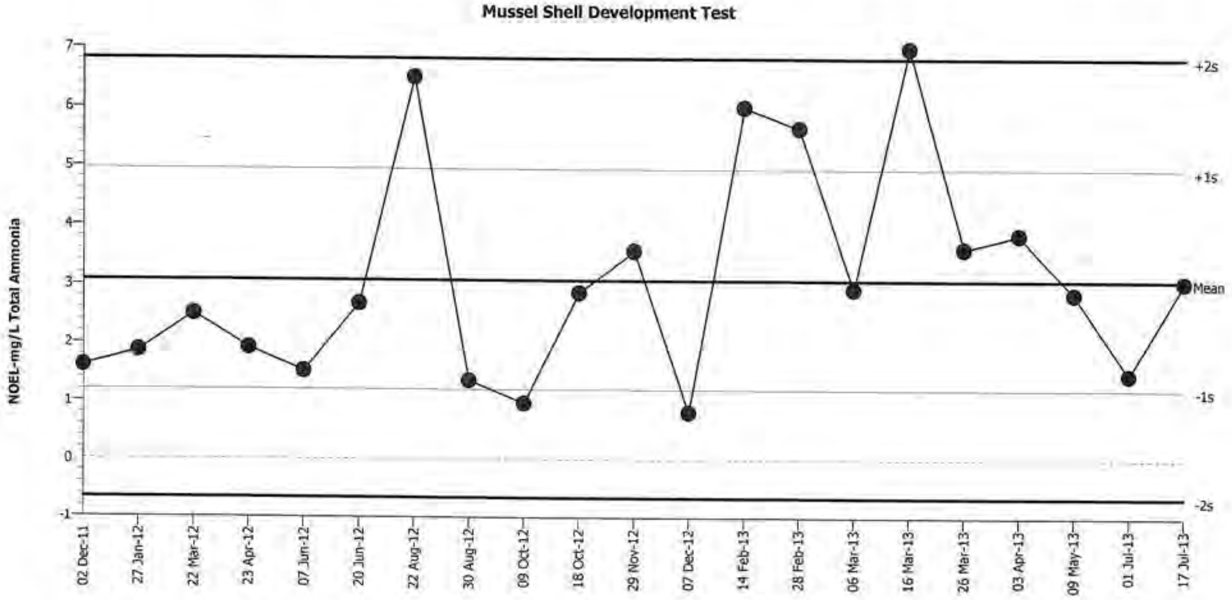
Analyst: BH QA: BH

CETIS QC Plot

Report Date: 28 Aug-13 10:40 (1 of 1)

Mussel Shell Development Test **NewFields**

Test Type:	Development-Survival	**Organism:**	Mytilus galloprovincialis (Bay Mussel	**Material:**	Total Ammonia
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



Mean:	3.077	**Count:**	20	**-1s Warning Limit:**	1.207	**-2s Action Limit:**	-0.663
Sigma:	1.87	**CV:**	60.80%	**+1s Warning Limit:**	4.947	**+2s Action Limit:**	6.817

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2011	Dec	2	18:25	1.61	-1.467	-0.7845			06-3989-5500	05-9587-4977
2	2012	Jan	27	17:30	1.87	-1.207	-0.6455			17-8035-0885	19-6006-6064
3		Mar	22	12:15	2.5	-0.577	-0.3086			08-5068-3541	14-6034-1614
4		Apr	23	18:45	1.92	-1.157	-0.6187			02-7458-4371	11-3829-0609
5		Jun	7	18:15	1.52	-1.557	-0.8326			20-4612-5080	06-0541-2169
6			20	17:50	2.68	-0.397	-0.2123			21-1169-3016	01-0499-1137
7		Aug	22	16:05	6.5	3.423	1.83	(+)		03-0988-3309	04-0917-6749
8			30	17:50	1.36	-1.717	-0.9182			00-6833-5106	03-2629-4542
9		Oct	9	18:00	0.973	-2.104	-1.125	(-)		06-6024-3093	07-8913-5319
10			18	18:00	2.87	-0.207	-0.1107			07-3550-9263	18-1681-7487
11		Nov	29	17:45	3.58	0.503	0.269			04-0681-3114	19-0538-4174
12		Dec	7	18:50	0.817	-2.26	-1.209	(-)		15-7850-6619	13-6604-7958
13	2013	Feb	14	17:40	6	2.923	1.563	(+)		02-6193-4857	07-3889-4891
14			28	21:20	5.65	2.573	1.376	(+)		06-9403-7957	16-1498-7518
15		Mar	6	16:45	2.93	-0.147	-0.07861			20-1267-3706	13-0769-0097
16			16	17:45	6.99	3.913	2.093	(+)	(+)	14-2253-0526	09-1011-9616
17			26	18:15	3.62	0.543	0.2904			03-8532-3895	01-1639-1779
18		Apr	3	0:00	3.85	0.773	0.4134			10-3604-5723	13-5448-8759
19		May	9	17:15	2.85	-0.227	-0.1214			00-6360-9095	00-7540-8630
20		Jul	1	19:00	1.46	-1.617	-0.8647			19-5961-2730	20-9160-8614
21			17	17:55	3.05	-0.027	-0.01444			18-2536-1347	04-3468-0815

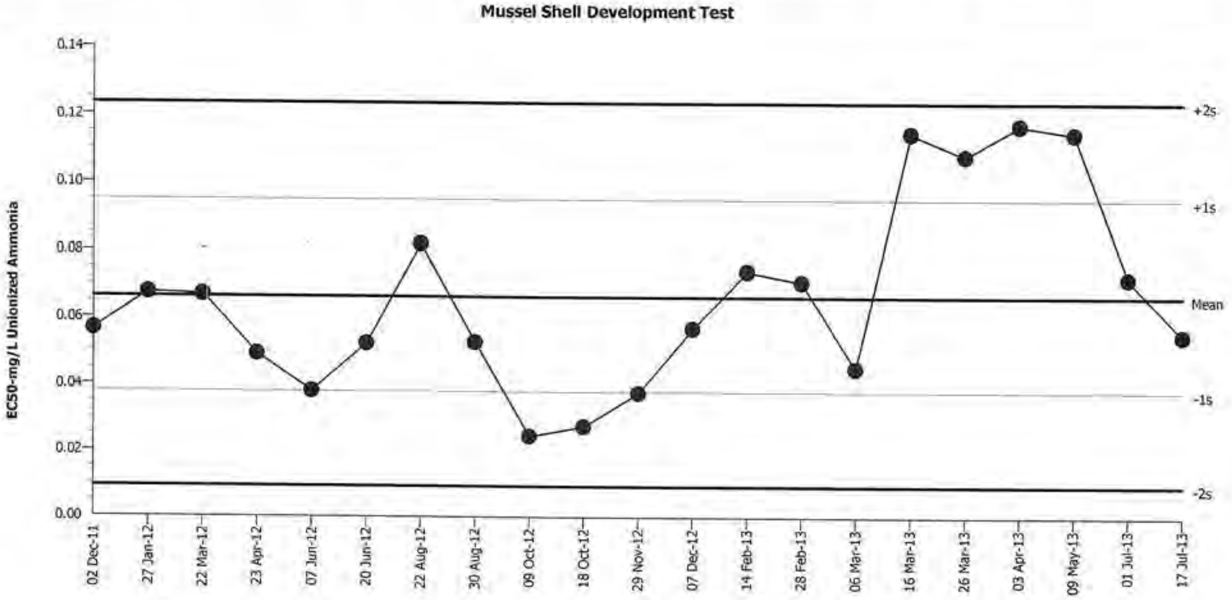
Analyst:______ QA:______

CETIS QC Plot

Report Date: 28 Aug-13 10:32 (1 of 1)

Mussel Shell Development Test **NewFields**

Test Type: Development-Survival
Protocol: EPA/600/R-95/136 (1995)
Organism: Mytilus galloprovincialis (Bay Mussel
Endpoint: Combined Proportion Normal
Material: Unionized Ammonia
Source: Reference Toxicant-REF



Mean: 0.06631 **Count:** 20 **-1s Warning Limit:** 0.03777 **-2s Action Limit:** 0.00923
Sigma: 0.02854 **CV:** 43.00% **+1s Warning Limit:** 0.09485 **+2s Action Limit:** 0.1234

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2011	Dec	2	18:25	0.05664	-0.00967	-0.3387			02-1703-2403	18-2609-9695
2	2012	Jan	27	17:30	0.06751	0.001204	0.04218			17-7315-3313	06-2387-0021
3		Mar	22	12:15	0.0669	0.000589	0.02062			16-8530-3093	20-6643-2329
4		Apr	23	18:45	0.04914	-0.01717	-0.6016			11-9474-8117	17-4324-5637
5		Jun	7	18:15	0.03798	-0.02833	-0.9927			14-3239-7455	05-6059-9571
6			20	17:50	0.05226	-0.01405	-0.4923			16-3362-6154	15-3244-5350
7		Aug	22	16:05	0.08186	0.01555	0.5448			19-7550-7456	08-0736-4891
8			30	17:50	0.05265	-0.01366	-0.4785			18-5169-0947	02-7047-2220
9		Oct	9	18:00	0.02443	-0.04188	-1.467	(-)		08-9570-9100	07-8331-5723
10			18	18:00	0.02739	-0.03892	-1.364	(-)		18-9514-2443	00-3905-9363
11		Nov	29	17:45	0.03751	-0.0288	-1.009	(-)		15-6645-8664	13-4294-0618
12		Dec	7	18:50	0.0569	-0.00941	-0.3296			11-6006-3509	05-8108-8018
13	2013	Feb	14	17:40	0.07388	0.007574	0.2654			14-1890-1951	14-7902-0800
14			28	21:20	0.0707	0.004392	0.1539			19-4434-4552	11-0678-0085
15		Mar	6	16:45	0.04499	-0.02132	-0.7471			18-3418-4255	07-5324-7355
16			16	16:10	0.1144	0.04814	1.687	(+)		11-4894-2693	12-9463-9515
17			26	18:15	0.1079	0.04157	1.457	(+)		10-2444-9875	09-9596-0674
18		Apr	3	0:00	0.1168	0.05054	1.771	(+)		20-6076-9735	05-3848-1619
19		May	9	17:15	0.1144	0.04809	1.685	(+)		14-3450-0734	06-3515-6667
20		Jul	1	19:00	0.07187	0.005561	0.1949			10-8846-7294	05-7595-2849
21			17	17:55	0.0548	-0.01151	-0.4033			10-3414-5102	08-1738-2772

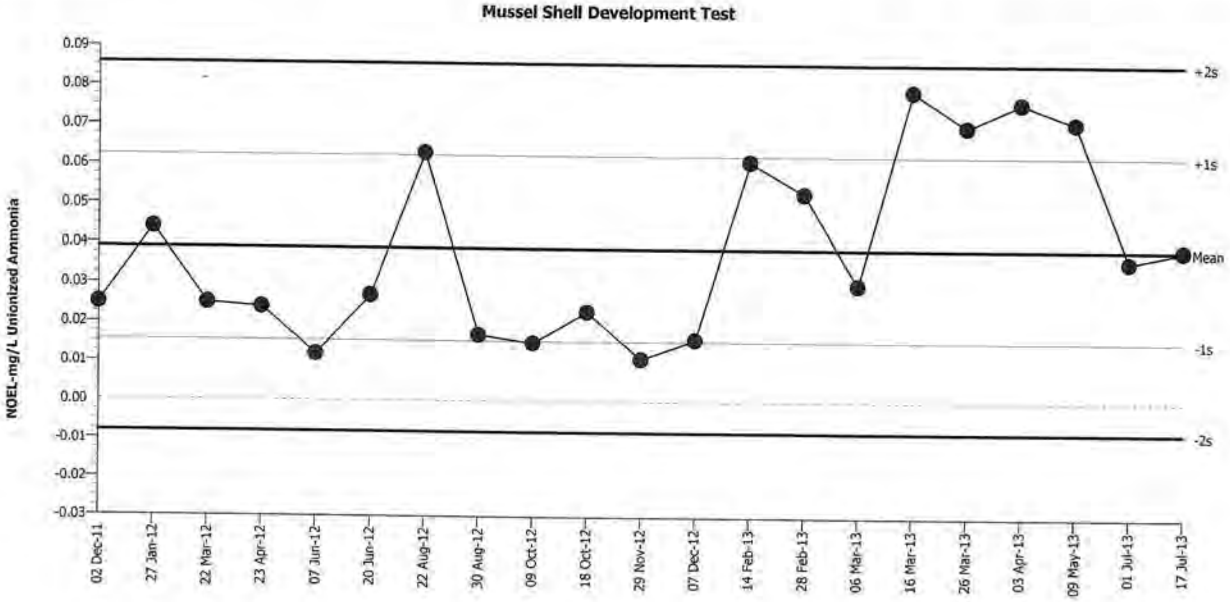
Analyst: BM QA: BM

CETIS QC Plot

Report Date: 28 Aug-13 10:40 (1 of 1)

Mussel Shell Development Test | **NewFields**

Test Type: Development-Survival | **Organism:** Mytilus galloprovincialis (Bay Mussel | **Material:** Unionized Ammonia
Protocol: EPA/600/R-95/136 (1995) | **Endpoint:** Combined Proportion Normal | **Source:** Reference Toxicant-REF



Mean:	0.0389	**Count:**	20	**-1s Warning Limit:**	0.01545	**-2s Action Limit:**	-0.008
Sigma:	0.02345	**CV:**	60.30%	**+1s Warning Limit:**	0.06235	**+2s Action Limit:**	0.0858

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2011	Dec	2	18:25	0.025	-0.0139	-0.5928			02-1703-2403	00-9746-5548
2	2012	Jan	27	17:30	0.044	0.0051	0.2175			17-7315-3313	14-7310-3808
3		Mar	22	12:15	0.025	-0.0139	-0.5928			16-8530-3093	00-2118-8798
4		Apr	23	18:45	0.024	-0.0149	-0.6354			11-9474-8117	16-8822-0741
5		Jun	7	18:15	0.012	-0.0269	-1.147	(-)		14-3239-7455	06-8748-6189
6			20	17:50	0.027	-0.0119	-0.5075			16-3362-6154	07-4796-6258
7		Aug	22	16:05	0.063	0.0241	1.028	(+)		19-7550-7456	17-2049-3239
8			30	17:50	0.017	-0.0219	-0.9339			18-5169-0947	11-3246-0073
9		Oct	9	18:00	0.015	-0.0239	-1.019	(-)		08-9570-9100	07-1156-4394
10			18	18:00	0.023	-0.0159	-0.678			18-9514-2443	05-5566-0485
11		Nov	29	17:45	0.011	-0.0279	-1.19	(-)		15-6645-8664	07-1864-3452
12		Dec	7	18:50	0.016	-0.0229	-0.9765			11-6006-3509	00-2066-3271
13	2013	Feb	14	17:40	0.061	0.0221	0.9424			14-1890-1951	16-6372-1200
14			28	21:20	0.053	0.0141	0.6013			19-4434-4552	04-8125-6089
15		Mar	6	16:45	0.03	-0.0089	-0.3795			18-3418-4255	11-0229-7491
16			16	16:10	0.079	0.0401	1.71	(+)		11-4894-2693	17-8368-9370
17			26	18:15	0.07	0.0311	1.326	(+)		10-2444-9875	00-8976-6127
18		Apr	3	0:00	0.076	0.0371	1.582	(+)		20-6076-9735	14-2423-4592
19		May	9	17:15	0.071	0.0321	1.369	(+)		14-3450-0734	19-5425-3899
20		Jul	1	19:00	0.036	-0.0029	-0.1237			10-8846-7294	11-2659-9719
21			17	17:55	0.039	0.0001	0.004264			10-3414-5102	05-6701-2859

Analyst: ______ QA: ______

CETIS Summary Report

Report Date: 28 Aug-13 10:20 (p 1 of 1)
Test Code: 6CCCCDC3 | 18-2536-1347

Mussel Shell Development Test

NewFields

Batch ID: 12-5409-2443
Start Date: 17 Jul-13 17:55
Ending Date: 19 Jul-13 17:40
Duration: 48h

Test Type: Development-Survival
Protocol: EPA/600/R-95/136 (1995)
Species: Mytilus galloprovincialis
Source: Taylor Shellfish

Analyst:
Diluent: Laboratory Seawater
Brine: Not Applicable
Age:

Sample ID: 20-4769-3215
Sample Date: 27 Sep-11
Receive Date: 27 Sep-11
Sample Age: 659d 18h

Code: 7A0D519F
Material: Total Ammonia
Source: Reference Toxicant
Station: P110927.152

Client: Internal Lab
Project: Reference Toxicant

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
04-3468-0815	Combined Proportion Norm	3.05	6.1	4.313	18.2%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
00-8750-2223	Combined Proportion Norm	EC50	4.313	4.205	4.424		Binomial/Graphical

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
04-3468-0815	Combined Proportion Norm	PMSD	0.1822	NL - 0.25	No	Passes Acceptability Criteria

Combined Proportion Normal Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.8889	0.7092	1	0.8394	0.9719	0.04176	0.07233	8.14%	0.0%
0.674		3	0.8902	0.7375	1	0.8434	0.9598	0.03549	0.06148	6.91%	-0.15%
1.5		3	0.921	0.8076	1	0.8835	0.9719	0.02637	0.04567	4.96%	-3.61%
3.05		3	0.9197	0.7554	1	0.8434	0.9598	0.03817	0.06611	7.19%	-3.46%
6.1		3	0	0	0	0	0	0	0		100.0%
11.8		3	0	0	0	0	0	0	0		100.0%

Combined Proportion Normal Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	0.8554	0.8394	0.9719
0.674		0.9598	0.8434	0.8675
1.5		0.9719	0.9076	0.8835
3.05		0.9558	0.9598	0.8434
6.1		0	0	0
11.8		0	0	0

Combined Proportion Normal Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	213/249	209/249	242/249
0.674		239/249	210/249	216/249
1.5		242/249	226/249	220/249
3.05		238/249	239/249	210/249
6.1		0/249	0/249	0/249
11.8		0/249	0/249	0/249

Analyst:______ QA:______

CETIS Test Data Worksheet

Report Date: 28 Aug-13 10:19 (p 1 of 1)
Test Code: 18-2536-1347/6CCCCDC3

Mussel Shell Development Test **NewFields**

Start Date: 17 Jul-13 17:55
End Date: 19 Jul-13 17:40
Sample Date: 27 Sep-11

Species: Mytilus galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Total Ammonia

Sample Code: 7A0D519F
Sample Source: Reference Toxicant
Sample Station: P110927.152

C-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	D	1	6	249	214	214	213	
0	D	2	7	249	221	221	209	
0	D	3	17	249	251	251	242	
0.674		1	13	249	244	244	239	
0.674		2	18	249	216	216	210	
0.674		3	14	249	224	224	216	
1.5		1	12	249	249	249	242	
1.5		2	15	249	236	236	226	
1.5		3	1	249	231	231	220	
3.05		1	8	249	255	255	238	
3.05		2	3	249	262	262	239	
3.05		3	2	249	247	247	210	
6.1		1	5	249	239	239	0	
6.1		2	10	249	267	267	0	
6.1		3	11	249	231	231	0	
11.8		1	9	249	226	226	0	
11.8		2	16	249	230	230	0	
11.8		3	4	249	262	262	0	

Analyst: BH QA: BH

CETIS Test Data Worksheet

Report Date: 28 Aug-13 10:29 (p 1 of 1)
Test Code: 10-3414-5102/3DA3CD4E

Mussel Shell Development Test **NewFields**

Start Date: 17 Jul-13 17:55
End Date: 19 Jul-13 17:40
Sample Date: 27 Sep-11

Species: Mytilus galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Unionized Ammonia

Sample Code: 788C008B
Sample Source: Reference Toxicant
Sample Station: P110927.152

C-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	D	1	11	249	214	214	213	
0	D	2	13	249	221	221	209	
0	D	3	10	249	251	251	242	
0.009		1	3	249	244	244	239	
0.009		2	6	249	216	216	210	
0.009		3	8	249	224	224	216	
0.019		1	17	249	249	249	242	
0.019		2	16	249	236	236	226	
0.019		3	1	249	231	231	220	
0.039		1	14	249	255	255	238	
0.039		2	5	249	262	262	239	
0.039		3	18	249	247	247	210	
0.077		1	7	249	239	239	0	
0.077		2	9	249	267	267	0	
0.077		3	2	249	231	231	0	
0.149		1	12	249	226	226	0	
0.149		2	4	249	230	230	0	
0.149		3	15	249	262	262	0	

Analyst: BM QA: BM

CETIS Summary Report

Report Date: 28 Aug-13 10:29 (p 1 of 1)
Test Code: 3DA3CD4E | 10-3414-5102

Mussel Shell Development Test **NewFields**

Batch ID:	12-5409-2443	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	17 Jul-13 17:55	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	19 Jul-13 17:40	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	48h	**Source:**	Taylor Shellfish	**Age:**	

Sample ID:	20-2244-1099	**Code:**	788C008B	**Client:**	Internal Lab
Sample Date:	27 Sep-11	**Material:**	Unionized Ammonia	**Project:**	Reference Toxicant
Receive Date:	27 Sep-11	**Source:**	Reference Toxicant		
Sample Age:	659d 18h	**Station:**	P110927.152		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
05-6701-2859	Combined Proportion Norm	0.039	0.077	0.0548	18.2%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
08-1738-2772	Combined Proportion Norm	EC50	0.0548	0.05345	0.05618		Binomial/Graphical

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
05-6701-2859	Combined Proportion Norm	PMSD	0.1822	NL - 0.25	No	Passes Acceptability Criteria

Combined Proportion Normal Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	3	0.8889	0.7092	1	0.8394	0.9719	0.04176	0.07233	8.14%	0.0%
0.009		3	0.8902	0.7375	1	0.8434	0.9598	0.03549	0.06148	6.91%	-0.15%
0.019		3	0.921	0.8076	1	0.8835	0.9719	0.02637	0.04567	4.96%	-3.61%
0.039		3	0.9197	0.7554	1	0.8434	0.9598	0.03817	0.06611	7.19%	-3.46%
0.077		3	0	0	0	0	0	0	0		100.0%
0.149		3	0	0	0	0	0	0	0		100.0%

Combined Proportion Normal Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	0.8554	0.8394	0.9719
0.009		0.9598	0.8434	0.8675
0.019		0.9719	0.9076	0.8835
0.039		0.9558	0.9598	0.8434
0.077		0	0	0
0.149		0	0	0

Combined Proportion Normal Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	213/249	209/249	242/249
0.009		239/249	210/249	216/249
0.019		242/249	226/249	220/249
0.039		238/249	239/249	210/249
0.077		0/249	0/249	0/249
0.149		0/249	0/249	0/249

Analyst: BH QA: BH

NewFields LARVAL DEVELOPMENT TEST

AMMONIA REF TOX OBSERVATION SHEET

				SPECIES *Mytilus galloprovincialis*			
CLIENT Integral Consulting Inc.	PROJECT Port Angeles	JOB NUMBER 860.0074.000		PROJECT MANAGER B. Hester		NEWFIELDS LAB / LOCATION Port Gamble / Incubator	PROTOCOL PSEP (1995)
TEST ID P110927.152	ORGANISM BATCH TS071713 Batch 2	TEST START DATE: 7.17.13		TIME 1755		TEST END DATE: 7.19.13	TIME 1740

LARVAL OBSERVATION DATA

CLIENT/ NEWFIELDS ID	CONC.		VIAL NUMBER	REP	NUMBER NORMAL	NUMBER ABNORMAL	DATE	TECHNICIAN	COMMENTS
	value	units							
Ref.Tox. - Ammonia - TAN	0	mg/L		1	213	1			
				2	209	12			
				3	242	9			
Ref.Tox. - Ammonia - TAN	0.75	mg/L		1	239	5			
				2	210	6			
				3	216	8			
Ref.Tox. - Ammonia - TAN	1.5	mg/L		1	242	7			
				2	226	10			
				3	220	11			
Ref.Tox. - Ammonia - TAN	3	mg/L		1	238	17			
				2	239	23			
				3	210	37			
Ref.Tox. - Ammonia - TAN	6	mg/L		1	0	239			
				2	0	267			
				3	0	231			
Ref.Tox. - Ammonia - TAN	12	mg/L		1	0	226			
				2	0	230			
				3	0	262			

STOCKING DENSITY		1		268			
		2		234			
		3		244			

$\bar{y} = 249$

NewFields

LARVAL DEVELOPMENT TEST
AMMONIA REF TOX WQ

CLIENT Integral Consulting Inc.	PROJECT Port Angeles	SPECIES *Mytilus galloprovincialis*	NEWFIELDS LAB / LOCATION Port Gamble / Incubator		PROTOCOL PSEP (1995)
JOB NUMBER 860.0074.000	PROJECT MANAGER B. Hester	TEST START DATE: 17Jul13	TIME 1755	TEST END DATE 7.19.13	TIME 1740
TEST ID P110927.152	LOT #: 111079				

WATER QUALITY DATA

DILTIN.WAT.BATCH	ORGANISM BATCH	REFERENCE TOX. MATERIAL	REFERENCE TOXICANT
FSW071713.01		Ammonium chloride	Ammonia - TAN

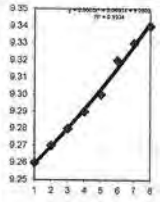
[redacted]					DO (mg/L)		TEMP(C)		SAL (ppt)		pH			
					>5.0		16 ± 1		28 ± 1		7 - 9			
CLIENT/ NEWFIELDS ID	CONCENTRATION		DAY	REP	D.O.		TEMP.		SALINITY		pH		TECH.	DATE
	value	units			meter	mg/L	meter	°C	meter	ppt	meter	unit		
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	6	7.9	6	16.8	2	28	5	7.7	BH	7/17
	0	mg/L	1	Stock	6	7.9	6	16.7	2	28	5	7.7	MWB	7/18
	Actual:		2	Stock	6	7.7	6	16.7	2	28	5	7.8	JL	7/19
	0.118		3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	6	7.9	6	16.8	2	28	5	7.7	BH	7/17
	0.75	mg/L	1	Stock	6	8.0	6	16.4	2	28	5	7.8	MWB	7/18
	Actual:		2	Stock	6	7.9	6	16.4	2	28	5	7.8	JL	7/19
	0.674		3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	6	8.0	6	16.8	2	28	5	7.7	BH	7/17
	1.5	mg/L	1	Stock	6	8.0	6	16.3	2	28	5	7.8	MWB	7/18
	Actual:		2	Stock	6	7.9	6	16.2	2	28	5	7.8	JL	7/19
	1.5		3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	6	7.9	6	WE MWB ~~2~~ 16.8	2	28	5	7.7	BH	7/17
	3	mg/L	1	Stock	6	8.0	6	16.1	2	28	5	7.8	MWB	7/18
	Actual:		2	Stock	6	8.0	6	16.0	2	28	5	7.8	JL	7/19
	3.05		3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	6	8.0	6	16.8	2	28	5	7.7	BH	7/17
	6	mg/L	1	Stock	6	8.1	6	16.0	2	28	5	7.8	MWB	7/18
	Actual:		2	Stock	6	8.0	6	16.1	2	28	5	7.8	JL	7/19
	6.10		3	Stock										
			4	Stock										
Ref.Tox.-Ammonia - TAN	Target:		0	Stock	6	8.0	6	16.8	2	28	5	7.7	BH	7/17
	12	mg/L	1	Stock	6	8.1	6	15.9	2	28	5	7.8	MWB	7/18
	Actual:		2	Stock	6	8.1	6	15.9	2	28	5	7.8	JL	7/19
	11.8		3	Stock										
			4	Stock										

TB 7/19 : 16.6 °C

CLIENT:	Internal	Date of Test:	17-Jul-13
PROJECT:	RT	Test Type:	*M. gallo*
COMMENTS:			

To convert Total Ammonia (mg/L) to Free (un-ionized) Ammonia (mg/L) enter the corresponding total ammonia, salinity, temperature, and pH.

Integer: I-factor	
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34



	Sample	Mod *NH3T (mg/L)*	*salinity (ppt)*	*pH*	*temp (C)*	temp (K)	i-factor	Mod **NH3U (mg/L)**
	Target / Sample Name	Actual	22.9	8.0	24.1	297.26	9.3053	**#VALUE!**
	Example 3.5	2.000	10.0	7.5	5.0	278.16	9.2750	**0.008**
1								
2	0.75	0.674	28	7.7	16.5	289.66	9.3187	**0.009**
3	1.5	1.500	28	7.7	16.5	289.66	9.3187	**0.019**
4	3	3.050	28	7.7	16.5	289.66	9.3187	**0.039**
5	6	6.100	28	7.7	16.4	289.56	9.3187	**0.077**
6	12	11.800	28	7.7	16.4	289.56	9.3187	**0.149**
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NewFields

ORGANISM RECEIPT LOG

Date: 7.17.13

Time: 1200

NewFields Batch No. 7S 071713

Organism / Project: Mytilus g. / Port Angeles

Invoice Attached Yes [✓ No]

Source / Supplier: Taylor Shellfish

Contact: Karen Underwood

No. Ordered: 1 batch 7lbs

No. Received: 1 batch

Source Batch: (Collection date, hatch date, etc.): Field

Condition of Organisms: (Good, fair, poor; describe.): Good

Approximate Size or Age: (Days from hatch, life stage, size class, etc.): Adult

Shipper: NF Courier

B of L (Tracking No.) NA

Condition of Container: (Good, fair, poor; describe.): Good

Received By: BH

Container	D.O. (mg/L)	Temp. (°C)	Cond. or Sal. (Include Units)	pH (Units)	Number Dead or Moribund	Technician (Initials)
1	—	15	—	—	-	BH

Notes:

Appendix A.5

Chain of Custody Forms

NEWFIELDS

NewFields Northwest, LLC.
Shipping: 472[illegible] View Dr.
Mailing: P.O. Box 216
Port Gamble, WA. 98364
Tel: (360) 297-6040, Fax: (360)297-7268

CHAIN OF CUSTODY

Destination Lab: NewFields
Destination Contact: B. Gardiner
Date: 6/25/13
Turn-Around-Time: NA
Project Name: Port Angeles Harbor
Contract/PO:

Sample Originator: NewFields
Contact Name: M. Bacon
Address: Same as above
Phone:
Fax:
E-mail: mbacon@newfields.com

Report Results To: NA
Contact Name:
Address:

Phone: NA
Fax:
Email:

Invoicing To:
Comments or Special Instructions:

No.	**Sample ID**	**Matrix**	**No. & Type of Container**	**Date & Time**	**Analysis** Ref. Sed Collection						**Preservation**	**Sample Temp Upon Receipt**	**LAB ID**
1	CR-12 (10% fines)	SS	1 Sediment bag	6/25/13 1420	X						4 C		
2	CARR 2C (30% fines)	↓	↓	6/25/13 1235	X						↓		
3	CR02 (58% fines)	↓	↓	6/25/13 1610	X								
4													
5													
6													
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20													

Relinquished by:	**Recieved by:**	**Relinquished by:**	**Recieved by:**
Print Name: Mary Bacon	Print Name: Jay Word	Print Name:	Print Name:
Signature: MBacon	Signature: Jay Word	Signature:	Signature:
Affiliation: NewFields	Affiliation: NewFields	Affiliation:	Affiliation:
Date/Time: 6/25/13 1835	Date/Time: 6/25/13 1835	Date/Time:	Date/Time:

Matrix Codes
FW = Fresh Water
WW = Waste Water
SB = Salt & Brackish Water
SS = Soil & Sediment
TS = plant & Animal Tissue
OT = Other

WHITE return to originator • YELLOW lab • PINK retained by originator

CHAIN OF CUSTODY FORM

integral
consulting inc.

Project: WPAH (C1102-0300)

Samplers: SEXTON, WODZICKI, ESTELLA

Integral Contact: Jane Sexton
Office Seattle WA
Phone 206-957-0342

Ship to:
Lab Name NewFields
Address 4729 NE View Drive
Port Gamble WA 98392
Contact Bill Gardiner
Phone 360-301-3376

Sample No.	Tag No	Date	Time	Matrix	10-day amphipod	Larval development with resuspension	20-day Neanthes	Bioaccumulation Test					Extra Container	Archive	Comments
SD0027	21118	6/25/13	0913	SD		✓									
SD0030	21124		0954			✓									Temps
SD0031	21130		1026			✓									6.1, 34, 2.6, 1.4
SD0032	21136		1100			✓									
SD0033	21142		1134			✓									
SD0034	21148		1302			✓									
SD0035	21154		1343			✓									
SD0036	21160		1438			✓									
SD0037	21166		1541			✓									
SD0038	21172		1545			✓									
SD0039	21178		1651			✓									
SD0044	21184		1739			✓									
SD0023	21190	6/26/13	0812			✓									
SD0024	21196		0856			✓									
SD0042	21202		0927			✓									
SD0043	21212		1022			✓									
SD0045	21218		1052			✓									
SD0046	21224		1121			✓									

Analysis Turn Time: [✓ Normal] Rush **Rush Results Needed By:**

Shipped by: Courier **Shipping Tracking No.**

Condition of Samples Upon Receipt: **Custody Seal Intact?**

Matrix Code:
SL - Soil
SD - Sediment
GW - Groundwater
SW - Surface water
Other:

Relinquished by: Jane Sexton (signature) **Date/Time:** 6/28/13 0900 **Received by:** Julia (signature) **Date/Time:** 6/28/13 1330

Relinquished by: (signature) **Date/Time:** **Received by:** (signature) **Date/Time:**

Special Instructions:

CHAIN OI STODY FORM

integral consulting inc.

Project: WFAH (C1102-0300)

Samplers: SEXTON; WODZICKI, ESTELLA

Integral Contact: Jane Sexton

Office: Seattle WA

Phone: 206-957-0342

Ship to:

Lab Name: New Fields

Address: 4729 NE View Drive
Port Gamble WA 98392

Contact: Bill Gardiner

Phone: 360-501-3376

Sample No.	Tag No.	Date	Time	Matrix	ANALYSES REQUESTED 10-day amphipod	Larval development	20-day Neanthes	Bioaccumulation Test					Extra Container	Archive	Comments
SD0047	21230	6/26/13	1237	SD		✓									
SD0049	21236		1638			✓									Temps
SD0048	21252		1443			✓									6.1, 3.4, 2.6, 1.4
SD0040	21262	↓	1711			✓									
SD0024	21268	6/27/13	0538			✓									
SD0025	21275		0904			✓		✓							
SD0026	21282		1047			✓		✓							
SD0028	21289		1241			✓		✓							
SD0005	21295		1412		✓										
	21296					✓									
↓	21297		↓				✓								
SD0006	21304		1546		✓										
	21305					✓									
↓	21306		↓				✓								
SD0007	21312		1652		✓										
	21313					✓									
↓	21314	↓	↓	↓			✓								

6/28/13

Analysis Turn Time: [✓ Normal] Rush **Rush Results Needed By:**

Shipped by: Courier **Shipping Tracking No.**

Condition of Samples Upon Receipt: **Custody Seal Intact?**

Matrix Code:
SL - Soil
SD -Sediment
GW - Groundwater
SW - Surface water
Other:

Relinquished by: Jane Sexton (signature) **Date/Time:** 6/28/13 0900 **Received by:** Julia (signature) **Date/Time:** 6/28/13 1330

Relinquished by: ________ (signature) **Date/Time:** ________ **Received by:** ________ (signature) **Date/Time:** ________

Special Instructions:

CHAIN O STODY FORM

integral consulting inc.

Project: WPAH (C1102-0300)

Samplers: SEXTON, WODZICKI, ESTELLA

Integral Contact: Jane Sexton
Office Seattle WA
Phone 206-957-0342

Ship to: Lab Name New Fields
Address 4729 NE View Drive
Port Gamble, WA 98352
Contact Bill Gardner
Phone 360-297-6080

Sample No.	Tag No.	Date	Time	Matrix	ANALYSES REQUESTED								Extra Container	Archive	Comments
					10-Day Amphipod	Larval Development with resuspension	20-day Neanthes	Bioaccumulation Test							
SD0014	21320	6/28/13	0815	SD	✓										
↓	21321		↓	↓		✓									
↓	21322		↓	↓			✓								
SD0017	21330		0907	↓	✓										
↓	21331		↓	↓		✓									
↓	21332		↓	↓			✓								
SD0019	21338		1016	↓	✓										
SD0019	21339		↓	↓		✓									
SD0019	21340		↓	↓			✓								
SD0020	21346		1127	↓	✓										
↓	21347		↓	↓		✓									
↓	21348		↓	↓			✓								

J. Sexton 7/4/13

Analysis Turn Time: [✓ Normal] Rush **Rush Results Needed By:**

Shipped by: Courier **Shipping Tracking No.**

Condition of Samples Upon Receipt: **Custody Seal Intact?**

Matrix Code: GW - Groundwater
SL - Soil SW - Surface water
SD -Sediment Other:

Relinquished by: Jane Sexton (signature) **Date/Time:** 7/4/13 0830 **Received by:** M Bacon (signature) **Date/Time:** 7/4/13 0930

Relinquished by: ____ (signature) **Date/Time:** ____ **Received by:** ____ (signature) **Date/Time:** ____

Special Instructions:

CHAIN O STODY FORM

Page 1 of 2

Project: WPAH (C1102-0300)

Samplers: SEXTON, WODZICKI, ESTELLA

Integral Contact: Jane Sexton

Office: Seattle WA

Phone: 206-957-0342

Ship to:

Lab Name: New Fields

Address: 4724 NE View Drive
Port Gamble, WA 98382

Contact: Bill Gardiner

Phone: ~~360-50~~ 360-297-6050

integral consulting inc.

ANALYSES REQUESTED

Sample No.	Tag No.	Date	Time	Matrix	10 day amphipod	Larval development with resuspension	20 day Neanthes	Bioaccumulation Test	Treatability Test				Extra Container	Archive	Comments
SD0009	21363	7/1/13	0843	SD	✓	✓	✓	✓							5 GAL BUCKET
SD0003	21371		1022		✓										
	21372					✓									
↓	21373		↓				✓								
SD0052	21379		~~1534~~ 1256					✓							1of2
↓	21380		↓					✓							2of2
SD0053	21386		1343					✓	✓						1of2
↓	21387		↓					✓	✓						2of2
SD0010	21394	↓	1534		✓	✓	✓	✓							5 GAL BUCKET
SD0004	21401	7/2/13	0822		✓	✓	✓	✓							1of2 } Lab replicate
↓	21402		↓		✓	✓	✓	✓							2of2 } divided sample
SD0012	21408		1027		✓	~~✓~~	~~✓~~								
	21409					✓									
↓	21410		↓				✓								
SD0011	21422	↓	1300		✓	✓	✓	✓							
SD0022	21428	7/3/13	1046			✓									
SD0001	21434		1215		✓										
↓	21435	↓	↓	✓		✓									

Analysis Turn Time: [✓ Normal] Rush **Rush Results Needed By:**

Shipped by: Courier **Shipping Tracking No.**

Condition of Samples Upon Receipt: **Custody Seal Intact?**

Relinquished by: Jane Sexton (signature) **Date/Time:** 7/4/13 0500 **Received by:** M Bacon (signature) **Date/Time:** 7/4/13 0930

Relinquished by: ________ (signature) **Date/Time:** ________ **Received by:** ________ (signature) **Date/Time:** ________

Matrix Code:
GW - Groundwater
SL - Soil
SW - Surface water
SD -Sediment
Other:

Special Instructions:

CHAIN O 'STODY FORM

Page 2 of 2

integral consulting inc.

Project: WPAH (C1102-0300)
Samplers: SEXTON, WODZICKI, ESTELLA
Integral Contact: Jane Sexton
Office: Seattle WA
Phone: 206-957-0342
Ship to: Lab Name: NewFields
Address: 4729 NE View Drive
Port Gamble, WA 98382
Contact: Bill Gardiner
Phone: 360-297-6080

					ANALYSES REQUESTED										
Sample No.	Tag No.	**Date**	**Time**	**Matrix**	10 day amphipod	Larval development with resuspension	20-day Neanthes	Bioaccumulation Test	Treatability Test				**Extra Container**	**Archive**	**Comments**
SD0001	21436	7/3/13	1216	SD			✓								
SD0002	~~21442~~		~~1435~~		~~✓~~										
	21443					✓									
↓	~~21444~~		↓				~~✓~~								
SD0051	21450		1550					✓							1 of 2
↓	21451		↓					✓							~~1 of 2~~ 2 of 2
SD0054	21462	↓	1717	↓				✓	✓						~~2 of 2~~ 5 gal bucket

J. Sexton 7/3/13

Analysis Turn Time: [✓ Normal] Rush **Rush Results Needed By:**

Shipped by: Courier **Shipping Tracking No.**

Condition of Samples Upon Receipt: **Custody Seal Intact?**

Relinquished by: Jane Sexton *(signature)* **Date/Time:** 7/4/13 0520 **Received by:** M Bacon *(signature)* **Date/Time:** 7/4/13 0930

Relinquished by: ________ *(signature)* **Date/Time:** ________ **Received by:** ________ *(signature)* **Date/Time:** ________

Matrix Code:
SL - Soil
SD - Sediment
GW - Groundwater
SW - Surface water
Other:

Special Instructions:

CHAIN C JSTODY FORM

Page 1 of 1

Project: WPAH (C1102-0302)

Samplers: SEXTON, WODZICKI, ESTELLA

integral consulting inc.

Integral Contact: Jane Sexton

Office: Seattle WA

Phone: 206-957-0342

Ship to:

Lab Name: New Fields

Address: 4729 NE View Drive
Port Gamble WA 98382

Contact: Bill Gardiner

Phone: 360-[illegible]-3370

ANALYSES REQUESTED

Sample No.	Tag No.	Date	Time	Matrix	10 day amphipod	Larval development with resuspension	20-day Neanthes	Bioaccumulation Test	Treatability Test				Extra Container	Archive	Comments
SD0002	21442	7/3/13	1435	SD	✓								2.2		
↓	21444	↓	↓				✓						0.7		
SD0015	21484	7/8/13	1004		✓	✓	✓	✓					1.5		5 GAL BUCKET
SD0013	21470		0530		✓	✓	✓	✓					1.5		5 GAL BUCKET
SD0021	21354		1225		✓								✓		
	21355					✓							~~1.8~~	0.5	
↓	21356		↓				✓						1.8		
SD0055	21490		1348					✓					1.8		1 of 2
↓	21491	↓	↓					✓					✓		2 of 2
SD0028	21505	7/9/13	0944		✓								1.8		
	21506					✓							~~1.4~~ 0.4		
	21507		↓				✓						1.4		
SD0018	21498	↓	0506		✓	✓	✓	✓					3.0		5 GAL BUCKET

J Sexton
7/9/13

Analysis Turn Time: [✓ Normal] Rush **Rush Results Needed By:**

Shipped by: Courier **Shipping Tracking No.**

Condition of Samples Upon Receipt: **Custody Seal Intact?**

Matrix Code:
GW - Groundwater
SL - Soil
SW - Surface water
SD -Sediment
Other:

Relinquished by: Jane Sexton (signature) **Date/Time:** 7/10/13 1606 **Received by:** (signature) **Date/Time:** 7.10.13 1606

Relinquished by: (signature) **Date/Time:** **Received by:** (signature) **Date/Time:**

Special Instructions:

Annapolis
200 Harry S. Truman Pkwy
Suite 330
Annapolis, MD 21401

Denver
285 Century Place
Suite 190
Louisville, CO 80027

Portland, Oregon
319 SW Washington St
Suite 1150
Portland, OR 97204

Honolulu
3465 Waialae Ave
Suite 380
Honolulu, HI 96816

Seattle
411 1st Ave S
Suite 550
Seattle, WA 98104

Portland, Maine
45 Exchange St
Suite 200
Portland, ME 04101

Olympia
1205 West Bay Dr NW
Olympia, WA 98502

CHAIN C JSTODY FORM

Page 1 of 1

integral
consulting inc.

Project: C1146 – FOPA – KPLY

Samplers: SEXTON; WODZICKI; ESTELLA

Integral Contact: Jane Sexton

Office: Seattle WA

Phone: 206-957-0342

Ship to:

Lab Name: NewFields

Address: 4729 NE View Drive
Port Gamble WA 98392

Contact: Bill Gardiner

Phone: 360-561-3376

ANALYSES REQUESTED

Sample No.	Tag No.	Date	Time	Matrix	10 day amphipod	Larval development with resuspension	20 day Neanthes						Extra Container	Archive	Comments
SD0001K	21514	7/9/13	1119	SD	✓										HOLD FOR FIS
	21515					✓									AUTHORIZATION
	21516						✓								
SD0002K	21523		1421		✓										
	21524					✓									
	21525						✓								
SD0003K	21532		1312		✓										
	21533					✓									
	21534						✓								

J. Sexton 7/9/13

Analysis Turn Time: [✓ Normal] Rush **Rush Results Needed By:**

Shipped by: Courier **Shipping Tracking No.**

Condition of Samples Upon Receipt: **Custody Seal Intact?**

Relinquished by: Jane Sexton *(signature)* **Date/Time:** 7/10/13 1611 **Received by:** *(signature)* **Date/Time:** 7.10.13 1611

Relinquished by: *(signature)* **Date/Time:** **Received by:** *(signature)* **Date/Time:**

Matrix Code:
SL - Soil
SD - Sediment
GW - Groundwater
SW - Surface water
Other:

Special Instructions:

CI IN OF CUSTODY

New ields

Shipping: 4770 NE View Dr. Mailing: P.O. Bo 5
Port Gamble, WA. 9 4
Tel: (360) 297-6045, Fax: (360)297-6901

Destination Lab: ALS Environmental	Sample Originator: NewFields	Report Results To: Integral	Phone: 360.705.3534, ext. 417
Destination Contact: Greg Salata	Contact Name: Bill Gardiner	Contact Name: Craig Hutchings	Fax: 360.705.3669
Date: 7/16/13	Address: Same as above	Address: 1205 West Bay Drive NW Olympia, WA 98502	Email: chutchings@integral-corp.com
Turn-Around-Time: NA			
Project Name: Port Angeles	Phone: 360-297-6080		Invoicing To: Integral
	Fax: Same as above		Comments or Special Instructions:
Contract/PO: NA	E-mail: bgardiner@newfields.com		

					Analysis								
No.	Sample ID	Matrix	No. & Type of Container	Date & Time	Total Solids & Grain Size	Archive					Preservation	Sample Temp Upon Receipt	LAB ID
1	SD0056	SS	2-8 oz. glass	6/25/13 1610	X	X					4 deg. C		
2	SD0057	SS	2-8 oz. glass	6/25/13 1420	X	X					4 deg. C		
3	SD0058	SS	2-8 oz. glass	6/25/13 1235	X	X					4 deg. C		
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

Relinquished by:	Recieved by:	Relinquished by:	Recieved by:	Matrix Codes
Print Name: Mary Bacon	Print Name:	Print Name:	Print Name:	FW = Fresh Water
Signature: MBacon	Signature:	Signature:	Signature:	WW = Waste Water
Affiliation: NewFields	Affiliation:	Affiliation:	Affiliation:	SB = Salt & Brackish Water
Date/Time: 7/16/13 1100	Date/Time:	Date/Time:	Date/Time:	SS = Soil & Sediment
Print Name:	Print Name:	Print Name:	Print Name:	TS = plant & Animal Tissue
Signature:	Signature:	Signature:	Signature:	OT = Other
Affiliation:	Affiliation:	Affiliation:	Affiliation:	
Date/Time:	Date/Time:	Date/Time:	Date/Time:	

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Appendix B

Statistical Comparisons of Test Treatments

Test	Endpoint	Treatment	Comparison	Prob Normal	Prob Homogeneous	Run Type	Prob T	Significant?	One-tailed T-test
Bivalve Development Batch 1	Percent Normal Development	CARR-20	Control	0.163	0.776	T-test Equal Var	4.60E-05	Yes	Treatment < Comparison
Bivalve Development Batch 1	Percent Normal Development	CR-02	Control	0.254	0.79	T-test Equal Var	5.50E-05	Yes	Treatment < Comparison
Bivalve Development Batch 1	Percent Normal Development	CR-12	Control	0.026	0.227	Mann-Whitney	0.05	Yes	Treatment < Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0046	CR-12	0.013	0.21	Mann-Whitney	0.694		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0047	CR-12	0.008	0.425	Mann-Whitney	0.419		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0045	CR-12	.	.	Rankit Unequal Var	.	Yes	Treatment < Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0023	CARR-20	0.817	0.098	T-test Unequal Var	0.001	Yes	Treatment < Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0025	CARR-20	0.104	0.362	T-test Equal Var	2.60E-04	Yes	Treatment < Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0027	CARR-20	0.492	0.879	T-test Equal Var	5.90E-04	Yes	Treatment < Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0035	CARR-20	0.209	0.532	T-test Equal Var	0.148		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0024	CR-02	0.553	0.128	T-test Equal Var	0.023	Yes	Treatment < Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0026	CR-02	0.203	0.846	T-test Equal Var	0.493		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0028	CR-02	0.595	0.014	T-test Unequal Var	0.215		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0029	CR-02	0.156	0.6	T-test Equal Var	0.006	Yes	Treatment < Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0030	CR-02	0.782	0.038	T-test Unequal Var	0.034	Yes	Treatment < Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0031	CR-02	0.288	0.261	T-test Equal Var	0.087		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0032	CR-02	0.492	0.779	T-test Equal Var	0.694		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0033	CR-02	0.209	0.548	T-test Equal Var	0.108		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0034	CR-02	0.24	0.388	T-test Equal Var	0.035	Yes	Treatment < Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0036	CR-02	0.067	0.706	T-test Equal Var	0.532		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0037	CR-02	0.435	0.323	T-test Equal Var	0.28		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0038	CR-02	0.111	0.49	T-test Equal Var	0.682		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0039	CR-02	0.896	0.029	T-test Unequal Var	0.035	Yes	Treatment < Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0040	CR-02	0.667	0.054	T-test Unequal Var	0.318		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0042	CR-02	0.389	0.259	T-test Equal Var	0.142		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0043	CR-02	0.763	0.817	T-test Equal Var	0.915		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0044	CR-02	0.425	0.151	T-test Equal Var	0.872		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0045	CR-02	0.202	0.589	T-test Equal Var	0.162		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0048	CR-02	0.395	0.211	T-test Equal Var	0.961		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD0049	CR-02	0.228	0.728	T-test Equal Var	0.973		Treatment >= Comparison
Bivalve Development Batch 1	Percent Normal Development	SD005	CR-02	0.67	0.143	T-test Equal Var	0.027	Yes	Treatment < Comparison
Bivalve Development Batch 1	Percent Normal Development	SD006	CR-02	0.263	0.215	T-test Equal Var	0.004	Yes	Treatment < Comparison
Bivalve Development Batch 1	Percent Normal Development	SD007	CR-02	0.429	0.536	T-test Equal Var	0.07		Treatment >= Comparison
Bivalve Development Batch 2	Percent Normal Development	CARR-20	Control	0.854	0.266	T-test Equal Var	0.016	Yes	Treatment < Comparison
Bivalve Development Batch 2	Percent Normal Development	CR-02	Control	0.896	0.008	T-test Unequal Var	0.01	Yes	Treatment < Comparison
Bivalve Development Batch 2	Percent Normal Development	CR-12	Control	0.581	0.742	T-test Equal Var	0.178		Treatment >= Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0003	CARR-20	0.444	0.193	T-test Equal Var	9.80E-04	Yes	Treatment < Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0004	CARR-20	0.435	0.382	T-test Equal Var	8.50E-06	Yes	Treatment < Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0001	CR-02	0.286	0.019	T-test Unequal Var	0.02	Yes	Treatment < Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0002	CR-02	0.468	0.042	T-test Unequal Var	0.02	Yes	Treatment < Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0008	CR-02	0.353	0.113	T-test Equal Var	0.011	Yes	Treatment < Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0010	CR-02	0.68	0.113	T-test Equal Var	5.20E-05	Yes	Treatment < Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0011	CR-02	0.626	0.183	T-test Equal Var	0.002	Yes	Treatment < Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0012	CR-02	0.295	0.672	T-test Equal Var	0.038	Yes	Treatment < Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0013	CR-02	0.978	0.055	T-test Unequal Var	0.096		Treatment >= Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0015	CR-02	0.758	0.02	T-test Unequal Var	0.033	Yes	Treatment < Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0017	CR-02	0.867	0.025	T-test Unequal Var	0.03	Yes	Treatment < Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0018	CR-02	0.673	0.063	T-test Unequal Var	0.831		Treatment >= Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0019	CR-02	0.28	0.049	T-test Unequal Var	0.297		Treatment >= Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0020	CR-02	0.503	0.151	T-test Equal Var	1.60E-04	Yes	Treatment < Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0022	CR-02	0.794	0.314	T-test Equal Var	0.163		Treatment >= Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0009	CR-02	0.012	0.216	Mann-Whitney	0.017	Yes	Treatment < Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0014	CR-02	0.016	0.162	Mann-Whitney	0.033	Yes	Treatment < Comparison
Bivalve Development Batch 2	Percent Normal Development	SD0021	CR-02	0.032	0.12	Mann-Whitney	0.912		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	CARR-20	Control	0.117	0.011	T-test Unequal Var	0.082		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	CR-12	Control	0.175	0.098	T-test Unequal Var	0.284		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	CR-02	Control	0.004	0.375	Mann-Whitney	0.31		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0003	CARR-20	0.088	0.326	T-test Equal Var	0.752		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0004	CARR-20	0.323	0.008	T-test Unequal Var	0.912		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0001	CR-02	0.376	0.962	T-test Equal Var	0.044	Yes	Treatment < Comparison
Eohaustorius estuarius	Percent Survival	SD0011	CR-02	0.231	0.13	T-test Equal Var	0.098		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0012	CR-02	0.178	0.653	T-test Equal Var	0.177		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0014	CR-02	0.075	0.899	T-test Equal Var	0.214		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0015	CR-02	0.325	0.67	T-test Equal Var	0.072		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0018	CR-02	0.108	0.543	T-test Equal Var	0.161		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0021	CR-02	0.216	0.361	T-test Equal Var	0.133		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0002	CR-02	0.008	0.301	Mann-Whitney	0.31		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0006	CR-02	0.004	0.375	Mann-Whitney	0.31		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0007	CR-02	0.047	0.579	Mann-Whitney	0.089		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0008	CR-02	4.70E-06	1	Mann-Whitney	0.5		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0009	CR-02	5.10E-05	0.532	Mann-Whitney	0.5		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0010	CR-02	5.10E-05	0.532	Mann-Whitney	0.5		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0013	CR-02	0.002	0.899	Mann-Whitney	0.401		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0017	CR-02	0.002	0.899	Mann-Whitney	0.401		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0019	CR-02	4.10E-04	0.111	Mann-Whitney	0.064		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0020	CR-02	0.004	0.375	Mann-Whitney	0.31		Treatment >= Comparison
Eohaustorius estuarius	Percent Survival	SD0005	CR-02	1.10E-04	0.029	Rankit Unequal Var	0.813		Treatment >= Comparison

Test	Endpoint	Treatment	Comparison	Prob Normal	Prob Homogeneous	Run Type	Prob T	Significant?	One-tailed T-test
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	CARR-20	Control	0.972	0.043	T-test Unequal Var	0.917		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	CR-02	Control	0.906	0.72	T-test Equal Var	0.139		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	CR-12	Control	0.883	0.086	T-test Unequal Var	0.942		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0003	CARR-20	0.58	0.001	T-test Unequal Var	0.999		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0004	CARR-20	0.643	0.72	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0001	CR-02	0.796	0.531	T-test Equal Var	0.997		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0002	CR-02	0.878	0.736	T-test Equal Var	0.999		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0005	CR-02	0.887	0.586	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0006	CR-02	0.566	0.409	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0007	CR-02	0.822	0.927	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0008	CR-02	0.719	0.857	T-test Equal Var	0.999		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0009	CR-02	0.71	0.262	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0010	CR-02	0.569	0.7	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0011	CR-02	0.571	0.667	T-test Equal Var	0.992		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0012	CR-02	0.804	0.251	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0013	CR-02	0.834	0.987	T-test Equal Var	0.999		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0014	CR-02	0.807	0.527	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0015	CR-02	0.255	0.354	T-test Equal Var	0.994		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0017	CR-02	0.909	0.377	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0018	CR-02	0.34	0.935	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0019	CR-02	0.456	0.681	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0020	CR-02	0.767	0.755	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	AFDW Growth (mg/ind/day)	SD0021	CR-02	0.496	0.233	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	CARR-20	Control	0.164	0.857	T-test Equal Var	0.912		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	CR-02	Control	0.462	0.981	T-test Equal Var	0.077		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	CR-12	Control	0.861	0.066	T-test Unequal Var	0.981		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0003	CARR-20	0.284	0.524	T-test Equal Var	0.969		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0004	CARR-20	0.991	0.024	T-test Unequal Var	0.965		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0001	CR-02	0.541	0.568	T-test Equal Var	0.985		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0002	CR-02	0.939	0.581	T-test Equal Var	0.995		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0005	CR-02	0.766	0.748	T-test Equal Var	0.999		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0006	CR-02	0.596	0.381	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0007	CR-02	0.495	0.979	T-test Equal Var	0.999		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0008	CR-02	0.524	0.952	T-test Equal Var	0.996		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0009	CR-02	0.849	0.171	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0010	CR-02	0.689	0.573	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0011	CR-02	0.406	0.631	T-test Equal Var	0.969		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0012	CR-02	0.375	0.168	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0013	CR-02	0.635	0.79	T-test Equal Var	0.999		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0014	CR-02	0.777	0.683	T-test Equal Var	0.999		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0015	CR-02	0.111	0.34	T-test Equal Var	0.993		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0017	CR-02	0.882	0.443	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0018	CR-02	0.888	0.89	T-test Equal Var	1		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0019	CR-02	0.361	0.437	T-test Equal Var	0.999		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0020	CR-02	0.959	0.802	T-test Equal Var	0.999		Treatment >= Comparison
Neanthes arenaceodentata	Individual Growth Rate (mg	SD0021	CR-02	0.236	0.161	T-test Equal Var	1		Treatment >= Comparison

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=CARR-20 ----

                                      The TTEST Procedure

                                       Variable:  result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         Control         5       1.5113       0.0975       0.0436       1.3464       1.5708
         Reference       5       1.1102       0.0773       0.0346       1.0312       1.2040
         Diff (1-2)              0.4012       0.0880       0.0556

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 Control                          1.5113      1.3903   1.6323      0.0975      0.0584   0.2800
 Reference                        1.1102      1.0141   1.2062      0.0773      0.0463   0.2223
 Diff (1-2)    Pooled             0.4012      0.2729   0.5295      0.0880      0.0594   0.1685
 Diff (1-2)    Satterthwaite      0.4012      0.2717   0.5306

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       7.21      <.0001
                  Satterthwaite    Unequal      7.6076       7.21      0.0001

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.59    0.6652
```

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                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
                                                       13:10 Monday, September 2, 2013

----- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=CR-02 -----

                                 The TTEST Procedure

                                  Variable:  result

         group           N         Mean     Std Dev     Std Err     Minimum     Maximum

         Control         5       1.5113      0.0975      0.0436      1.3464      1.5708
         Reference       5       1.0766      0.0984      0.0440      0.9616      1.1794
         Diff (1-2)              0.4348      0.0979      0.0619

 group        Method              Mean       95% CL Mean        Std Dev      95% CL Std Dev

 Control                        1.5113      1.3903   1.6323      0.0975      0.0584   0.2800
 Reference                      1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
 Diff (1-2)   Pooled            0.4348      0.2919   0.5776      0.0979      0.0661   0.1876
 Diff (1-2)   Satterthwaite     0.4348      0.2919   0.5776

              Method           Variances        DF    t Value    Pr > |t|

              Pooled           Equal             8       7.02      0.0001
              Satterthwaite    Unequal      7.9992       7.02      0.0001

                                Equality of Variances

                  Method        Num DF     Den DF     F Value    Pr > F

                  Folded F           4          4        1.02    0.9854
```

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                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
                                                    13:10 Monday, September 2, 2013

---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=CARR-20 ----

                              The TTEST Procedure

                               Variable:  result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         Control         5       1.2311       0.0707       0.0316       1.1580       1.3212
         Reference       5       1.1269       0.0545       0.0244       1.0383       1.1845
         Diff (1-2)              0.1042       0.0631       0.0399

 group         Method              Mean       95% CL Mean         Std Dev      95% CL Std Dev

 Control                         1.2311      1.1433   1.3189      0.0707      0.0424   0.2031
 Reference                       1.1269      1.0593   1.1945      0.0545      0.0326   0.1565
 Diff (1-2)    Pooled            0.1042      0.0122   0.1962      0.0631      0.0426   0.1209
 Diff (1-2)    Satterthwaite     0.1042      0.0111   0.1973

                 Method           Variances        DF     t Value    Pr > |t|

                 Pooled           Equal             8        2.61      0.0311
                 Satterthwaite    Unequal      7.5113        2.61      0.0328

                             Equality of Variances

                      Method       Num DF     Den DF     F Value    Pr > F

                      Folded F          4          4        1.68    0.6257
```

```
----- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=CR-02 -----

                                     The TTEST Procedure

                                      Variable:  result

          group           N         Mean      Std Dev      Std Err      Minimum      Maximum

          Control         5       1.2311       0.0707       0.0316       1.1580       1.3212
          Reference       5       1.1163       0.0238       0.0107       1.0873       1.1397
          Diff (1-2)              0.1148       0.0527       0.0334

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 Control                          1.2311       1.1433   1.3189     0.0707      0.0424   0.2031
 Reference                        1.1163       1.0867   1.1459     0.0238      0.0143   0.0685
 Diff (1-2)    Pooled             0.1148       0.0379   0.1917     0.0527      0.0356   0.1011
 Diff (1-2)    Satterthwaite      0.1148       0.0285   0.2011

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       3.44      0.0088
                  Satterthwaite    Unequal      4.8978       3.44      0.0190

                                    Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       8.80    0.0583
```

```
----- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=CR-12 -----

                                      The TTEST Procedure

                                       Variable:  result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          Control        5      1.2311      0.0707      0.0316      1.1580      1.3212
          Reference      5      1.1882      0.0675      0.0302      1.0909      1.2636
          Diff (1-2)            0.0429      0.0691      0.0437

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 Control                          1.2311      1.1433   1.3189      0.0707      0.0424   0.2031
 Reference                        1.1882      1.1044   1.2721      0.0675      0.0405   0.1940
 Diff (1-2)    Pooled             0.0429     -0.0579   0.1437      0.0691      0.0467   0.1324
 Diff (1-2)    Satterthwaite      0.0429     -0.0580   0.1437

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       0.98      0.3555
                  Satterthwaite    Unequal      7.9832       0.98      0.3555

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.10    0.9313
```

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                                 T-test Results, This is a 2-tailed result
                                     See Summary Page for 1-tail Result
                                                                  13:10 Monday, September 2, 2013

----------- Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=CARR-20 ------------

                                        The TTEST Procedure

                                         Variable:  result

          group           N         Mean      Std Dev      Std Err      Minimum      Maximum

          Control         5       1.4462       0.1812       0.0810       1.1731       1.5708
          Reference       5       1.3068       0.0527       0.0236       1.2490       1.3453
          Diff (1-2)              0.1394       0.1334       0.0844

 group         Method              Mean        95% CL Mean        Std Dev       95% CL Std Dev

 Control                         1.4462      1.2212    1.6712      0.1812       0.1086    0.5207
 Reference                       1.3068      1.2413    1.3722      0.0527       0.0316    0.1515
 Diff (1-2)    Pooled            0.1394     -0.0553    0.3340      0.1334       0.0901    0.2556
 Diff (1-2)    Satterthwaite     0.1394     -0.0822    0.3610

                  Method           Variances        DF     t Value    Pr > |t|

                  Pooled           Equal             8        1.65      0.1373
                  Satterthwaite    Unequal      4.6721        1.65      0.1637

                                     Equality of Variances

                       Method        Num DF     Den DF     F Value    Pr > F

                       Folded F           4          4       11.82    0.0346
```

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                     T-test Results, This is a 2-tailed result
                         See Summary Page for 1-tail Result
                                                         13:10 Monday, September 2, 2013

------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=CR-12 -------------

                                      The TTEST Procedure

                                       Variable:  result

         group           N          Mean      Std Dev      Std Err      Minimum      Maximum

         Control         5        1.4462       0.1812       0.0810       1.1731       1.5708
         Reference       5        1.3904       0.1009       0.0451       1.3453       1.5708
         Diff (1-2)               0.0558       0.1466       0.0927

group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

Control                          1.4462      1.2212   1.6712      0.1812      0.1086   0.5207
Reference                        1.3904      1.2652   1.5156      0.1009      0.0604   0.2898
Diff (1-2)    Pooled             0.0558     -0.1581   0.2696      0.1466      0.0990   0.2809
Diff (1-2)    Satterthwaite      0.0558     -0.1689   0.2804

                  Method           Variances        DF     t Value     Pr > |t|

                  Pooled           Equal             8        0.60       0.5643
                  Satterthwaite    Unequal      6.2611        0.60       0.5687

                                     Equality of Variances

                       Method        Num DF     Den DF     F Value     Pr > F

                       Folded F           4          4        3.23     0.2827
```

```
------ Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=CARR-20 -------

                                     The TTEST Procedure

                                      Variable:  result

          group           N         Mean      Std Dev      Std Err      Minimum      Maximum

          Control         5       0.3465       0.0619       0.0277       0.2713       0.4144
          Reference       5       0.3942       0.0231       0.0103       0.3700       0.4241
          Diff (1-2)             -0.0476       0.0467       0.0295

 group          Method                Mean       95% CL Mean        Std Dev      95% CL Std Dev

 Control                            0.3465      0.2697   0.4234      0.0619      0.0371   0.1779
 Reference                          0.3942      0.3655   0.4228      0.0231      0.0138   0.0663
 Diff (1-2)     Pooled             -0.0476     -0.1157   0.0205      0.0467      0.0315   0.0895
 Diff (1-2)     Satterthwaite      -0.0476     -0.1232   0.0279

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -1.61      0.1456
                  Satterthwaite    Unequal      5.0902      -1.61      0.1668

                                    Equality of Variances

                       Method      Num DF     Den DF     F Value    Pr > F

                       Folded F         4          4        7.20    0.0820
```

```
                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
                                                  13:10 Monday, September 2, 2013

------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=CR-02 --------

                                 The TTEST Procedure

                                 Variable:  result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         Control         5       0.3465       0.0619       0.0277       0.2713       0.4144
         Reference       5       0.2924       0.0835       0.0373       0.1951       0.4194
         Diff (1-2)              0.0541       0.0735       0.0465

 group         Method                 Mean       95% CL Mean        Std Dev      95% CL Std Dev

 Control                            0.3465      0.2697   0.4234      0.0619      0.0371   0.1779
 Reference                          0.2924      0.1888   0.3961      0.0835      0.0500   0.2399
 Diff (1-2)    Pooled               0.0541     -0.0531   0.1613      0.0735      0.0496   0.1408
 Diff (1-2)    Satterthwaite        0.0541     -0.0547   0.1629

                 Method           Variances        DF     t Value    Pr > |t|

                 Pooled           Equal             8        1.16      0.2778
                 Satterthwaite    Unequal      7.3767        1.16      0.2805

                                Equality of Variances

                      Method       Num DF     Den DF     F Value    Pr > F

                      Folded F          4          4        1.82    0.5763
```

```
                      T-test Results, This is a 2-tailed result
                          See Summary Page for 1-tail Result
                                                         13:10 Monday, September 2, 2013

------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=CR-12 --------

                                 The TTEST Procedure

                                 Variable:  result

        group           N         Mean      Std Dev      Std Err      Minimum      Maximum

        Control         5       0.3465       0.0619       0.0277       0.2713       0.4144
        Reference       5       0.4031       0.0294       0.0132       0.3614       0.4353
        Diff (1-2)             -0.0566       0.0485       0.0306

group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

Control                          0.3465      0.2697   0.4234      0.0619      0.0371   0.1779
Reference                        0.4031      0.3666   0.4396      0.0294      0.0176   0.0846
Diff (1-2)    Pooled            -0.0566     -0.1272   0.0141      0.0485      0.0327   0.0928
Diff (1-2)    Satterthwaite     -0.0566     -0.1325   0.0193

                  Method           Variances        DF     t Value    Pr > |t|

                  Pooled           Equal             8       -1.85      0.1022
                  Satterthwaite    Unequal      5.7207       -1.85      0.1169

                                Equality of Variances

                       Method      Num DF     Den DF     F Value    Pr > F

                       Folded F         4          4        4.42    0.1789
```

```
                       T-test Results, This is a 2-tailed result
                           See Summary Page for 1-tail Result
                                                              13:10 Monday, September 2, 2013

----- Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=CARR-20 ------

                                  The TTEST Procedure

                                   Variable:  result

         group          N         Mean      Std Dev      Std Err      Minimum      Maximum

         Control        5       0.5131       0.0920       0.0412       0.4092       0.6082
         Reference      5       0.5960       0.0847       0.0379       0.4813       0.6896
         Diff (1-2)            -0.0830       0.0884       0.0559

group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

Control                          0.5131      0.3988   0.6273      0.0920      0.0551   0.2645
Reference                        0.5960      0.4909   0.7011      0.0847      0.0507   0.2433
Diff (1-2)    Pooled            -0.0830     -0.2119   0.0460      0.0884      0.0597   0.1694
Diff (1-2)    Satterthwaite     -0.0830     -0.2121   0.0461

                 Method           Variances        DF     t Value    Pr > |t|

                 Pooled           Equal             8       -1.48      0.1762
                 Satterthwaite    Unequal      7.9446       -1.48      0.1764

                                Equality of Variances

                      Method       Num DF     Den DF     F Value    Pr > F

                      Folded F          4          4        1.18    0.8751
```

```
------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=CR-02 -------

                                      The TTEST Procedure

                                       Variable:  result

          group          N        Mean      Std Dev      Std Err      Minimum      Maximum

          Control        5      0.5131       0.0920       0.0412       0.4092       0.6082
          Reference      5      0.4171       0.1005       0.0450       0.3058       0.5662
          Diff (1-2)            0.0960       0.0964       0.0610

 group         Method              Mean       95% CL Mean        Std Dev      95% CL Std Dev

 Control                         0.5131      0.3988   0.6273      0.0920      0.0551   0.2645
 Reference                       0.4171      0.2923   0.5419      0.1005      0.0602   0.2889
 Diff (1-2)    Pooled            0.0960     -0.0446   0.2365      0.0964      0.0651   0.1847
 Diff (1-2)    Satterthwaite     0.0960     -0.0448   0.2367

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       1.57      0.1541
                  Satterthwaite    Unequal      7.9383       1.57      0.1544

                                     Equality of Variances

                       Method       Num DF     Den DF     F Value    Pr > F

                       Folded F          4          4        1.19    0.8681
```

```
                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
                                                  13:10 Monday, September 2, 2013

------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=CR-12 -------

                                 The TTEST Procedure

                                  Variable:  result

          group           N        Mean     Std Dev     Std Err     Minimum     Maximum

          Control         5      0.5131      0.0920      0.0412      0.4092      0.6082
          Reference       5      0.6344      0.0387      0.0173      0.5859      0.6806
          Diff (1-2)            -0.1213      0.0706      0.0447

 group          Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 Control                           0.5131      0.3988   0.6273      0.0920      0.0551   0.2645
 Reference                         0.6344      0.5863   0.6824      0.0387      0.0232   0.1112
 Diff (1-2)     Pooled            -0.1213     -0.2243  -0.0184      0.0706      0.0477   0.1353
 Diff (1-2)     Satterthwaite     -0.1213     -0.2338 -0.00889

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -2.72      0.0264
                  Satterthwaite    Unequal      5.3715      -2.72      0.0389

                                Equality of Variances

                       Method      Num DF     Den DF    F Value    Pr > F

                       Folded F         4          4       5.66    0.1219
```

```
----- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=CR-12 -----

                                The NPAR1WAY Procedure

                     Wilcoxon Scores (Rank Sums) for Variable result
                              Classified by Variable group

                                Sum of      Expected       Std Dev          Mean
          group          N      Scores      Under H0      Under H0         Score
          ------------------------------------------------------------------------
          Control        5       36.50         27.50      4.624812          7.30
          Reference      5       18.50         27.50      4.624812          3.70

                           Average scores were used for ties.


                                Wilcoxon Two-Sample Test

                              Statistic             36.5000

                              Normal Approximation
                              Z                      1.8379
                              One-Sided Pr >  Z      0.0330
                              Two-Sided Pr > |Z|     0.0661

                              t Approximation
                              One-Sided Pr >  Z      0.0496
                              Two-Sided Pr > |Z|     0.0992

                        Z includes a continuity correction of 0.5.


                                   Kruskal-Wallis Test

                              Chi-Square             3.7870
                              DF                          1
                              Pr > Chi-Square        0.0517
```

```
------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=CR-02 -------------

                                     The NPAR1WAY Procedure

                        Wilcoxon Scores (Rank Sums) for Variable result
                                 Classified by Variable group

                                    Sum of      Expected       Std Dev          Mean
           group            N       Scores      Under H0      Under H0         Score
           -------------------------------------------------------------------------
           Control          5         25.0         27.50      3.890873           5.0
           Reference        5         30.0         27.50      3.890873           6.0

                              Average scores were used for ties.


                                   Wilcoxon Two-Sample Test

                                 Statistic             25.0000

                                 Normal Approximation
                                 Z                     -0.5140
                                 One-Sided Pr <  Z      0.3036
                                 Two-Sided Pr > |Z|     0.6072

                                 t Approximation
                                 One-Sided Pr <  Z      0.3098
                                 Two-Sided Pr > |Z|     0.6196

                           Z includes a continuity correction of 0.5.


                                      Kruskal-Wallis Test

                                 Chi-Square             0.4128
                                 DF                          1
                                 Pr > Chi-Square        0.5205
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0046 -----

                                   The NPAR1WAY Procedure

                       Wilcoxon Scores (Rank Sums) for Variable Result
                                Classified by Variable group

                                Sum of      Expected       Std Dev          Mean
            group        N      Scores      Under H0      Under H0         Score
            ____________________________________________________________________

            CR-12        5       24.50         27.50      4.758034          4.90
            Test         5       30.50         27.50      4.758034          6.10

                             Average scores were used for ties.


                                  Wilcoxon Two-Sample Test

                                Statistic             24.5000

                                Normal Approximation
                                Z                     -0.5254
                                One-Sided Pr <  Z      0.2996
                                Two-Sided Pr > |Z|     0.5993

                                t Approximation
                                One-Sided Pr <  Z      0.3060
                                Two-Sided Pr > |Z|     0.6120

                          Z includes a continuity correction of 0.5.


                                     Kruskal-Wallis Test

                                Chi-Square             0.3975
                                DF                          1
                                Pr > Chi-Square        0.5284
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0047 -----

                                     The NPAR1WAY Procedure

                        Wilcoxon Scores (Rank Sums) for Variable Result
                                 Classified by Variable group

                                  Sum of      Expected       Std Dev          Mean
             group       N        Scores      Under H0      Under H0         Score
             ---------------------------------------------------------------------
             CR-12       5          29.0         27.50      4.772607          5.80
             Test        5          26.0         27.50      4.772607          5.20

                              Average scores were used for ties.


                                   Wilcoxon Two-Sample Test

                                 Statistic             29.0000

                                 Normal Approximation
                                 Z                      0.2095
                                 One-Sided Pr >  Z      0.4170
                                 Two-Sided Pr > |Z|     0.8340

                                 t Approximation
                                 One-Sided Pr >  Z      0.4194
                                 Two-Sided Pr > |Z|     0.8387

                           Z includes a continuity correction of 0.5.


                                      Kruskal-Wallis Test

                                 Chi-Square             0.0988
                                 DF                          1
                                 Pr > Chi-Square        0.7533
```

```
                      T-test Results on Rankits, This is a 2-tailed result
                               See Summary Page for 1-tail Result
                                                                  13:10 Monday, September 2, 2013

---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0045 -----

                                       The TTEST Procedure

                         Variable:  rankit  (Rank for Variable Result)

          group          N        Mean      Std Dev      Std Err      Minimum      Maximum

          CR-12          1      0.5895            .            .       0.5895       0.5895
          Test           1     -0.5895            .            .      -0.5895      -0.5895
          Diff (1-2)                 .            .            .

 group         Method                 Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-12                              0.5895          .        .            .            .        .
 Test                              -0.5895          .        .            .            .        .
 Diff (1-2)    Pooled                    .          .        .            .            .        .
 Diff (1-2)    Satterthwaite             .          .        .

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             0          .           .
                  Satterthwaite    Unequal           0          .           .

                                      Equality of Variances

                       Method       Num DF     Den DF     F Value    Pr > F

                       Folded F          0          0           .         .
```

```
                         T-test Results, This is a 2-tailed result
                             See Summary Page for 1-tail Result
                                                                13:10 Monday, September 2, 2013

---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0023 -----

                                      The TTEST Procedure

                                       Variable:  Result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         CARR-20         5       1.1102       0.0773       0.0346       1.0312       1.2040
         Test            5       0.9088       0.0399       0.0179       0.8653       0.9571
         Diff (1-2)              0.2014       0.0615       0.0389

group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

CARR-20                          1.1102      1.0141   1.2062      0.0773      0.0463   0.2223
Test                             0.9088      0.8592   0.9584      0.0399      0.0239   0.1148
Diff (1-2)    Pooled             0.2014      0.1116   0.2911      0.0615      0.0416   0.1179
Diff (1-2)    Satterthwaite      0.2014      0.1061   0.2967

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       5.17      0.0008
                  Satterthwaite    Unequal      5.9912       5.17      0.0021

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       3.75    0.2285
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0025 -----

                                      The TTEST Procedure

                                       Variable:  Result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         CARR-20         5       1.1102       0.0773       0.0346       1.0312       1.2040
         Test            5       0.8050       0.0944       0.0422       0.6952       0.8998
         Diff (1-2)              0.3051       0.0863       0.0546

 group         Method              Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CARR-20                         1.1102      1.0141   1.2062      0.0773      0.0463   0.2223
 Test                            0.8050      0.6878   0.9222      0.0944      0.0566   0.2712
 Diff (1-2)    Pooled            0.3051      0.1793   0.4310      0.0863      0.0583   0.1653
 Diff (1-2)    Satterthwaite     0.3051      0.1784   0.4318

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8       5.59      0.0005
                 Satterthwaite    Unequal      7.7024       5.59      0.0006

                                     Equality of Variances

                      Method      Num DF    Den DF    F Value    Pr > F

                      Folded F         4         4       1.49    0.7089
```

```
                     T-test Results, This is a 2-tailed result
                         See Summary Page for 1-tail Result
                                                                13:10 Monday, September 2, 2013

---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0027 -----

                                    The TTEST Procedure

                                    Variable:  Result

         group           N         Mean     Std Dev     Std Err     Minimum     Maximum

         CARR-20         5       1.1102      0.0773      0.0346      1.0312      1.2040
         Test            5       0.8476      0.0913      0.0408      0.7549      0.9936
         Diff (1-2)              0.2626      0.0846      0.0535

group         Method              Mean       95% CL Mean        Std Dev      95% CL Std Dev

CARR-20                         1.1102      1.0141   1.2062      0.0773      0.0463   0.2223
Test                            0.8476      0.7342   0.9610      0.0913      0.0547   0.2624
Diff (1-2)    Pooled            0.2626      0.1392   0.3860      0.0846      0.0572   0.1621
Diff (1-2)    Satterthwaite     0.2626      0.1386   0.3866

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       4.91      0.0012
                  Satterthwaite    Unequal      7.7891       4.91      0.0013

                                   Equality of Variances

                       Method       Num DF    Den DF    F Value    Pr > F

                       Folded F          4         4       1.39    0.7554
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0035 -----

                                       The TTEST Procedure

                                        Variable:  Result

          group           N         Mean      Std Dev      Std Err      Minimum      Maximum

          CARR-20         5       1.1102       0.0773       0.0346       1.0312       1.2040
          Test            5       1.0504       0.0911       0.0407       0.9260       1.1335
          Diff (1-2)              0.0597       0.0845       0.0534

 group         Method                 Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CARR-20                            1.1102      1.0141   1.2062      0.0773      0.0463   0.2223
 Test                               1.0504      0.9373   1.1635      0.0911      0.0546   0.2618
 Diff (1-2)    Pooled               0.0597     -0.0635   0.1830      0.0845      0.0571   0.1619
 Diff (1-2)    Satterthwaite        0.0597     -0.0641   0.1836

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       1.12      0.2960
                  Satterthwaite    Unequal      7.7948       1.12      0.2968

                                     Equality of Variances

                       Method      Num DF     Den DF     F Value    Pr > F

                       Folded F         4          4        1.39    0.7588
```

```
---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0003 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CARR-20        5      1.1269      0.0545      0.0244      1.0383      1.1845
          Test           5      0.9172      0.0883      0.0395      0.7842      1.0050
          Diff (1-2)            0.2097      0.0734      0.0464

 group        Method                 Mean       95% CL Mean         Std Dev      95% CL Std Dev

 CARR-20                           1.1269      1.0593   1.1945      0.0545      0.0326   0.1565
 Test                              0.9172      0.8075   1.0269      0.0883      0.0529   0.2538
 Diff (1-2)    Pooled              0.2097      0.1027   0.3167      0.0734      0.0496   0.1406
 Diff (1-2)    Satterthwaite       0.2097      0.0988   0.3206

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       4.52      0.0020
                  Satterthwaite    Unequal      6.6567       4.52      0.0031

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       2.63    0.3715
```

```
---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0004 -----

                                     The TTEST Procedure

                                      Variable:  Result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         CARR-20         5       1.1269       0.0545       0.0244       1.0383       1.1845
         Test            5       0.8823       0.0253       0.0113       0.8557       0.9102
         Diff (1-2)              0.2446       0.0425       0.0269

 group          Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CARR-20                           1.1269      1.0593   1.1945      0.0545      0.0326   0.1565
 Test                              0.8823      0.8509   0.9137      0.0253      0.0152   0.0727
 Diff (1-2)     Pooled             0.2446      0.1827   0.3065      0.0425      0.0287   0.0813
 Diff (1-2)     Satterthwaite      0.2446      0.1779   0.3113

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       9.11      <.0001
                  Satterthwaite    Unequal      5.6486       9.11      0.0001

                                    Equality of Variances

                       Method       Num DF     Den DF     F Value    Pr > F

                       Folded F          4          4        4.64    0.1665
```

```
------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0003 ------------

                                     The TTEST Procedure

                                      Variable:  Result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         CARR-20         5       1.3068       0.0527       0.0236       1.2490       1.3453
         Test            5       1.3519       0.1315       0.0588       1.2490       1.5708
         Diff (1-2)             -0.0451       0.1002       0.0634

 group          Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CARR-20                           1.3068      1.2413   1.3722      0.0527      0.0316   0.1515
 Test                              1.3519      1.1886   1.5152      0.1315      0.0788   0.3779
 Diff (1-2)     Pooled            -0.0451     -0.1912   0.1010      0.1002      0.0677   0.1919
 Diff (1-2)     Satterthwaite     -0.0451     -0.2056   0.1154

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8      -0.71      0.4968
                 Satterthwaite    Unequal      5.2532      -0.71      0.5069

                                    Equality of Variances

                      Method      Num DF     Den DF     F Value    Pr > F

                      Folded F         4          4        6.22    0.1044
```

```
                  T-test Results, This is a 2-tailed result
                      See Summary Page for 1-tail Result
                                                   13:10 Monday, September 2, 2013

------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0004 ------------

                                 The TTEST Procedure

                                  Variable:  Result

         group          N        Mean     Std Dev     Std Err     Minimum     Maximum

         CARR-20        5      1.3068      0.0527      0.0236      1.2490      1.3453
         Test           5      1.4162      0.1465      0.0655      1.2490      1.5708
         Diff (1-2)           -0.1095      0.1101      0.0696

group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

CARR-20                          1.3068      1.2413   1.3722      0.0527      0.0316   0.1515
Test                             1.4162      1.2344   1.5981      0.1465      0.0877   0.4209
Diff (1-2)    Pooled            -0.1095     -0.2700   0.0511      0.1101      0.0743   0.2109
Diff (1-2)    Satterthwaite     -0.1095     -0.2882   0.0693

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8      -1.57      0.1545
                 Satterthwaite    Unequal      5.0192      -1.57      0.1765

                                Equality of Variances

                      Method      Num DF    Den DF    F Value    Pr > F

                      Folded F         4         4       7.72    0.0729
```

```
------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0003 -------

                                     The TTEST Procedure

                                      Variable:  Result

          group           N         Mean      Std Dev      Std Err      Minimum      Maximum

          CARR-20         5       0.3942       0.0231       0.0103       0.3700       0.4241
          Test            5       0.6240       0.0833       0.0372       0.5551       0.7340
          Diff (1-2)             -0.2299       0.0611       0.0386

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CARR-20                          0.3942      0.3655   0.4228      0.0231      0.0138   0.0663
 Test                             0.6240      0.5206   0.7274      0.0833      0.0499   0.2393
 Diff (1-2)    Pooled            -0.2299     -0.3190  -0.1408      0.0611      0.0413   0.1171
 Diff (1-2)    Satterthwaite     -0.2299     -0.3318  -0.1280

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -5.95      0.0003
                  Satterthwaite    Unequal      4.6102      -5.95      0.0025

                                    Equality of Variances

                       Method       Num DF     Den DF     F Value    Pr > F

                       Folded F          4          4       13.03    0.0290
```

```
                     T-test Results, This is a 2-tailed result
                         See Summary Page for 1-tail Result
                                                            13:10 Monday, September 2, 2013

------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0004 -------

                                    The TTEST Procedure

                                     Variable:  Result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         CARR-20         5       0.3942       0.0231       0.0103       0.3700       0.4241
         Test            5       0.5940       0.0201      0.00901       0.5642       0.6143
         Diff (1-2)             -0.1998       0.0217       0.0137

 group          Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CARR-20                           0.3942      0.3655   0.4228       0.0231      0.0138   0.0663
 Test                              0.5940      0.5690   0.6190       0.0201      0.0121   0.0579
 Diff (1-2)     Pooled            -0.1998     -0.2314  -0.1682       0.0217      0.0146   0.0415
 Diff (1-2)     Satterthwaite     -0.1998     -0.2315  -0.1681

                  Method           Variances        DF     t Value    Pr > |t|

                  Pooled           Equal             8      -14.59      <.0001
                  Satterthwaite    Unequal      7.8572      -14.59      <.0001

                                   Equality of Variances

                       Method       Num DF     Den DF     F Value    Pr > F

                       Folded F          4          4        1.31    0.7990
```

```
                          T-test Results, This is a 2-tailed result
                              See Summary Page for 1-tail Result
                                                                  13:10 Monday, September 2, 2013

------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0003 ------

                                     The TTEST Procedure

                                      Variable:  Result

         group          N        Mean     Std Dev     Std Err     Minimum     Maximum

         CARR-20        5      0.5960      0.0847      0.0379      0.4813      0.6896
         Test           5      0.7192      0.0951      0.0425      0.6337      0.8393
         Diff (1-2)           -0.1231      0.0900      0.0569

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CARR-20                          0.5960      0.4909    0.7011     0.0847      0.0507   0.2433
 Test                             0.7192      0.6011    0.8372     0.0951      0.0570   0.2732
 Diff (1-2)    Pooled            -0.1231     -0.2544   0.00816     0.0900      0.0608   0.1724
 Diff (1-2)    Satterthwaite     -0.1231     -0.2547   0.00846

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8      -2.16      0.0625
                 Satterthwaite    Unequal      7.8946      -2.16      0.0630

                                    Equality of Variances

                      Method      Num DF    Den DF    F Value    Pr > F

                      Folded F         4         4       1.26    0.8274
```

```
                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
                                                            13:10 Monday, September 2, 2013

------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0004 ------

                                  The TTEST Procedure

                                   Variable:  Result

         group          N        Mean     Std Dev     Std Err     Minimum     Maximum

         CARR-20        5      0.5960      0.0847      0.0379      0.4813      0.6896
         Test           5      0.6887      0.0287      0.0129      0.6552      0.7302
         Diff (1-2)           -0.0926      0.0632      0.0400

 group          Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CARR-20                           0.5960      0.4909    0.7011      0.0847      0.0507   0.2433
 Test                              0.6887      0.6530    0.7244      0.0287      0.0172   0.0826
 Diff (1-2)     Pooled            -0.0926     -0.1848  -0.00044      0.0632      0.0427   0.1211
 Diff (1-2)     Satterthwaite     -0.0926     -0.1960    0.0107

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -2.32      0.0491
                  Satterthwaite    Unequal      4.9105      -2.32      0.0692

                                 Equality of Variances

                       Method       Num DF    Den DF    F Value    Pr > F

                       Folded F          4         4       8.67    0.0597
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0024 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean      Std Dev      Std Err      Minimum      Maximum

          CR-02          5      1.0766       0.0984       0.0440       0.9616       1.1794
          Test           5      0.9580       0.0553       0.0247       0.8998       1.0409
          Diff (1-2)            0.1185       0.0798       0.0505

 group         Method                Mean        95% CL Mean         Std Dev      95% CL Std Dev

 CR-02                             1.0766      0.9544   1.1987        0.0984      0.0590   0.2828
 Test                              0.9580      0.8894   1.0267        0.0553      0.0331   0.1588
 Diff (1-2)    Pooled              0.1185     0.00213   0.2349        0.0798      0.0539   0.1529
 Diff (1-2)    Satterthwaite       0.1185    -0.00359   0.2406

                  Method           Variances        DF     t Value    Pr > |t|

                  Pooled           Equal             8        2.35      0.0468
                  Satterthwaite    Unequal      6.2953        2.35      0.0552

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       3.17    0.2899
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0026 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      1.0766      0.0984      0.0440      0.9616      1.1794
          Test           5      1.0753      0.1297      0.0580      0.9707      1.2961
          Diff (1-2)           0.00126      0.1151      0.0728

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
 Test                             1.0753      0.9143   1.2363      0.1297      0.0777   0.3726
 Diff (1-2)    Pooled            0.00126     -0.1666   0.1691      0.1151      0.0778   0.2205
 Diff (1-2)    Satterthwaite     0.00126     -0.1688   0.1713

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       0.02      0.9866
                  Satterthwaite    Unequal      7.4598       0.02      0.9866

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.74    0.6061
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0028 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean      Std Dev      Std Err      Minimum      Maximum

          CR-02          5      1.0766       0.0984       0.0440       0.9616       1.1794
          Test           5      1.0373       0.0252       0.0113       1.0169       1.0755
          Diff (1-2)            0.0393       0.0718       0.0454

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
 Test                             1.0373      1.0060   1.0686      0.0252      0.0151   0.0724
 Diff (1-2)    Pooled             0.0393     -0.0655   0.1440      0.0718      0.0485   0.1376
 Diff (1-2)    Satterthwaite      0.0393     -0.0813   0.1599

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       0.86      0.4125
                  Satterthwaite    Unequal      4.5225       0.86      0.4308

                                     Equality of Variances

                       Method       Num DF    Den DF    F Value    Pr > F

                       Folded F          4         4      15.24    0.0218
```

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                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
                                                          13:10 Monday, September 2, 2013

---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0029 -----

                                     The TTEST Procedure

                                      Variable:  Result

         group            N         Mean     Std Dev     Std Err     Minimum     Maximum

         CR-02            5       1.0766      0.0984      0.0440      0.9616      1.1794
         Test             5       0.8870      0.0851      0.0381      0.7676      0.9843
         Diff (1-2)               0.1895      0.0920      0.0582

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
 Test                             0.8870      0.7813   0.9927      0.0851      0.0510   0.2446
 Diff (1-2)    Pooled             0.1895      0.0554   0.3237      0.0920      0.0621   0.1763
 Diff (1-2)    Satterthwaite      0.1895      0.0549   0.3242

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       3.26      0.0116
                  Satterthwaite    Unequal      7.8372       3.26      0.0119

                                    Equality of Variances

                       Method       Num DF     Den DF     F Value    Pr > F

                       Folded F          4          4        1.34    0.7853
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0030 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      1.0766      0.0984      0.0440      0.9616      1.1794
          Test           5      0.9684      0.0379      0.0169      0.9304      1.0217
          Diff (1-2)            0.1082      0.0746      0.0472

 group        Method               Mean       95% CL Mean        Std Dev       95% CL Std Dev

 CR-02                           1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
 Test                            0.9684      0.9214   1.0154      0.0379      0.0227   0.1088
 Diff (1-2)   Pooled             0.1082    -0.00057   0.2169      0.0746      0.0504   0.1428
 Diff (1-2)   Satterthwaite      0.1082     -0.0119   0.2283

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       2.29      0.0510
                  Satterthwaite    Unequal       5.159       2.29      0.0687

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       6.75    0.0912
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0031 -----

                                    The TTEST Procedure

                                     Variable:  Result

         group           N          Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02           5        1.0766       0.0984       0.0440       0.9616       1.1794
         Test            5        0.9964       0.0690       0.0309       0.9393       1.1118
         Diff (1-2)               0.0802       0.0850       0.0538

 group          Method                Mean        95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                              1.0766      0.9544    1.1987      0.0984      0.0590    0.2828
 Test                               0.9964      0.9106    1.0821      0.0690      0.0414    0.1984
 Diff (1-2)     Pooled              0.0802     -0.0438    0.2042      0.0850      0.0574    0.1628
 Diff (1-2)     Satterthwaite       0.0802     -0.0463    0.2067

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8       1.49      0.1741
                 Satterthwaite    Unequal      7.1694       1.49      0.1783

                                   Equality of Variances

                      Method       Num DF     Den DF     F Value    Pr > F

                      Folded F          4          4        2.03    0.5092
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0032 -----

                                     The TTEST Procedure

                                      Variable:  Result

         group           N          Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02           5        1.0766       0.0984       0.0440       0.9616       1.1794
         Test            5        1.1098       0.0999       0.0447       1.0075       1.2726
         Diff (1-2)              -0.0332       0.0992       0.0627

group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

CR-02                            1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
Test                             1.1098      0.9857   1.2339      0.0999      0.0599   0.2872
Diff (1-2)    Pooled            -0.0332     -0.1778   0.1115      0.0992      0.0670   0.1900
Diff (1-2)    Satterthwaite     -0.0332     -0.1779   0.1115

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -0.53      0.6110
                  Satterthwaite    Unequal      7.9981      -0.53      0.6110

                                    Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.03    0.9767
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0033 -----

                                     The TTEST Procedure

                                      Variable:  Result

         group           N          Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02           5        1.0766       0.0984       0.0440       0.9616       1.1794
         Test            5        0.9737       0.1404       0.0628       0.7422       1.0908
         Diff (1-2)               0.1029       0.1212       0.0767

 group          Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                             1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
 Test                              0.9737      0.7994   1.1479      0.1404      0.0841   0.4033
 Diff (1-2)     Pooled             0.1029     -0.0739   0.2797      0.1212      0.0819   0.2322
 Diff (1-2)     Satterthwaite      0.1029     -0.0775   0.2833

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8       1.34      0.2164
                 Satterthwaite    Unequal      7.1673       1.34      0.2205

                                     Equality of Variances

                      Method      Num DF    Den DF    F Value    Pr > F

                      Folded F         4         4       2.03    0.5085
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0034 -----

                                      The TTEST Procedure

                                       Variable:  Result

         group           N          Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02           5        1.0766       0.0984       0.0440       0.9616       1.1794
         Test            5        0.9580       0.0806       0.0360       0.8397       1.0655
         Diff (1-2)               0.1185       0.0899       0.0569

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
 Test                             0.9580      0.8580   1.0581      0.0806      0.0483   0.2315
 Diff (1-2)    Pooled             0.1185     -0.0126   0.2497      0.0899      0.0607   0.1723
 Diff (1-2)    Satterthwaite      0.1185     -0.0135   0.2506

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8       2.08      0.0707
                 Satterthwaite    Unequal      7.6998       2.08      0.0720

                                    Equality of Variances

                      Method      Num DF    Den DF    F Value    Pr > F

                      Folded F         4         4       1.49    0.7077
```

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                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
                                                              13:10 Monday, September 2, 2013

---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0036 -----

                                     The TTEST Procedure

                                      Variable:  Result

          group           N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02           5      1.0766      0.0984      0.0440      0.9616      1.1794
          Test            5      1.0814      0.0841      0.0376      0.9982      1.1735
          Diff (1-2)           -0.00483      0.0915      0.0579

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
 Test                             1.0814      0.9770   1.1858      0.0841      0.0504   0.2416
 Diff (1-2)    Pooled           -0.00483     -0.1383   0.1286      0.0915      0.0618   0.1753
 Diff (1-2)    Satterthwaite    -0.00483     -0.1389   0.1292

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -0.08      0.9355
                  Satterthwaite    Unequal      7.8097      -0.08      0.9355

                                    Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.37    0.7677
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0037 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      1.0766      0.0984      0.0440      0.9616      1.1794
          Test           5      1.0439      0.0690      0.0308      0.9437      1.1118
          Diff (1-2)            0.0326      0.0850      0.0537

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
 Test                             1.0439      0.9583   1.1296      0.0690      0.0413   0.1982
 Diff (1-2)    Pooled             0.0326     -0.0913   0.1566      0.0850      0.0574   0.1628
 Diff (1-2)    Satterthwaite      0.0326     -0.0938   0.1591

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       0.61      0.5604
                  Satterthwaite    Unequal      7.1662       0.61      0.5623

                                     Equality of Variances

                       Method      Num DF     Den DF    F Value    Pr > F

                       Folded F         4          4       2.04    0.5082
```

```
                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
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---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0038 -----

                                The TTEST Procedure

                                 Variable:  Result

         group           N         Mean     Std Dev     Std Err     Minimum     Maximum

         CR-02           5       1.0766      0.0984      0.0440      0.9616      1.1794
         Test            5       1.1208      0.1757      0.0786      0.9889      1.4191
         Diff (1-2)             -0.0443      0.1424      0.0901

group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

CR-02                            1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
Test                             1.1208      0.9027   1.3390      0.1757      0.1053   0.5050
Diff (1-2)    Pooled            -0.0443     -0.2520   0.1634      0.1424      0.0962   0.2728
Diff (1-2)    Satterthwaite     -0.0443     -0.2623   0.1737

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8      -0.49      0.6361
                 Satterthwaite    Unequal      6.2842      -0.49      0.6396

                              Equality of Variances

                      Method      Num DF    Den DF    F Value    Pr > F

                      Folded F         4         4       3.19    0.2875
```

```
                  T-test Results, This is a 2-tailed result
                      See Summary Page for 1-tail Result
                                                    13:10 Monday, September 2, 2013

---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0039 -----

                                 The TTEST Procedure

                                  Variable:  Result

        group           N        Mean     Std Dev     Std Err     Minimum     Maximum

        CR-02           5      1.0766      0.0984      0.0440      0.9616      1.1794
        Test            5      0.9692      0.0343      0.0154      0.9304      1.0075
        Diff (1-2)             0.1074      0.0737      0.0466

group         Method             Mean       95% CL Mean        Std Dev      95% CL Std Dev

CR-02                          1.0766      0.9544    1.1987      0.0984      0.0590   0.2828
Test                           0.9692      0.9266    1.0118      0.0343      0.0206   0.0986
Diff (1-2)    Pooled           0.1074    -0.00013    0.2148      0.0737      0.0498   0.1412
Diff (1-2)    Satterthwaite    0.1074     -0.0128    0.2275

              Method           Variances        DF    t Value    Pr > |t|

              Pooled           Equal             8       2.30      0.0502
              Satterthwaite    Unequal      4.9593       2.30      0.0699

                                Equality of Variances

                  Method       Num DF    Den DF    F Value    Pr > F

                  Folded F          4         4       8.22    0.0655
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0040 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      1.0766      0.0984      0.0440      0.9616      1.1794
          Test           5      1.0525      0.0439      0.0196      0.9843      1.1065
          Diff (1-2)            0.0241      0.0762      0.0482

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
 Test                             1.0525      0.9980   1.1069      0.0439      0.0263   0.1260
 Diff (1-2)    Pooled             0.0241     -0.0870   0.1352      0.0762      0.0515   0.1459
 Diff (1-2)    Satterthwaite      0.0241     -0.0963   0.1444

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       0.50      0.6309
                  Satterthwaite    Unequal      5.5286       0.50      0.6367

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       5.03    0.1465
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0042 -----

                                     The TTEST Procedure

                                      Variable:  Result

         group           N        Mean     Std Dev     Std Err     Minimum     Maximum

         CR-02           5      1.0766      0.0984      0.0440      0.9616      1.1794
         Test            5      1.0149      0.0687      0.0307      0.8998      1.0755
         Diff (1-2)             0.0617      0.0848      0.0537

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
 Test                             1.0149      0.9296   1.1001      0.0687      0.0411   0.1973
 Diff (1-2)    Pooled             0.0617     -0.0620   0.1855      0.0848      0.0573   0.1625
 Diff (1-2)    Satterthwaite      0.0617     -0.0647   0.1881

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8       1.15      0.2834
                 Satterthwaite    Unequal      7.1483       1.15      0.2872

                                    Equality of Variances

                      Method       Num DF     Den DF     F Value    Pr > F

                      Folded F          4          4        2.05    0.5028
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0043 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      1.0766      0.0984      0.0440      0.9616      1.1794
          Test           5      1.1720      0.1013      0.0453      1.0360      1.3127
          Diff (1-2)           -0.0954      0.0999      0.0632

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
 Test                             1.1720      1.0462   1.2978      0.1013      0.0607   0.2912
 Diff (1-2)    Pooled            -0.0954     -0.2411   0.0502      0.0999      0.0675   0.1913
 Diff (1-2)    Satterthwaite     -0.0954     -0.2411   0.0503

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -1.51      0.1693
                  Satterthwaite    Unequal      7.9932      -1.51      0.1693

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.06    0.9562
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0044 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group            N          Mean      Std Dev      Std Err      Minimum      Maximum

          CR-02            5        1.0766       0.0984       0.0440       0.9616       1.1794
          Test             5        1.2119       0.2265       0.1013       0.9982       1.5708
          Diff (1-2)               -0.1353       0.1746       0.1104

 group         Method                 Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                              1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
 Test                               1.2119      0.9307   1.4930      0.2265      0.1357   0.6507
 Diff (1-2)    Pooled              -0.1353     -0.3899   0.1193      0.1746      0.1179   0.3345
 Diff (1-2)    Satterthwaite       -0.1353     -0.4121   0.1415

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -1.23      0.2553
                  Satterthwaite    Unequal      5.4588      -1.23      0.2707

                                     Equality of Variances

                       Method       Num DF    Den DF    F Value    Pr > F

                       Folded F          4         4       5.30    0.1354
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0045 -----

                                      The TTEST Procedure

                                       Variable:  Result

         group           N          Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02           4        1.0508       0.0922       0.0461       0.9616       1.1735
         Test            4        0.9884       0.0707       0.0353       0.9393       1.0908
         Diff (1-2)               0.0625       0.0822       0.0581

 group         Method                 Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                              1.0508      0.9041    1.1976      0.0922      0.0522    0.3438
 Test                               0.9884      0.8759    1.1008      0.0707      0.0400    0.2635
 Diff (1-2)    Pooled               0.0625     -0.0797    0.2046      0.0822      0.0529    0.1809
 Diff (1-2)    Satterthwaite        0.0625     -0.0821    0.2070

                  Method           Variances        DF     t Value    Pr > |t|

                  Pooled           Equal             6        1.08      0.3237
                  Satterthwaite    Unequal      5.6201        1.08      0.3263

                                    Equality of Variances

                       Method       Num DF     Den DF     F Value    Pr > F

                       Folded F          3          3        1.70    0.6727
```

```
                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
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---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0048 -----

                                      The TTEST Procedure

                                       Variable:  Result

         group           N        Mean     Std Dev     Std Err     Minimum     Maximum

         CR-02           5      1.0766      0.0984      0.0440      0.9616      1.1794
         Test            5      1.1813      0.0618      0.0277      1.1226      1.2652
         Diff (1-2)            -0.1048      0.0822      0.0520

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
 Test                             1.1813      1.1046   1.2581      0.0618      0.0370   0.1777
 Diff (1-2)    Pooled            -0.1048     -0.2246   0.0151      0.0822      0.0555   0.1574
 Diff (1-2)    Satterthwaite     -0.1048     -0.2287   0.0191

                Method           Variances        DF    t Value    Pr > |t|

                Pooled           Equal             8      -2.02      0.0785
                Satterthwaite    Unequal      6.7321      -2.02      0.0852

                                   Equality of Variances

                     Method       Num DF    Den DF    F Value    Pr > F

                     Folded F          4         4       2.53    0.3899
```

```
---- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD0049 -----

                                     The TTEST Procedure

                                      Variable:  Result

         group           N          Mean       Std Dev       Std Err       Minimum       Maximum

         CR-02           5        1.0766        0.0984        0.0440        0.9616        1.1794
         Test            5        1.2095        0.0876        0.0392        1.0857        1.3043
         Diff (1-2)              -0.1330        0.0932        0.0589

 group          Method                Mean        95% CL Mean          Std Dev       95% CL Std Dev

 CR-02                              1.0766      0.9544    1.1987        0.0984       0.0590    0.2828
 Test                               1.2095      1.1008    1.3183        0.0876       0.0525    0.2517
 Diff (1-2)     Pooled             -0.1330     -0.2688   0.00291        0.0932       0.0629    0.1785
 Diff (1-2)     Satterthwaite      -0.1330     -0.2691   0.00323

                  Method           Variances         DF     t Value    Pr > |t|

                  Pooled           Equal              8       -2.26      0.0540
                  Satterthwaite    Unequal       7.8938       -2.26      0.0544

                                    Equality of Variances

                       Method       Num DF     Den DF     F Value    Pr > F

                       Folded F          4          4        1.26    0.8268
```

```
----- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD005 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      1.0766      0.0984      0.0440      0.9616      1.1794
          Test           5      0.9616      0.0567      0.0254      0.8738      1.0169
          Diff (1-2)            0.1150      0.0803      0.0508

 group         Method               Mean      95% CL Mean         Std Dev      95% CL Std Dev

 CR-02                            1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
 Test                             0.9616      0.8912   1.0320      0.0567      0.0340   0.1630
 Diff (1-2)    Pooled             0.1150    -0.00217   0.2321      0.0803      0.0542   0.1539
 Diff (1-2)    Satterthwaite      0.1150    -0.00750   0.2374

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       2.26      0.0535
                  Satterthwaite    Unequal      6.3932       2.26      0.0616

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       3.01    0.3110
```

```
----- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD006 -----

                                     The TTEST Procedure

                                      Variable:  Result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02           5       1.0766       0.0984       0.0440       0.9616       1.1794
         Test            5       0.8876       0.0652       0.0291       0.8311       0.9982
         Diff (1-2)              0.1889       0.0835       0.0528

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
 Test                             0.8876      0.8067   0.9685      0.0652      0.0390   0.1872
 Diff (1-2)    Pooled             0.1889      0.0672   0.3107      0.0835      0.0564   0.1599
 Diff (1-2)    Satterthwaite      0.1889      0.0639   0.3140

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       3.58      0.0072
                  Satterthwaite    Unequal      6.9417       3.58      0.0091

                                    Equality of Variances

                       Method       Num DF    Den DF    F Value    Pr > F

                       Folded F          4         4       2.28    0.4441
```

```
----- Test=Bivalve Development Batch 1 Endpoint=Percent Normal Development Treatment=SD007 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean      Std Dev      Std Err      Minimum      Maximum

          CR-02          5      1.0766       0.0984       0.0440       0.9616       1.1794
          Test           5      0.9818       0.0842       0.0377       0.8439       1.0605
          Diff (1-2)            0.0947       0.0916       0.0579

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.0766      0.9544   1.1987      0.0984      0.0590   0.2828
 Test                             0.9818      0.8773   1.0864      0.0842      0.0505   0.2420
 Diff (1-2)    Pooled             0.0947     -0.0389   0.2283      0.0916      0.0619   0.1755
 Diff (1-2)    Satterthwaite      0.0947     -0.0394   0.2289

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       1.64      0.1406
                  Satterthwaite    Unequal      7.8135       1.64      0.1415

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.37    0.7701
```

```
---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0001 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group          N         Mean      Std Dev      Std Err      Minimum      Maximum

          CR-02          5       1.1163       0.0238       0.0107       1.0873       1.1397
          Test           5       0.9834       0.1008       0.0451       0.9010       1.1397
          Diff (1-2)             0.1329       0.0732       0.0463

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.1163      1.0867   1.1459      0.0238      0.0143   0.0685
 Test                             0.9834      0.8583   1.1086      0.1008      0.0604   0.2897
 Diff (1-2)    Pooled             0.1329      0.0261   0.2397      0.0732      0.0495   0.1403
 Diff (1-2)    Satterthwaite      0.1329     0.00919   0.2566

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       2.87      0.0209
                  Satterthwaite    Unequal      4.4457       2.87      0.0402

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4      17.89    0.0162
```

```
---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0002 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      1.1163      0.0238      0.0107      1.0873      1.1397
          Test           5      0.9759      0.1063      0.0475      0.8707      1.1320
          Diff (1-2)            0.1404      0.0770      0.0487

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.1163      1.0867   1.1459      0.0238      0.0143   0.0685
 Test                             0.9759      0.8439   1.1078      0.1063      0.0637   0.3053
 Diff (1-2)    Pooled             0.1404      0.0281   0.2528      0.0770      0.0520   0.1475
 Diff (1-2)    Satterthwaite      0.1404     0.00996   0.2709

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       2.88      0.0204
                  Satterthwaite    Unequal      4.4014       2.88      0.0400

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4      19.88    0.0133
```

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                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
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---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0008 -----

                                     The TTEST Procedure

                                      Variable:  Result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02           5       1.1163       0.0238       0.0107       1.0873       1.1397
         Test            5       1.0543       0.0432       0.0193       0.9919       1.0909
         Diff (1-2)              0.0621       0.0349       0.0221

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.1163      1.0867   1.1459      0.0238      0.0143   0.0685
 Test                             1.0543      1.0006   1.1079      0.0432      0.0259   0.1242
 Diff (1-2)    Pooled             0.0621      0.0112   0.1130      0.0349      0.0236   0.0669
 Diff (1-2)    Satterthwaite      0.0621     0.00852   0.1156

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8       2.81      0.0228
                 Satterthwaite    Unequal      6.2263       2.81      0.0295

                                    Equality of Variances

                      Method      Num DF     Den DF     F Value    Pr > F

                      Folded F         4          4        3.29    0.2754
```

```
---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0010 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group          N         Mean      Std Dev      Std Err      Minimum      Maximum

          CR-02          5       1.1163       0.0238       0.0107       1.0873       1.1397
          Test           5       0.9103       0.0606       0.0271       0.8199       0.9790
          Diff (1-2)             0.2060       0.0460       0.0291

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.1163      1.0867   1.1459      0.0238      0.0143   0.0685
 Test                             0.9103      0.8351   0.9855      0.0606      0.0363   0.1741
 Diff (1-2)    Pooled             0.2060      0.1389   0.2732      0.0460      0.0311   0.0882
 Diff (1-2)    Satterthwaite      0.2060      0.1321   0.2800

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       7.08      0.0001
                  Satterthwaite    Unequal      5.2088       7.08      0.0007

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       6.46    0.0981
```

```
---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0011 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group            N         Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02            5       1.1163      0.0238      0.0107      1.0873      1.1397
          Test             5       1.0343      0.0404      0.0181      0.9887      1.0909
          Diff (1-2)               0.0820      0.0332      0.0210

 group          Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                             1.1163      1.0867   1.1459      0.0238      0.0143   0.0685
 Test                              1.0343      0.9842   1.0845      0.0404      0.0242   0.1160
 Diff (1-2)     Pooled             0.0820      0.0337   0.1304      0.0332      0.0224   0.0635
 Diff (1-2)     Satterthwaite      0.0820      0.0316   0.1324

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       3.91      0.0045
                  Satterthwaite    Unequal      6.4848       3.91      0.0068

                                     Equality of Variances

                       Method       Num DF     Den DF     F Value    Pr > F

                       Folded F          4          4        2.87    0.3314
```

```
                     T-test Results, This is a 2-tailed result
                         See Summary Page for 1-tail Result
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---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0012 -----

                                 The TTEST Procedure

                                  Variable:  Result

         group          N        Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02          5      1.1163       0.0238       0.0107       1.0873       1.1397
         Test           5      1.0785       0.0339       0.0152       1.0215       1.1092
         Diff (1-2)            0.0378       0.0293       0.0185

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.1163      1.0867   1.1459      0.0238      0.0143   0.0685
 Test                             1.0785      1.0364   1.1207      0.0339      0.0203   0.0975
 Diff (1-2)    Pooled             0.0378    -0.00496   0.0806      0.0293      0.0198   0.0562
 Diff (1-2)    Satterthwaite      0.0378    -0.00584   0.0814

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8       2.04      0.0759
                 Satterthwaite    Unequal      7.1743       2.04      0.0799

                                Equality of Variances

                      Method      Num DF     Den DF     F Value    Pr > F

                      Folded F         4          4        2.03    0.5107
```

```
                 T-test Results, This is a 2-tailed result
                     See Summary Page for 1-tail Result
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---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0013 -----

                           The TTEST Procedure

                            Variable:  Result

         group          N        Mean     Std Dev     Std Err     Minimum     Maximum

         CR-02          5      1.1163      0.0238      0.0107      1.0873      1.1397
         Test           5      1.0688      0.0662      0.0296      0.9822      1.1397
         Diff (1-2)            0.0475      0.0498      0.0315

group        Method              Mean       95% CL Mean        Std Dev      95% CL Std Dev

CR-02                          1.1163      1.0867   1.1459      0.0238      0.0143   0.0685
Test                           1.0688      0.9866   1.1511      0.0662      0.0397   0.1903
Diff (1-2)   Pooled            0.0475     -0.0251   0.1201      0.0498      0.0336   0.0954
Diff (1-2)   Satterthwaite     0.0475     -0.0333   0.1283

                 Method           Variances        DF     t Value    Pr > |t|

                 Pooled           Equal             8        1.51      0.1698
                 Satterthwaite    Unequal      5.0185        1.51      0.1915

                          Equality of Variances

                      Method      Num DF    Den DF    F Value    Pr > F

                      Folded F         4         4       7.73    0.0728
```

```
---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0015 -----

                                    The TTEST Procedure

                                     Variable:  Result

         group            N         Mean       Std Dev       Std Err      Minimum      Maximum

         CR-02            5       1.1163        0.0238        0.0107       1.0873       1.1397
         Test             5       1.0199        0.0870        0.0389       0.9194       1.1092
         Diff (1-2)               0.0964        0.0638        0.0403

 group          Method               Mean        95% CL Mean          Std Dev      95% CL Std Dev

 CR-02                             1.1163       1.0867    1.1459       0.0238       0.0143    0.0685
 Test                              1.0199       0.9119    1.1279       0.0870       0.0521    0.2499
 Diff (1-2)     Pooled             0.0964      0.00343    0.1894       0.0638       0.0431    0.1221
 Diff (1-2)     Satterthwaite      0.0964      -0.0100    0.2029

                 Method           Variances        DF     t Value     Pr > |t|

                 Pooled           Equal             8        2.39       0.0438
                 Satterthwaite    Unequal      4.5975        2.39       0.0668

                                   Equality of Variances

                      Method       Num DF     Den DF     F Value     Pr > F

                      Folded F          4          4       13.31     0.0279
```

```
                    T-test Results, This is a 2-tailed result
                       See Summary Page for 1-tail Result
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---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0017 -----

                                  The TTEST Procedure

                                  Variable:  Result

         group           N        Mean     Std Dev     Std Err     Minimum     Maximum

         CR-02           5      1.1163      0.0238      0.0107      1.0873      1.1397
         Test            5      1.0358      0.0705      0.0315      0.9474      1.1167
         Diff (1-2)             0.0806      0.0526      0.0333

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.1163      1.0867    1.1459      0.0238      0.0143    0.0685
 Test                             1.0358      0.9483    1.1232      0.0705      0.0422    0.2025
 Diff (1-2)    Pooled             0.0806     0.00385    0.1573      0.0526      0.0355    0.1008
 Diff (1-2)    Satterthwaite      0.0806    -0.00546    0.1666

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       2.42      0.0417
                  Satterthwaite    Unequal      4.9035       2.42      0.0610

                                 Equality of Variances

                       Method       Num DF     Den DF    F Value    Pr > F

                       Folded F          4          4       8.74    0.0589
```

```
---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0018 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      1.1163      0.0238      0.0107      1.0873      1.1397
          Test           5      1.1521      0.0714      0.0319      1.0659      1.2534
          Diff (1-2)           -0.0358      0.0532      0.0337

 group         Method                   Mean       95% CL Mean        Std Dev       95% CL Std Dev

 CR-02                                1.1163      1.0867    1.1459      0.0238      0.0143    0.0685
 Test                                 1.1521      1.0635    1.2408      0.0714      0.0428    0.2052
 Diff (1-2)    Pooled                -0.0358     -0.1134    0.0418      0.0532      0.0360    0.1020
 Diff (1-2)    Satterthwaite         -0.0358     -0.1230    0.0514

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -1.06      0.3187
                  Satterthwaite    Unequal      4.8805      -1.06      0.3374

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       8.97    0.0563
```

```
---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0019 -----

                                      The TTEST Procedure

                                       Variable:  Result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02           5       1.1163       0.0238       0.0107       1.0873       1.1397
         Test            5       1.0972       0.0710       0.0318       0.9855       1.1596
         Diff (1-2)              0.0191       0.0530       0.0335

 group          Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                             1.1163      1.0867   1.1459      0.0238      0.0143   0.0685
 Test                              1.0972      1.0091   1.1854      0.0710      0.0425   0.2041
 Diff (1-2)     Pooled             0.0191     -0.0582   0.0963      0.0530      0.0358   0.1015
 Diff (1-2)     Satterthwaite      0.0191     -0.0676   0.1058

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       0.57      0.5848
                  Satterthwaite    Unequal      4.8898       0.57      0.5943

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       8.88    0.0573
```

```
---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0020 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      1.1163      0.0238      0.0107      1.0873      1.1397
          Test           5      0.9427      0.0601      0.0269      0.8858      1.0316
          Diff (1-2)            0.1736      0.0457      0.0289

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.1163      1.0867   1.1459      0.0238      0.0143   0.0685
 Test                             0.9427      0.8681   1.0173      0.0601      0.0360   0.1727
 Diff (1-2)    Pooled             0.1736      0.1069   0.2403      0.0457      0.0309   0.0876
 Diff (1-2)    Satterthwaite      0.1736      0.1002   0.2470

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       6.00      0.0003
                  Satterthwaite    Unequal      5.2277       6.00      0.0016

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       6.36    0.1008
```

```
---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0022 -----

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      1.1163      0.0238      0.0107      1.0873      1.1397
          Test           5      1.0914      0.0476      0.0213      1.0182      1.1437
          Diff (1-2)            0.0249      0.0377      0.0238

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.1163      1.0867   1.1459      0.0238      0.0143   0.0685
 Test                             1.0914      1.0322   1.1505      0.0476      0.0285   0.1369
 Diff (1-2)    Pooled             0.0249     -0.0300   0.0799      0.0377      0.0254   0.0722
 Diff (1-2)    Satterthwaite      0.0249     -0.0336   0.0835

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       1.05      0.3258
                  Satterthwaite    Unequal      5.8844       1.05      0.3362

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       3.99    0.2084
```

```
                      T-test Results, This is a 2-tailed result
                          See Summary Page for 1-tail Result
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------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0001 ------------

                                    The TTEST Procedure

                                     Variable:  Result

         group           N         Mean     Std Dev     Std Err     Minimum     Maximum

         CR-02           5       1.5064      0.1439      0.0644      1.2490      1.5708
         Test            5       1.3326      0.1395      0.0624      1.2490      1.5708
         Diff (1-2)              0.1738      0.1417      0.0896

group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

CR-02                            1.5064      1.3278   1.6851      0.1439      0.0862   0.4135
Test                             1.3326      1.1594   1.5059      0.1395      0.0836   0.4009
Diff (1-2)    Pooled             0.1738     -0.0329   0.3805      0.1417      0.0957   0.2715
Diff (1-2)    Satterthwaite      0.1738     -0.0329   0.3805

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       1.94      0.0885
                  Satterthwaite    Unequal      7.9923       1.94      0.0885

                                   Equality of Variances

                       Method       Num DF     Den DF     F Value    Pr > F

                       Folded F          4          4        1.06    0.9536
```

```
------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0011 ------------

                                    The TTEST Procedure

                                     Variable:  Result

         group          N         Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02          5       1.5064       0.1439       0.0644       1.2490       1.5708
         Test           5       1.3474       0.2063       0.0923       1.1731       1.5708
         Diff (1-2)             0.1591       0.1779       0.1125

group         Method                Mean        95% CL Mean        Std Dev      95% CL Std Dev

CR-02                             1.5064      1.3278   1.6851       0.1439      0.0862   0.4135
Test                              1.3474      1.0912   1.6035       0.2063      0.1236   0.5928
Diff (1-2)    Pooled              0.1591     -0.1003   0.4185       0.1779      0.1201   0.3407
Diff (1-2)    Satterthwaite       0.1591     -0.1058   0.4240

                 Method           Variances        DF     t Value    Pr > |t|

                 Pooled           Equal             8        1.41      0.1950
                 Satterthwaite    Unequal       7.147        1.41      0.1994

                                   Equality of Variances

                      Method      Num DF     Den DF     F Value    Pr > F

                      Folded F         4          4        2.06    0.5024
```

```
                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
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------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0012 ------------

                                 The TTEST Procedure

                                  Variable:  Result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02           5       1.5064       0.1439       0.0644       1.2490       1.5708
         Test            5       1.4162       0.1465       0.0655       1.2490       1.5708
         Diff (1-2)              0.0902       0.1452       0.0918

group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

CR-02                            1.5064      1.3278   1.6851      0.1439      0.0862   0.4135
Test                             1.4162      1.2344   1.5981      0.1465      0.0877   0.4209
Diff (1-2)    Pooled             0.0902     -0.1215   0.3019      0.1452      0.0981   0.2781
Diff (1-2)    Satterthwaite      0.0902     -0.1215   0.3020

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8       0.98      0.3547
                 Satterthwaite    Unequal      7.9975       0.98      0.3547

                                Equality of Variances

                      Method       Num DF     Den DF     F Value    Pr > F

                      Folded F          4          4        1.04    0.9735
```

```
                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
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------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0014 ------------

                                  The TTEST Procedure

                                   Variable:  Result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02           5       1.5064       0.1439       0.0644       1.2490       1.5708
         Test            5       1.4355       0.1235       0.0552       1.3453       1.5708
         Diff (1-2)              0.0710       0.1341       0.0848

 group         Method              Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                           1.5064      1.3278   1.6851      0.1439      0.0862   0.4135
 Test                            1.4355      1.2821   1.5889      0.1235      0.0740   0.3549
 Diff (1-2)    Pooled            0.0710     -0.1246   0.2665      0.1341      0.0906   0.2569
 Diff (1-2)    Satterthwaite     0.0710     -0.1254   0.2673

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8       0.84      0.4270
                 Satterthwaite    Unequal      7.8205       0.84      0.4276

                                 Equality of Variances

                      Method       Num DF    Den DF    F Value    Pr > F

                      Folded F          4         4       1.36    0.7745
```

```
------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0015 ------------

                                    The TTEST Procedure

                                     Variable:  Result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02           5       1.5064       0.1439       0.0644       1.2490       1.5708
         Test            5       1.3711       0.1191       0.0533       1.2490       1.5708
         Diff (1-2)              0.1353       0.1321       0.0835

 group         Method              Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                           1.5064      1.3278    1.6851      0.1439      0.0862    0.4135
 Test                            1.3711      1.2232    1.5191      0.1191      0.0714    0.3423
 Diff (1-2)    Pooled            0.1353     -0.0573    0.3280      0.1321      0.0892    0.2531
 Diff (1-2)    Satterthwaite     0.1353     -0.0585    0.3291

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8       1.62      0.1440
                  Satterthwaite    Unequal      7.7309       1.62      0.1453

                                   Equality of Variances

                       Method       Num DF     Den DF     F Value    Pr > F

                       Folded F          4          4        1.46    0.7234
```

```
                           T-test Results, This is a 2-tailed result
                               See Summary Page for 1-tail Result
                                                             13:10 Monday, September 2, 2013

------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0018 ------------

                                     The TTEST Procedure

                                      Variable:  Result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02           5       1.5064       0.1439       0.0644       1.2490       1.5708
         Test            5       1.4011       0.1702       0.0761       1.1731       1.5708
         Diff (1-2)              0.1054       0.1576       0.0997

group         Method               Mean        95% CL Mean         Std Dev       95% CL Std Dev

CR-02                            1.5064       1.3278   1.6851       0.1439       0.0862   0.4135
Test                             1.4011       1.1898   1.6123       0.1702       0.1019   0.4889
Diff (1-2)    Pooled             0.1054      -0.1244   0.3352       0.1576       0.1064   0.3019
Diff (1-2)    Satterthwaite      0.1054      -0.1255   0.3363

                 Method           Variances        DF     t Value    Pr > |t|

                 Pooled           Equal             8        1.06      0.3211
                 Satterthwaite    Unequal      7.7852        1.06      0.3220

                                    Equality of Variances

                      Method       Num DF     Den DF     F Value     Pr > F

                      Folded F          4          4        1.40     0.7531
```

```
------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0021 ------------

                                    The TTEST Procedure

                                     Variable:  Result

         group           N          Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02           5        1.5064       0.1439       0.0644       1.2490       1.5708
         Test            5        1.3818       0.1830       0.0818       1.1731       1.5708
         Diff (1-2)               0.1246       0.1646       0.1041

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            1.5064      1.3278   1.6851      0.1439      0.0862   0.4135
 Test                             1.3818      1.1546   1.6090      0.1830      0.1096   0.5259
 Diff (1-2)    Pooled             0.1246     -0.1154   0.3647      0.1646      0.1112   0.3154
 Diff (1-2)    Satterthwaite      0.1246     -0.1178   0.3671

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8       1.20      0.2655
                 Satterthwaite    Unequal      7.5783       1.20      0.2673

                                   Equality of Variances

                      Method      Num DF     Den DF     F Value    Pr > F

                      Folded F         4          4        1.62    0.6527
```

```
                          T-test Results, This is a 2-tailed result
                              See Summary Page for 1-tail Result
                                                                 13:10 Monday, September 2, 2013

------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0001 -------

                                      The TTEST Procedure

                                       Variable:  Result

          group           N         Mean      Std Dev      Std Err      Minimum      Maximum

          CR-02           5       0.2924       0.0835       0.0373       0.1951       0.4194
          Test            5       0.4650       0.0591       0.0265       0.3925       0.5527
          Diff (1-2)             -0.1725       0.0723       0.0458

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.2924      0.1888   0.3961      0.0835      0.0500   0.2399
 Test                             0.4650      0.3915   0.5384      0.0591      0.0354   0.1700
 Diff (1-2)    Pooled            -0.1725     -0.2781  -0.0670      0.0723      0.0489   0.1386
 Diff (1-2)    Satterthwaite     -0.1725     -0.2801  -0.0650

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -3.77      0.0055
                  Satterthwaite    Unequal      7.2071      -3.77      0.0066

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.99    0.5207
```

```
                  T-test Results, This is a 2-tailed result
                      See Summary Page for 1-tail Result
                                               13:10 Monday, September 2, 2013

------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0002 -------

                                The TTEST Procedure

                                 Variable:  Result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02           5       0.2924       0.0835       0.0373       0.1951       0.4194
         Test            5       0.4898       0.0631       0.0282       0.4061       0.5554
         Diff (1-2)             -0.1973       0.0740       0.0468

group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

CR-02                            0.2924      0.1888   0.3961      0.0835      0.0500   0.2399
Test                             0.4898      0.4115   0.5681      0.0631      0.0378   0.1812
Diff (1-2)    Pooled            -0.1973     -0.3052  -0.0894      0.0740      0.0500   0.1417
Diff (1-2)    Satterthwaite     -0.1973     -0.3067  -0.0880

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8      -4.22      0.0029
                 Satterthwaite    Unequal      7.4438      -4.22      0.0034

                               Equality of Variances

                      Method       Num DF     Den DF     F Value    Pr > F

                      Folded F          4          4        1.75    0.6002
```

```
                         T-test Results, This is a 2-tailed result
                             See Summary Page for 1-tail Result
                                                            13:10 Monday, September 2, 2013

------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0005 -------

                                   The TTEST Procedure

                                    Variable:  Result

         group          N        Mean     Std Dev     Std Err     Minimum     Maximum

         CR-02          5      0.2924      0.0835      0.0373      0.1951      0.4194
         Test           5      0.5836      0.0537      0.0240      0.5176      0.6389
         Diff (1-2)           -0.2912      0.0702      0.0444

 group         Method              Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                           0.2924      0.1888    0.3961      0.0835      0.0500    0.2399
 Test                            0.5836      0.5170    0.6502      0.0537      0.0322    0.1542
 Diff (1-2)    Pooled           -0.2912     -0.3935   -0.1888      0.0702      0.0474    0.1344
 Diff (1-2)    Satterthwaite    -0.2912     -0.3967   -0.1857

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8      -6.56      0.0002
                 Satterthwaite    Unequal      6.8233      -6.56      0.0004

                                  Equality of Variances

                      Method       Num DF     Den DF     F Value    Pr > F

                      Folded F          4          4        2.42    0.4129
```

```
------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0006 -------

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean      Std Dev      Std Err      Minimum      Maximum

          CR-02          5      0.2924       0.0835       0.0373       0.1951       0.4194
          Test           5      0.6460       0.0522       0.0233       0.5992       0.7292
          Diff (1-2)           -0.3535       0.0696       0.0440

 group         Method                 Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                               0.2924      0.1888    0.3961      0.0835      0.0500    0.2399
 Test                                0.6460      0.5812    0.7108      0.0522      0.0313    0.1500
 Diff (1-2)    Pooled               -0.3535     -0.4551   -0.2520      0.0696      0.0470    0.1334
 Diff (1-2)    Satterthwaite        -0.3535     -0.4586   -0.2485

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -8.03      <.0001
                  Satterthwaite    Unequal       6.712      -8.03      0.0001

                                     Equality of Variances

                       Method       Num DF     Den DF     F Value    Pr > F

                       Folded F          4          4        2.56    0.3850
```

```
                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
                                                            13:10 Monday, September 2, 2013

------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0007 -------

                                  The TTEST Procedure

                                   Variable:  Result

         group          N        Mean     Std Dev     Std Err     Minimum     Maximum

         CR-02          5      0.2924      0.0835      0.0373      0.1951      0.4194
         Test           5      0.5718      0.0661      0.0296      0.4942      0.6307
         Diff (1-2)           -0.2794      0.0753      0.0476

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.2924      0.1888    0.3961     0.0835      0.0500    0.2399
 Test                             0.5718      0.4898    0.6539     0.0661      0.0396    0.1899
 Diff (1-2)    Pooled            -0.2794     -0.3892   -0.1696     0.0753      0.0509    0.1442
 Diff (1-2)    Satterthwaite     -0.2794     -0.3902   -0.1686

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8      -5.87      0.0004
                 Satterthwaite    Unequal      7.5995      -5.87      0.0005

                                 Equality of Variances

                      Method      Num DF    Den DF    F Value    Pr > F

                      Folded F         4         4       1.60    0.6617
```

```
                          T-test Results, This is a 2-tailed result
                              See Summary Page for 1-tail Result
                                                                13:10 Monday, September 2, 2013

------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0008 -------

                                     The TTEST Procedure

                                      Variable:  Result

         group          N         Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02          5       0.2924       0.0835       0.0373       0.1951       0.4194
         Test           5       0.5286       0.0650       0.0291       0.4630       0.6157
         Diff (1-2)            -0.2362       0.0748       0.0473

group         Method               Mean         95% CL Mean          Std Dev       95% CL Std Dev

CR-02                            0.2924       0.1888    0.3961       0.0835       0.0500    0.2399
Test                             0.5286       0.4479    0.6093       0.0650       0.0389    0.1868
Diff (1-2)    Pooled            -0.2362      -0.3453   -0.1271       0.0748       0.0505    0.1433
Diff (1-2)    Satterthwaite     -0.2362      -0.3465   -0.1259

                  Method           Variances         DF     t Value    Pr > |t|

                  Pooled           Equal              8       -4.99      0.0011
                  Satterthwaite    Unequal       7.5463       -4.99      0.0013

                                    Equality of Variances

                       Method       Num DF     Den DF     F Value    Pr > F

                       Folded F          4          4        1.65    0.6396
```

```
                      T-test Results, This is a 2-tailed result
                          See Summary Page for 1-tail Result
                                                               13:10 Monday, September 2, 2013

------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0009 -------

                                      The TTEST Procedure

                                       Variable:  Result

          group           N         Mean      Std Dev      Std Err      Minimum      Maximum

          CR-02           5       0.2924       0.0835       0.0373       0.1951       0.4194
          Test            5       0.6065       0.0378       0.0169       0.5717       0.6613
          Diff (1-2)             -0.3140       0.0648       0.0410

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.2924      0.1888   0.3961      0.0835      0.0500   0.2399
 Test                             0.6065      0.5595   0.6535      0.0378      0.0227   0.1088
 Diff (1-2)    Pooled            -0.3140     -0.4086  -0.2195      0.0648      0.0438   0.1242
 Diff (1-2)    Satterthwaite     -0.3140     -0.4162  -0.2119

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -7.66      <.0001
                  Satterthwaite    Unequal      5.5772      -7.66      0.0004

                                     Equality of Variances

                       Method       Num DF     Den DF     F Value    Pr > F

                       Folded F          4          4        4.87    0.1545
```

```
------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0010 -------

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      0.2924      0.0835      0.0373      0.1951      0.4194
          Test           5      0.6325      0.0692      0.0310      0.5431      0.7333
          Diff (1-2)           -0.3400      0.0767      0.0485

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.2924      0.1888   0.3961      0.0835      0.0500   0.2399
 Test                             0.6325      0.5465   0.7184      0.0692      0.0415   0.1989
 Diff (1-2)    Pooled            -0.3400     -0.4519  -0.2282      0.0767      0.0518   0.1469
 Diff (1-2)    Satterthwaite     -0.3400     -0.4526  -0.2275

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -7.01      0.0001
                  Satterthwaite    Unequal      7.7343      -7.01      0.0001

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.46    0.7252
```

```
------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0011 -------

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      0.2924      0.0835      0.0373      0.1951      0.4194
          Test           5      0.4834      0.1121      0.0501      0.2911      0.5840
          Diff (1-2)           -0.1909      0.0989      0.0625

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.2924      0.1888   0.3961      0.0835      0.0500   0.2399
 Test                             0.4834      0.3441   0.6226      0.1121      0.0672   0.3222
 Diff (1-2)    Pooled            -0.1909     -0.3351  -0.0468      0.0989      0.0668   0.1894
 Diff (1-2)    Satterthwaite     -0.1909     -0.3372  -0.0447

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -3.05      0.0157
                  Satterthwaite    Unequal      7.3925      -3.05      0.0173

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.80    0.5818
```

```
------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0012 -------

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      0.2924      0.0835      0.0373      0.1951      0.4194
          Test           5      0.5956      0.0432      0.0193      0.5308      0.6519
          Diff (1-2)           -0.3031      0.0665      0.0420

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.2924      0.1888   0.3961      0.0835      0.0500   0.2399
 Test                             0.5956      0.5420   0.6492      0.0432      0.0259   0.1241
 Diff (1-2)    Pooled            -0.3031     -0.4001  -0.2062      0.0665      0.0449   0.1273
 Diff (1-2)    Satterthwaite     -0.3031     -0.4060  -0.2003

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -7.21      <.0001
                  Satterthwaite    Unequal      5.9964      -7.21      0.0004

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       3.74    0.2295
```

```
                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
                                                  13:10 Monday, September 2, 2013

------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0013 -------

                                 The TTEST Procedure

                                  Variable:  Result

         group          N        Mean     Std Dev     Std Err     Minimum     Maximum

         CR-02          5      0.2924      0.0835      0.0373      0.1951      0.4194
         Test           5      0.5409      0.0729      0.0326      0.4579      0.6212
         Diff (1-2)           -0.2485      0.0784      0.0496

group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

CR-02                            0.2924      0.1888    0.3961      0.0835      0.0500    0.2399
Test                             0.5409      0.4504    0.6314      0.0729      0.0437    0.2095
Diff (1-2)    Pooled            -0.2485     -0.3628   -0.1342      0.0784      0.0529    0.1501
Diff (1-2)    Satterthwaite     -0.2485     -0.3632   -0.1338

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8      -5.01      0.0010
                 Satterthwaite    Unequal       7.857      -5.01      0.0011

                                Equality of Variances

                      Method       Num DF     Den DF     F Value    Pr > F

                      Folded F          4          4        1.31    0.7988
```

```
------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0014 -------

                                     The TTEST Procedure

                                      Variable:  Result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02           5       0.2924       0.0835       0.0373       0.1951       0.4194
         Test            5       0.5386       0.0572       0.0256       0.4648       0.6204
         Diff (1-2)             -0.2461       0.0716       0.0453

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.2924      0.1888    0.3961      0.0835      0.0500    0.2399
 Test                             0.5386      0.4676    0.6096      0.0572      0.0343    0.1643
 Diff (1-2)    Pooled            -0.2461     -0.3505   -0.1418      0.0716      0.0483    0.1371
 Diff (1-2)    Satterthwaite     -0.2461     -0.3529   -0.1394

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8      -5.44      0.0006
                 Satterthwaite    Unequal      7.0751      -5.44      0.0009

                                    Equality of Variances

                      Method      Num DF    Den DF    F Value    Pr > F

                      Folded F         4         4       2.13    0.4813
```

```
------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0015 -------

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      0.2924      0.0835      0.0373      0.1951      0.4194
          Test           5      0.4820      0.1025      0.0458      0.3725      0.5935
          Diff (1-2)           -0.1896      0.0935      0.0591

 group        Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                           0.2924      0.1888   0.3961      0.0835      0.0500   0.2399
 Test                            0.4820      0.3547   0.6093      0.1025      0.0614   0.2946
 Diff (1-2)    Pooled           -0.1896     -0.3259  -0.0532      0.0935      0.0631   0.1791
 Diff (1-2)    Satterthwaite    -0.1896     -0.3269  -0.0523

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -3.21      0.0125
                  Satterthwaite    Unequal      7.6853      -3.21      0.0132

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.51    0.7006
```

```
------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0017 -------

                                      The TTEST Procedure

                                       Variable:  Result

          group           N         Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02           5       0.2924      0.0835      0.0373      0.1951      0.4194
          Test            5       0.6416      0.0456      0.0204      0.5870      0.7032
          Diff (1-2)             -0.3491      0.0673      0.0425

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.2924      0.1888    0.3961     0.0835      0.0500    0.2399
 Test                             0.6416      0.5849    0.6982     0.0456      0.0273    0.1310
 Diff (1-2)    Pooled            -0.3491     -0.4472   -0.2510     0.0673      0.0454    0.1289
 Diff (1-2)    Satterthwaite     -0.3491     -0.4525   -0.2458

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -8.21      <.0001
                  Satterthwaite    Unequal      6.1916      -8.21      0.0001

                                     Equality of Variances

                       Method      Num DF     Den DF     F Value    Pr > F

                       Folded F         4          4        3.35    0.2683
```

```
------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0018 -------

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      0.2924      0.0835      0.0373      0.1951      0.4194
          Test           5      0.5772      0.0870      0.0389      0.4683      0.7062
          Diff (1-2)           -0.2847      0.0852      0.0539

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.2924      0.1888   0.3961      0.0835      0.0500   0.2399
 Test                             0.5772      0.4692   0.6852      0.0870      0.0521   0.2499
 Diff (1-2)    Pooled            -0.2847     -0.4091  -0.1604      0.0852      0.0576   0.1633
 Diff (1-2)    Satterthwaite     -0.2847     -0.4091  -0.1604

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -5.28      0.0007
                  Satterthwaite    Unequal      7.9867      -5.28      0.0007

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.09    0.9388
```

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                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
                                                       13:10 Monday, September 2, 2013

------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0019 -------

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      0.2924      0.0835      0.0373      0.1951      0.4194
          Test           5      0.5671      0.0863      0.0386      0.4789      0.6745
          Diff (1-2)           -0.2747      0.0849      0.0537

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.2924      0.1888   0.3961      0.0835      0.0500   0.2399
 Test                             0.5671      0.4599   0.6743      0.0863      0.0517   0.2481
 Diff (1-2)    Pooled            -0.2747     -0.3986  -0.1509      0.0849      0.0574   0.1627
 Diff (1-2)    Satterthwaite     -0.2747     -0.3986  -0.1508

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8      -5.11      0.0009
                 Satterthwaite    Unequal       7.991      -5.11      0.0009

                                     Equality of Variances

                      Method      Num DF     Den DF     F Value    Pr > F

                      Folded F         4          4        1.07    0.9498
```

```
                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
                                                    13:10 Monday, September 2, 2013

------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0020 -------

                               The TTEST Procedure

                               Variable:  Result

         group          N       Mean     Std Dev     Std Err     Minimum     Maximum

         CR-02          5     0.2924      0.0835      0.0373      0.1951      0.4194
         Test           5     0.5515      0.0684      0.0306      0.4485      0.6151
         Diff (1-2)          -0.2591      0.0763      0.0483

group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

CR-02                            0.2924      0.1888   0.3961      0.0835      0.0500   0.2399
Test                             0.5515      0.4666   0.6364      0.0684      0.0410   0.1965
Diff (1-2)    Pooled            -0.2591     -0.3704  -0.1478      0.0763      0.0515   0.1462
Diff (1-2)    Satterthwaite     -0.2591     -0.3711  -0.1471

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8      -5.37      0.0007
                 Satterthwaite    Unequal      7.7005      -5.37      0.0008

                              Equality of Variances

                      Method      Num DF    Den DF    F Value    Pr > F

                      Folded F         4         4       1.49    0.7080
```

```
------- Test=Neanthes arenaceodentata Endpoint=AFDW Growth (mg/ind/day) Treatment=SD0021 -------

                                      The TTEST Procedure

                                       Variable:  Result

          group           N         Mean      Std Dev      Std Err      Minimum      Maximum

          CR-02           5       0.2924       0.0835       0.0373       0.1951       0.4194
          Test            5       0.6165       0.0379       0.0169       0.5523       0.6450
          Diff (1-2)             -0.3240       0.0648       0.0410

 group          Method                  Mean         95% CL Mean         Std Dev       95% CL Std Dev

 CR-02                                0.2924       0.1888    0.3961       0.0835       0.0500    0.2399
 Test                                 0.6165       0.5694    0.6635       0.0379       0.0227    0.1089
 Diff (1-2)     Pooled               -0.3240      -0.4186   -0.2295       0.0648       0.0438    0.1242
 Diff (1-2)     Satterthwaite        -0.3240      -0.4262   -0.2219

                  Method           Variances        DF     t Value    Pr > |t|

                  Pooled           Equal             8       -7.90      <.0001
                  Satterthwaite    Unequal      5.5808       -7.90      0.0003

                                     Equality of Variances

                       Method       Num DF     Den DF     F Value    Pr > F

                       Folded F          4          4        4.85    0.1551
```

```
                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
                                                            13:10 Monday, September 2, 2013

------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0001 ------

                                The TTEST Procedure

                                 Variable:  Result

         group          N        Mean     Std Dev     Std Err     Minimum     Maximum

         CR-02          5      0.4171      0.1005      0.0450      0.3058      0.5662
         Test           5      0.5672      0.0769      0.0344      0.4779      0.6850
         Diff (1-2)           -0.1501      0.0895      0.0566

group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

CR-02                            0.4171      0.2923   0.5419      0.1005      0.0602   0.2889
Test                             0.5672      0.4716   0.6627      0.0769      0.0461   0.2211
Diff (1-2)    Pooled            -0.1501     -0.2806  -0.0195      0.0895      0.0605   0.1715
Diff (1-2)    Satterthwaite     -0.1501     -0.2822  -0.0179

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8      -2.65      0.0292
                 Satterthwaite    Unequal       7.488      -2.65      0.0310

                               Equality of Variances

                      Method      Num DF    Den DF    F Value    Pr > F

                      Folded F         4         4       1.71    0.6167
```

```
                           T-test Results, This is a 2-tailed result
                               See Summary Page for 1-tail Result
                                                                 13:10 Monday, September 2, 2013

------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0002 ------

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      0.4171      0.1005      0.0450      0.3058      0.5662
          Test           5      0.5979      0.0694      0.0310      0.5116      0.6847
          Diff (1-2)           -0.1808      0.0864      0.0546

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.4171      0.2923   0.5419      0.1005      0.0602   0.2889
 Test                             0.5979      0.5118   0.6840      0.0694      0.0416   0.1993
 Diff (1-2)    Pooled            -0.1808     -0.3068  -0.0549      0.0864      0.0583   0.1655
 Diff (1-2)    Satterthwaite     -0.1808     -0.3096  -0.0521

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -3.31      0.0107
                  Satterthwaite    Unequal      7.1037      -3.31      0.0127

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       2.10    0.4896
```

```
------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0005 ------

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      0.4171      0.1005      0.0450      0.3058      0.5662
          Test           5      0.7008      0.0786      0.0351      0.5936      0.7915
          Diff (1-2)           -0.2837      0.0902      0.0571

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.4171      0.2923   0.5419      0.1005      0.0602   0.2889
 Test                             0.7008      0.6033   0.7984      0.0786      0.0471   0.2257
 Diff (1-2)    Pooled            -0.2837     -0.4153  -0.1521      0.0902      0.0609   0.1728
 Diff (1-2)    Satterthwaite     -0.2837     -0.4167  -0.1508

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -4.97      0.0011
                  Satterthwaite    Unequal      7.5579      -4.97      0.0013

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.64    0.6443
```

```
                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
                                                              13:10 Monday, September 2, 2013

------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0006 ------

                                  The TTEST Procedure

                                  Variable:  Result

         group           N         Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02           5       0.4171       0.1005       0.0450       0.3058       0.5662
         Test            5       0.7637       0.0640       0.0286       0.7096       0.8700
         Diff (1-2)             -0.3466       0.0843       0.0533

group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

CR-02                            0.4171      0.2923   0.5419      0.1005      0.0602   0.2889
Test                             0.7637      0.6842   0.8431      0.0640      0.0383   0.1839
Diff (1-2)    Pooled            -0.3466     -0.4695  -0.2237      0.0843      0.0569   0.1615
Diff (1-2)    Satterthwaite     -0.3466     -0.4734  -0.2197

                 Method           Variances        DF     t Value    Pr > |t|

                 Pooled           Equal             8       -6.50      0.0002
                 Satterthwaite    Unequal      6.7839       -6.50      0.0004

                                Equality of Variances

                      Method        Num DF     Den DF     F Value    Pr > F

                      Folded F           4          4        2.47    0.4029
```

```
------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0007 ------

                                      The TTEST Procedure

                                       Variable:  Result

          group          N         Mean      Std Dev      Std Err      Minimum      Maximum

          CR-02          5       0.4171       0.1005       0.0450       0.3058       0.5662
          Test           5       0.6854       0.0872       0.0390       0.5869       0.7794
          Diff (1-2)           -0.2683       0.0941       0.0595

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                             0.4171      0.2923   0.5419      0.1005      0.0602   0.2889
 Test                              0.6854      0.5772   0.7936      0.0872      0.0522   0.2505
 Diff (1-2)    Pooled             -0.2683     -0.4055  -0.1311      0.0941      0.0636   0.1803
 Diff (1-2)    Satterthwaite      -0.2683     -0.4060  -0.1306

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -4.51      0.0020
                  Satterthwaite    Unequal      7.8421      -4.51      0.0021

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.33    0.7886
```

```
------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0008 ------

                                    The TTEST Procedure

                                     Variable:  Result

         group           N          Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02           5        0.4171       0.1005       0.0450       0.3058       0.5662
         Test            5        0.6274       0.0889       0.0398       0.5379       0.7470
         Diff (1-2)              -0.2103       0.0949       0.0600

group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

CR-02                            0.4171      0.2923   0.5419      0.1005      0.0602   0.2889
Test                             0.6274      0.5170   0.7378      0.0889      0.0533   0.2555
Diff (1-2)    Pooled            -0.2103     -0.3488  -0.0719      0.0949      0.0641   0.1818
Diff (1-2)    Satterthwaite     -0.2103     -0.3491  -0.0716

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8      -3.50      0.0080
                 Satterthwaite    Unequal      7.8822      -3.50      0.0082

                                   Equality of Variances

                      Method      Num DF    Den DF    F Value    Pr > F

                      Folded F         4         4       1.28    0.8176
```

```
------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0009 ------

                                      The TTEST Procedure

                                       Variable:  Result

          group          N         Mean      Std Dev      Std Err      Minimum      Maximum

          CR-02          5       0.4171       0.1005       0.0450       0.3058       0.5662
          Test           5       0.7158       0.0389       0.0174       0.6705       0.7624
          Diff (1-2)            -0.2987       0.0762       0.0482

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.4171      0.2923   0.5419      0.1005      0.0602   0.2889
 Test                             0.7158      0.6675   0.7641      0.0389      0.0233   0.1117
 Diff (1-2)    Pooled            -0.2987     -0.4099  -0.1875      0.0762      0.0515   0.1460
 Diff (1-2)    Satterthwaite     -0.2987     -0.4214  -0.1760

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -6.20      0.0003
                  Satterthwaite    Unequal      5.1692      -6.20      0.0014

                                     Equality of Variances

                       Method       Num DF    Den DF    F Value    Pr > F

                       Folded F          4         4       6.69    0.0926
```

```
------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0010 ------

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      0.4171      0.1005      0.0450      0.3058      0.5662
          Test           5      0.7521      0.0740      0.0331      0.6589      0.8574
          Diff (1-2)           -0.3350      0.0883      0.0558

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.4171      0.2923   0.5419      0.1005      0.0602   0.2889
 Test                             0.7521      0.6602   0.8440      0.0740      0.0443   0.2127
 Diff (1-2)    Pooled            -0.3350     -0.4637  -0.2062      0.0883      0.0596   0.1691
 Diff (1-2)    Satterthwaite     -0.3350     -0.4657  -0.2042

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -6.00      0.0003
                  Satterthwaite    Unequal      7.3513      -6.00      0.0004

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.85    0.5675
```

```
                          T-test Results, This is a 2-tailed result
                              See Summary Page for 1-tail Result
                                                                13:10 Monday, September 2, 2013

------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0011 ------

                                     The TTEST Procedure

                                      Variable:  Result

         group          N         Mean      Std Dev      Std Err      Minimum      Maximum

         CR-02          5       0.4171       0.1005       0.0450       0.3058       0.5662
         Test           5       0.5815       0.1364       0.0610       0.3420       0.6841
         Diff (1-2)            -0.1644       0.1198       0.0758

group         Method                Mean       95% CL Mean         Std Dev       95% CL Std Dev

CR-02                             0.4171      0.2923    0.5419      0.1005       0.0602    0.2889
Test                              0.5815      0.4121    0.7508      0.1364       0.0817    0.3919
Diff (1-2)    Pooled             -0.1644     -0.3391    0.0104      0.1198       0.0809    0.2295
Diff (1-2)    Satterthwaite      -0.1644     -0.3418    0.0131

                 Method           Variances        DF     t Value     Pr > |t|

                 Pooled           Equal             8       -2.17       0.0619
                 Satterthwaite    Unequal      7.3569       -2.17       0.0648

                                    Equality of Variances

                      Method       Num DF     Den DF     F Value     Pr > F

                      Folded F          4          4        1.84     0.5694
```

```
------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0012 ------

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean      Std Dev      Std Err      Minimum      Maximum

          CR-02          5      0.4171       0.1005       0.0450       0.3058       0.5662
          Test           5      0.7165       0.0424       0.0190       0.6455       0.7586
          Diff (1-2)           -0.2994       0.0772       0.0488

 group         Method               Mean      95% CL Mean       Std Dev      95% CL Std Dev

 CR-02                            0.4171      0.2923   0.5419     0.1005      0.0602   0.2889
 Test                             0.7165      0.6638   0.7691     0.0424      0.0254   0.1218
 Diff (1-2)    Pooled            -0.2994     -0.4119  -0.1868     0.0772      0.0521   0.1478
 Diff (1-2)    Satterthwaite     -0.2994     -0.4222  -0.1765

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -6.13      0.0003
                  Satterthwaite    Unequal       5.379      -6.13      0.0013

                                     Equality of Variances

                       Method      Num DF     Den DF     F Value     Pr > F

                       Folded F         4          4        5.62     0.1230
```

```
------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0013 ------

                                     The TTEST Procedure

                                      Variable:  Result

         group          N        Mean     Std Dev     Std Err     Minimum     Maximum

         CR-02          5      0.4171      0.1005      0.0450      0.3058      0.5662
         Test           5      0.6672      0.0786      0.0351      0.5808      0.7558
         Diff (1-2)           -0.2501      0.0902      0.0571

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.4171      0.2923   0.5419      0.1005      0.0602   0.2889
 Test                             0.6672      0.5696   0.7647      0.0786      0.0471   0.2258
 Diff (1-2)    Pooled            -0.2501     -0.3817  -0.1185      0.0902      0.0609   0.1729
 Diff (1-2)    Satterthwaite     -0.2501     -0.3830  -0.1172

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8      -4.38      0.0023
                 Satterthwaite    Unequal       7.558      -4.38      0.0027

                                    Equality of Variances

                      Method      Num DF    Den DF    F Value    Pr > F

                      Folded F         4         4       1.64    0.6443
```

```
------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0014 ------

                                     The TTEST Procedure

                                      Variable:  Result

         group           N        Mean     Std Dev     Std Err     Minimum     Maximum

         CR-02           5      0.4171      0.1005      0.0450      0.3058      0.5662
         Test            5      0.6597      0.0794      0.0355      0.5519      0.7641
         Diff (1-2)            -0.2426      0.0906      0.0573

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.4171      0.2923   0.5419      0.1005      0.0602   0.2889
 Test                             0.6597      0.5611   0.7582      0.0794      0.0476   0.2281
 Diff (1-2)    Pooled            -0.2426     -0.3747  -0.1105      0.0906      0.0612   0.1735
 Diff (1-2)    Satterthwaite     -0.2426     -0.3759  -0.1092

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8      -4.23      0.0029
                 Satterthwaite    Unequal      7.5912      -4.23      0.0032

                                    Equality of Variances

                      Method      Num DF    Den DF    F Value    Pr > F

                      Folded F         4         4       1.60    0.6582
```

```
                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
                                                  13:10 Monday, September 2, 2013

------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0015 ------

                                  The TTEST Procedure

                                   Variable:  Result

          group          N        Mean      Std Dev      Std Err      Minimum      Maximum

          CR-02          5      0.4171       0.1005       0.0450       0.3058       0.5662
          Test           5      0.6382       0.1197       0.0535       0.5174       0.7697
          Diff (1-2)           -0.2211       0.1106       0.0699

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.4171      0.2923   0.5419      0.1005      0.0602   0.2889
 Test                             0.6382      0.4895   0.7869      0.1197      0.0717   0.3441
 Diff (1-2)    Pooled            -0.2211     -0.3824  -0.0599      0.1106      0.0747   0.2118
 Diff (1-2)    Satterthwaite     -0.2211     -0.3832  -0.0590

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -3.16      0.0133
                  Satterthwaite    Unequal      7.7678      -3.16      0.0139

                                 Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.42    0.7432
```

```
------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0017 ------

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      0.4171      0.1005      0.0450      0.3058      0.5662
          Test           5      0.7865      0.0611      0.0273      0.7316      0.8750
          Diff (1-2)           -0.3694      0.0832      0.0526

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.4171      0.2923   0.5419      0.1005      0.0602   0.2889
 Test                             0.7865      0.7107   0.8623      0.0611      0.0366   0.1755
 Diff (1-2)    Pooled            -0.3694     -0.4907  -0.2481      0.0832      0.0562   0.1594
 Diff (1-2)    Satterthwaite     -0.3694     -0.4954  -0.2435

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -7.02      0.0001
                  Satterthwaite    Unequal      6.5976      -7.02      0.0003

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       2.71    0.3574
```

```
------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0018 ------

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      0.4171      0.1005      0.0450      0.3058      0.5662
          Test           5      0.7441      0.1028      0.0460      0.6036      0.8600
          Diff (1-2)           -0.3270      0.1017      0.0643

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.4171      0.2923   0.5419      0.1005      0.0602   0.2889
 Test                             0.7441      0.6164   0.8717      0.1028      0.0616   0.2954
 Diff (1-2)    Pooled            -0.3270     -0.4753  -0.1787      0.1017      0.0687   0.1948
 Diff (1-2)    Satterthwaite     -0.3270     -0.4753  -0.1787

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -5.08      0.0009
                  Satterthwaite    Unequal      7.9961      -5.08      0.0009

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.05    0.9668
```

```
                           T-test Results, This is a 2-tailed result
                               See Summary Page for 1-tail Result
                                                                 13:10 Monday, September 2, 2013

------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0019 ------

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev     Std Err     Minimum     Maximum

          CR-02          5      0.4171      0.1005      0.0450      0.3058      0.5662
          Test           5      0.7330      0.1287      0.0576      0.6042      0.9031
          Diff (1-2)           -0.3159      0.1155      0.0730

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.4171      0.2923   0.5419      0.1005      0.0602   0.2889
 Test                             0.7330      0.5732   0.8928      0.1287      0.0771   0.3698
 Diff (1-2)    Pooled            -0.3159     -0.4843  -0.1475      0.1155      0.0780   0.2212
 Diff (1-2)    Satterthwaite     -0.3159     -0.4861  -0.1458

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -4.33      0.0025
                  Satterthwaite    Unequal      7.5574      -4.33      0.0029

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.64    0.6441
```

```
------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0020 ------

                                      The TTEST Procedure

                                       Variable:  Result

          group          N        Mean     Std Dev      Std Err      Minimum      Maximum

          CR-02          5      0.4171      0.1005       0.0450       0.3058       0.5662
          Test           5      0.7124      0.0874       0.0391       0.5713       0.7929
          Diff (1-2)           -0.2953      0.0942       0.0596

 group         Method                     Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                                  0.4171      0.2923   0.5419      0.1005      0.0602   0.2889
 Test                                   0.7124      0.6039   0.8208      0.0874      0.0523   0.2510
 Diff (1-2)    Pooled                  -0.2953     -0.4326  -0.1579      0.0942      0.0636   0.1804
 Diff (1-2)    Satterthwaite           -0.2953     -0.4331  -0.1575

                  Method           Variances        DF    t Value    Pr > |t|

                  Pooled           Equal             8      -4.96      0.0011
                  Satterthwaite    Unequal      7.8467      -4.96      0.0012

                                     Equality of Variances

                       Method      Num DF    Den DF    F Value    Pr > F

                       Folded F         4         4       1.32    0.7917
```

```
                    T-test Results, This is a 2-tailed result
                        See Summary Page for 1-tail Result
                                                        13:10 Monday, September 2, 2013

------ Test=Neanthes arenaceodentata Endpoint=Individual Growth Rate (mg Treatment=SD0021 ------

                                 The TTEST Procedure

                                  Variable:  Result

         group           N        Mean     Std Dev     Std Err     Minimum     Maximum

         CR-02           5      0.4171      0.1005      0.0450      0.3058      0.5662
         Test            5      0.7620      0.0407      0.0182      0.6910      0.7914
         Diff (1-2)            -0.3449      0.0767      0.0485

 group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

 CR-02                            0.4171      0.2923   0.5419      0.1005      0.0602   0.2889
 Test                             0.7620      0.7115   0.8125      0.0407      0.0244   0.1169
 Diff (1-2)    Pooled            -0.3449     -0.4568  -0.2330      0.0767      0.0518   0.1469
 Diff (1-2)    Satterthwaite     -0.3449     -0.4677  -0.2221

                Method           Variances        DF    t Value    Pr > |t|

                Pooled           Equal             8      -7.11      0.0001
                Satterthwaite    Unequal      5.2748      -7.11      0.0007

                                Equality of Variances

                    Method      Num DF     Den DF     F Value    Pr > F

                    Folded F         4          4        6.11    0.1075
```

```
---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0009 -----

                                     The NPAR1WAY Procedure

                        Wilcoxon Scores (Rank Sums) for Variable Result
                                 Classified by Variable group

                                  Sum of      Expected       Std Dev          Mean
             group       N        Scores      Under H0      Under H0         Score
             ─────────────────────────────────────────────────────────────────────
             CR-02       5          40.0         27.50      4.772607           8.0
             Test        5          15.0         27.50      4.772607           3.0

                              Average scores were used for ties.


                                   Wilcoxon Two-Sample Test

                                 Statistic             40.0000

                                 Normal Approximation
                                 Z                      2.5143
                                 One-Sided Pr >  Z      0.0060
                                 Two-Sided Pr > |Z|     0.0119

                                 t Approximation
                                 One-Sided Pr >  Z      0.0165
                                 Two-Sided Pr > |Z|     0.0331

                           Z includes a continuity correction of 0.5.


                                      Kruskal-Wallis Test

                                 Chi-Square             6.8598
                                 DF                          1
                                 Pr > Chi-Square        0.0088
```

```
---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0014 -----

                                     The NPAR1WAY Procedure

                        Wilcoxon Scores (Rank Sums) for Variable Result
                                 Classified by Variable group

                                  Sum of      Expected        Std Dev          Mean
             group       N        Scores      Under H0       Under H0         Score
             _____________________________________________________________________

             CR-02       5          38.0         27.50       4.772607          7.60
             Test        5          17.0         27.50       4.772607          3.40

                              Average scores were used for ties.


                                   Wilcoxon Two-Sample Test

                                 Statistic             38.0000

                                 Normal Approximation
                                 Z                      2.0953
                                 One-Sided Pr >  Z      0.0181
                                 Two-Sided Pr > |Z|     0.0361

                                 t Approximation
                                 One-Sided Pr >  Z      0.0328
                                 Two-Sided Pr > |Z|     0.0656

                           Z includes a continuity correction of 0.5.


                                      Kruskal-Wallis Test

                                 Chi-Square             4.8402
                                 DF                          1
                                 Pr > Chi-Square        0.0278
```

```
---- Test=Bivalve Development Batch 2 Endpoint=Percent Normal Development Treatment=SD0021 -----

                                     The NPAR1WAY Procedure

                        Wilcoxon Scores (Rank Sums) for Variable Result
                                 Classified by Variable group

                                  Sum of      Expected       Std Dev          Mean
             group       N        Scores      Under H0      Under H0         Score
             ---------------------------------------------------------------------
             CR-02       5          20.0         27.50      4.758034           4.0
             Test        5          35.0         27.50      4.758034           7.0

                              Average scores were used for ties.


                                   Wilcoxon Two-Sample Test

                                 Statistic             20.0000

                                 Normal Approximation
                                 Z                     -1.4712
                                 One-Sided Pr <  Z      0.0706
                                 Two-Sided Pr > |Z|     0.1412

                                 t Approximation
                                 One-Sided Pr <  Z      0.0877
                                 Two-Sided Pr > |Z|     0.1753

                           Z includes a continuity correction of 0.5.


                                      Kruskal-Wallis Test

                                 Chi-Square             2.4847
                                 DF                          1
                                 Pr > Chi-Square        0.1150
```

```
------------- Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0002 ------------

                                   The NPAR1WAY Procedure

                        Wilcoxon Scores (Rank Sums) for Variable Result
                                 Classified by Variable group

                                 Sum of      Expected       Std Dev          Mean
            group        N       Scores      Under H0      Under H0         Score
            ---------------------------------------------------------------------
            CR-02        5         30.0         27.50      3.890873           6.0
            Test         5         25.0         27.50      3.890873           5.0

                              Average scores were used for ties.


                                   Wilcoxon Two-Sample Test

                                 Statistic             30.0000

                                 Normal Approximation
                                 Z                      0.5140
                                 One-Sided Pr >  Z      0.3036
                                 Two-Sided Pr > |Z|     0.6072

                                 t Approximation
                                 One-Sided Pr >  Z      0.3098
                                 Two-Sided Pr > |Z|     0.6196

                           Z includes a continuity correction of 0.5.


                                      Kruskal-Wallis Test

                                 Chi-Square             0.4128
                                 DF                          1
                                 Pr > Chi-Square        0.5205
```

```
------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0006 ------------

                                   The NPAR1WAY Procedure

                        Wilcoxon Scores (Rank Sums) for Variable Result
                                 Classified by Variable group

                                  Sum of      Expected       Std Dev          Mean
             group        N       Scores      Under H0      Under H0         Score
             ---------------------------------------------------------------------
             CR-02        5         30.0         27.50      3.890873           6.0
             Test         5         25.0         27.50      3.890873           5.0

                              Average scores were used for ties.


                                  Wilcoxon Two-Sample Test

                                 Statistic             30.0000

                                 Normal Approximation
                                 Z                      0.5140
                                 One-Sided Pr >  Z      0.3036
                                 Two-Sided Pr > |Z|     0.6072

                                 t Approximation
                                 One-Sided Pr >  Z      0.3098
                                 Two-Sided Pr > |Z|     0.6196

                           Z includes a continuity correction of 0.5.


                                     Kruskal-Wallis Test

                                 Chi-Square             0.4128
                                 DF                          1
                                 Pr > Chi-Square        0.5205
```

```
------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0007 ------------

                                    The NPAR1WAY Procedure

                        Wilcoxon Scores (Rank Sums) for Variable Result
                                 Classified by Variable group

                                  Sum of      Expected       Std Dev          Mean
             group        N       Scores      Under H0      Under H0         Score
             ____________________________________________________________________

             CR-02        5        34.50         27.50      4.456581          6.90
             Test         5        20.50         27.50      4.456581          4.10

                              Average scores were used for ties.


                                   Wilcoxon Two-Sample Test

                                 Statistic             34.5000

                                 Normal Approximation
                                 Z                      1.4585
                                 One-Sided Pr >  Z      0.0723
                                 Two-Sided Pr > |Z|     0.1447

                                 t Approximation
                                 One-Sided Pr >  Z      0.0893
                                 Two-Sided Pr > |Z|     0.1787

                           Z includes a continuity correction of 0.5.


                                      Kruskal-Wallis Test

                                 Chi-Square             2.4671
                                 DF                          1
                                 Pr > Chi-Square        0.1162
```

```
------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0008 ------------

                                   The NPAR1WAY Procedure

                        Wilcoxon Scores (Rank Sums) for Variable Result
                                 Classified by Variable group

                                  Sum of      Expected       Std Dev          Mean
             group         N      Scores      Under H0      Under H0         Score
             ------------------------------------------------------------------------
             CR-02         5       27.50         27.50      3.333333          5.50
             Test          5       27.50         27.50      3.333333          5.50

                              Average scores were used for ties.


                                   Wilcoxon Two-Sample Test

                                 Statistic             27.5000

                                 Normal Approximation
                                 Z                      0.0000
                                 One-Sided Pr <  Z      0.5000
                                 Two-Sided Pr > |Z|     1.0000

                                 t Approximation
                                 One-Sided Pr <  Z      0.5000
                                 Two-Sided Pr > |Z|     1.0000

                           Z includes a continuity correction of 0.5.


                                      Kruskal-Wallis Test

                                 Chi-Square             0.0000
                                 DF                          1
                                 Pr > Chi-Square        1.0000
```

```
------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0009 ------------

                                   The NPAR1WAY Procedure

                        Wilcoxon Scores (Rank Sums) for Variable Result
                                 Classified by Variable group

                               Sum of      Expected       Std Dev          Mean
             group       N     Scores      Under H0      Under H0         Score
             ____________________________________________________________________

             CR-02       5       27.0         27.50      3.354102          5.40
             Test        5       28.0         27.50      3.354102          5.60

                              Average scores were used for ties.


                                  Wilcoxon Two-Sample Test

                                 Statistic             27.0000

                                 Normal Approximation
                                 Z                      0.0000
                                 One-Sided Pr <  Z      0.5000
                                 Two-Sided Pr > |Z|     1.0000

                                 t Approximation
                                 One-Sided Pr <  Z      0.5000
                                 Two-Sided Pr > |Z|     1.0000

                           Z includes a continuity correction of 0.5.


                                     Kruskal-Wallis Test

                                 Chi-Square             0.0222
                                 DF                          1
                                 Pr > Chi-Square        0.8815
```

```
------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0010 ------------

                                     The NPAR1WAY Procedure

                        Wilcoxon Scores (Rank Sums) for Variable Result
                                 Classified by Variable group

                                  Sum of      Expected       Std Dev          Mean
             group       N        Scores      Under H0      Under H0         Score
             ---------------------------------------------------------------------
             CR-02       5          27.0         27.50      3.354102          5.40
             Test        5          28.0         27.50      3.354102          5.60

                              Average scores were used for ties.


                                   Wilcoxon Two-Sample Test

                                 Statistic             27.0000

                                 Normal Approximation
                                 Z                      0.0000
                                 One-Sided Pr <  Z      0.5000
                                 Two-Sided Pr > |Z|     1.0000

                                 t Approximation
                                 One-Sided Pr <  Z      0.5000
                                 Two-Sided Pr > |Z|     1.0000

                           Z includes a continuity correction of 0.5.


                                      Kruskal-Wallis Test

                                 Chi-Square             0.0222
                                 DF                          1
                                 Pr > Chi-Square        0.8815
```

```
------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0013 ------------

                                  The NPAR1WAY Procedure

                        Wilcoxon Scores (Rank Sums) for Variable Result
                                 Classified by Variable group

                                  Sum of      Expected       Std Dev            Mean
             group        N       Scores      Under H0      Under H0           Score
             ---------------------------------------------------------------------
             CR-02        5         29.0         27.50      3.872983            5.80
             Test         5         26.0         27.50      3.872983            5.20

                              Average scores were used for ties.


                                 Wilcoxon Two-Sample Test

                                 Statistic             29.0000

                                 Normal Approximation
                                 Z                      0.2582
                                 One-Sided Pr >  Z      0.3981
                                 Two-Sided Pr > |Z|     0.7963

                                 t Approximation
                                 One-Sided Pr >  Z      0.4010
                                 Two-Sided Pr > |Z|     0.8021

                           Z includes a continuity correction of 0.5.


                                    Kruskal-Wallis Test

                                 Chi-Square             0.1500
                                 DF                          1
                                 Pr > Chi-Square        0.6985
```

```
------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0017 ------------

                                The NPAR1WAY Procedure

                     Wilcoxon Scores (Rank Sums) for Variable Result
                              Classified by Variable group

                                  Sum of      Expected       Std Dev          Mean
            group        N        Scores      Under H0      Under H0         Score
            ------------------------------------------------------------------------
            CR-02        5          29.0         27.50      3.872983          5.80
            Test         5          26.0         27.50      3.872983          5.20

                           Average scores were used for ties.


                                Wilcoxon Two-Sample Test

                              Statistic             29.0000

                              Normal Approximation
                              Z                      0.2582
                              One-Sided Pr >  Z      0.3981
                              Two-Sided Pr > |Z|     0.7963

                              t Approximation
                              One-Sided Pr >  Z      0.4010
                              Two-Sided Pr > |Z|     0.8021

                        Z includes a continuity correction of 0.5.


                                  Kruskal-Wallis Test

                              Chi-Square             0.1500
                              DF                          1
                              Pr > Chi-Square        0.6985
```

```
------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0019 ------------

                                    The NPAR1WAY Procedure

                       Wilcoxon Scores (Rank Sums) for Variable Result
                                Classified by Variable group

                                  Sum of      Expected       Std Dev          Mean
             group        N       Scores      Under H0      Under H0         Score
             ---------------------------------------------------------------------
             CR-02        5        35.50         27.50      4.472136          7.10
             Test         5        19.50         27.50      4.472136          3.90

                             Average scores were used for ties.


                                  Wilcoxon Two-Sample Test

                                Statistic             35.5000

                                Normal Approximation
                                Z                      1.6771
                                One-Sided Pr >  Z      0.0468
                                Two-Sided Pr > |Z|     0.0935

                                t Approximation
                                One-Sided Pr >  Z      0.0639
                                Two-Sided Pr > |Z|     0.1278

                          Z includes a continuity correction of 0.5.


                                     Kruskal-Wallis Test

                                Chi-Square             3.2000
                                DF                          1
                                Pr > Chi-Square        0.0736
```

```
------------- Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0020 ------------

                                    The NPAR1WAY Procedure

                        Wilcoxon Scores (Rank Sums) for Variable Result
                                 Classified by Variable group

                                  Sum of      Expected       Std Dev           Mean
             group         N      Scores      Under H0      Under H0          Score
             ---------------------------------------------------------------------
             CR-02         5        30.0         27.50      3.890873            6.0
             Test          5        25.0         27.50      3.890873            5.0

                              Average scores were used for ties.


                                   Wilcoxon Two-Sample Test

                                 Statistic             30.0000

                                 Normal Approximation
                                 Z                      0.5140
                                 One-Sided Pr >  Z      0.3036
                                 Two-Sided Pr > |Z|     0.6072

                                 t Approximation
                                 One-Sided Pr >  Z      0.3098
                                 Two-Sided Pr > |Z|     0.6196

                           Z includes a continuity correction of 0.5.


                                      Kruskal-Wallis Test

                                 Chi-Square             0.4128
                                 DF                          1
                                 Pr > Chi-Square        0.5205
```

```
                    T-test Results on Rankits, This is a 2-tailed result
                             See Summary Page for 1-tail Result
                                                                 13:10 Monday, September 2, 2013

------------ Test=Eohaustorius estuarius Endpoint=Percent Survival Treatment=SD0005 ------------

                                     The TTEST Procedure

                        Variable:  rankit  (Rank for Variable Result)

         group          N        Mean     Std Dev     Std Err     Minimum     Maximum

         CR-02          5     -0.1718      0.7685      0.3437     -1.5466      0.1718
         Test           5      0.1718           0           0      0.1718      0.1718
         Diff (1-2)           -0.3437      0.5434      0.3437

group         Method               Mean       95% CL Mean        Std Dev      95% CL Std Dev

CR-02                           -0.1718     -1.1261   0.7824      0.7685      0.4605   2.2084
Test                             0.1718      0.1718   0.1718           0           .        .
Diff (1-2)    Pooled            -0.3437     -1.1363   0.4489      0.5434      0.3671   1.0411
Diff (1-2)    Satterthwaite     -0.3437     -1.2980   0.6106

                 Method           Variances        DF    t Value    Pr > |t|

                 Pooled           Equal             8      -1.00      0.3466
                 Satterthwaite    Unequal           4      -1.00      0.3739

                                    Equality of Variances

                      Method       Num DF     Den DF     F Value    Pr > F

                      Folded F          4          4       Infty    <.0001
```

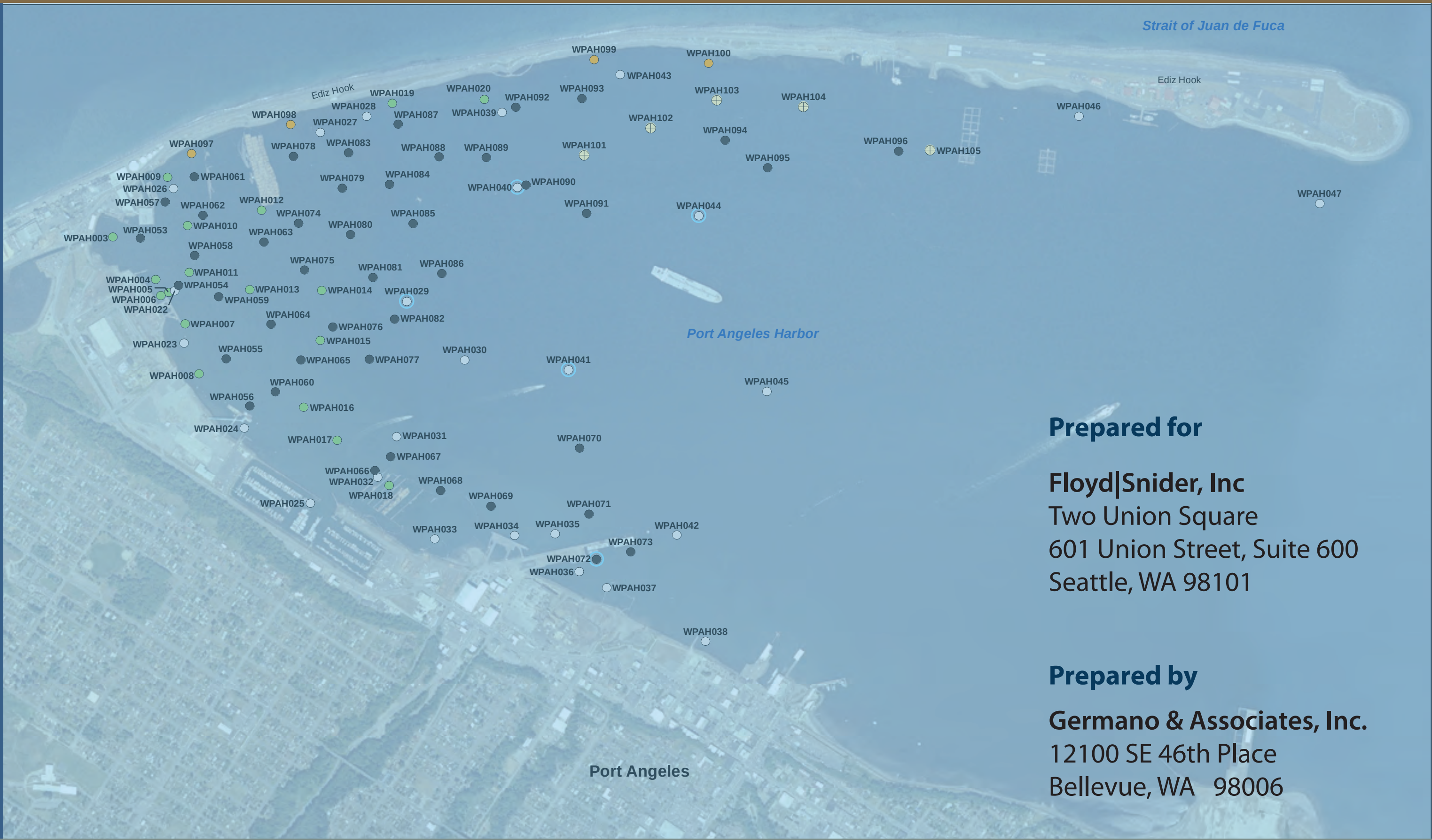
APPENDIX I

SEDIMENT PROFILE/PLAN VIEW IMAGING REPORT

January 2014

Sediment Profile Imaging Report

Port Angeles Harbor
Sediment Profile & Plan View Imaging Survey



Prepared for

Floyd|Snider, Inc
Two Union Square
601 Union Street, Suite 600
Seattle, WA 98101

Prepared by

Germano & Associates, Inc.
12100 SE 46th Place
Bellevue, WA 98006

Sediment Profile Imaging Report

PORT ANGELES HARBOR
SEDIMENT PROFILE & PLAN VIEW IMAGING SURVEY

Prepared for

Floyd|Snider, Inc
Two Union Square
601 Union Street, Suite 600
Seattle, WA 98101

Prepared by

Germano & Associates, Inc.
12100 SE 46th Place
Bellevue, WA 98006

January, 2014

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1.0
INTRODUCTION

As part of the investigations being done in Port Angeles for the Western Port Angeles Harbor Group (WPAHG), Germano & Associates, Inc. (G&A) performed a Sediment Profile and Plan View Imaging (SPI/PV) survey at selected locations in Port Angeles Harbor. The purpose of the SPI/PV survey was to characterize physical, chemical, and biological processes within the area of interest to provide the WPAHG with a more comprehensive description of the seafloor for the ongoing remedial investigation.

2.0
MATERIALS AND METHODS

Between July 15-18, 2013, scientists from G&A collected SPI/PV images aboard the R/V Kittiwake in Port Angeles Harbor. An Ocean Imaging Systems Model 3731 sediment profile camera was used for this survey; a total of 485 sediment profile images were collected at 100 stations (Figure 1) during the field sampling operations. Three of the stations sampled (KSS-1, KSS-2, KSS-3), whose results are included in this report, were sampled at the request of and paid for separately by the K Ply Site Remedial Investigation / Feasibility Study.

SPI was developed more than three decades ago as a rapid reconnaissance tool for characterizing physical, chemical, and biological seafloor processes and has been used in numerous seafloor surveys throughout North America, Asia, Europe, and Africa (Rhoads and Germano 1982, 1986, 1990; Revelas et al. 1987; Diaz and Schaffner, 1988; Valente et al. 1992; Germano et al. 2011). The sediment profile camera works like an inverted periscope. A Nikon D7000 16.2-megapixel SLR camera with two 16-gigabyte secure digital (SD) memory cards is mounted horizontally inside a watertight housing on top of a wedge-shaped prism. The prism has a Plexiglas® faceplate at the front with a mirror placed at a 45° angle at the back. The camera lens looks down at the mirror, which is reflecting the image from the faceplate. The prism has an internal strobe mounted inside at the back of the wedge to provide illumination for the image; this chamber is filled with distilled water, so the camera always has an optically clear path. This wedge assembly is mounted on a moveable carriage within a stainless steel frame. The frame is lowered to the seafloor on a winch wire, and the tension on the wire keeps the prism in its “up” position. When the frame comes to rest on the seafloor, the winch wire goes slack and the camera prism descends into the sediment at a slow, controlled rate by the dampening action of a hydraulic piston so as not to disturb the sediment-water interface. On the way down, it trips a trigger that activates a time-delay circuit of variable length (operator-selected) to allow the camera to penetrate the seafloor before any image is taken (Figure 2). The knife-sharp edge of the prism transects the sediment, and the prism penetrates the bottom. The strobe is discharged after an appropriate time delay to obtain a cross-sectional image of the upper 20 cm of the sediment column. The resulting images give the viewer the same perspective as looking through the side of an aquarium half-filled with sediment. After the first image is obtained at the first location, the camera is then raised up about 2 to 3 meters off the bottom to allow the strobe to recharge; a wiper blade mounted on the frame removes any mud adhering to the faceplate. The strobe recharges within 5 seconds, and the camera is ready to be lowered again for a replicate image. Surveys can be accomplished rapidly by “pogo-sticking” the camera across an area of seafloor while recording positional fixes on the surface vessel.

Two types of adjustments to the SPI system are typically made in the field: physical adjustments to the chassis stop collars or adding/subtracting lead weights to the chassis to control penetration in harder or softer sediments, and electronic software adjustments to the Nikon D7000 to control camera settings. Camera settings (f-stop, shutter speed, ISO equivalents, digital file format, color balance, etc.) are selectable through a water-tight USB port on the camera housing and Nikon Control Pro® software. At the beginning of the survey, the time on the sediment profile camera's internal data logger was synchronized with the internal clock on the computerized navigation system to local time. Details of the camera settings for each digital image are available in the associated parameters file embedded in the electronic image file; for this survey, the ISO-equivalent was set at 640. The additional camera settings used were as follows: shutter speed was 1/250, f9, white balance set to flash, color mode to Adobe RGB, sharpening to none, noise reduction off, and storage in compressed raw Nikon Electronic Format (NEF) files (approximately 20 MB each). Electronic files were converted to high-resolution jpeg (8-bit) format files (3264 x 4928 pixels) using Nikon Capture NX2® software (Version 2.2.7).

A minimum of four replicate images were taken at each station; each SPI replicate is identified by the time recorded on the digital image file in the camera and on disk along with vessel position on the navigation computer. The unique time stamp on the digital image was then cross-checked with the time stamp in the navigational system's computer data file. The field crew kept redundant written sample logs. Images were downloaded periodically (sometimes after each station) to verify successful sample acquisition or to assess what type of sediment/depositional layer was present at a particular station. Digital image files were re-named with the appropriate station name immediately after downloading on deck as a further quality assurance step.

Test exposures of the Kodak® Color Separation Guide (Publication No. Q-13) were made on deck at the beginning and end of each survey to verify that all internal electronic systems were working to design specifications and to provide a color standard against which final images could be checked for proper color balance. A spare camera and charged battery were carried in the field at all times to insure uninterrupted sample acquisition. After deployment of the camera at each station, the frame counter was checked to make sure that the requisite number of replicates had been taken. In addition, a prism penetration depth indicator on the camera frame was checked to verify that the optical prism had actually penetrated the bottom to a sufficient depth. If images were missed (frame counter indicator or verification from digital download) or the penetration depth was insufficient (penetration indicator), chassis stops were adjusted and/or weights were added or removed, and additional replicate images were taken. Changes in prism weight amounts, the presence or absence of mud doors, and chassis stop positions were recorded for each replicate image. Images were inspected at high magnification to determine whether any stations needed resampling with different stop collar or weight settings.

An Ocean Imaging Model DSC16000 plan-view underwater camera (PV) system with two Ocean Imaging Model 400-37 Deep Sea Scaling lasers mounted to the DSC16000 were attached to the sediment profile camera frame and used to collect plan-view photographs of the seafloor surface; both SPI and plan view images were collected during each "drop" of the system. The PV system consisted of Nikon D-7000 encased in a stainless steel housing with a domed glass port, a 24 VDC autonomous power pack, a 500W strobe, and a bounce trigger. A weight was attached to the bounce trigger with a stainless steel cable so that the weight hung below the camera frame; the scaling lasers project 2 red dots that are separated by a constant distance (26 cm) regardless of the field of view of the final image, which can be varied by increasing or decreasing the length of the trigger wire. As the camera apparatus was lowered to the seafloor, the weight attached to the bounce trigger contacted the seafloor prior to the camera frame hitting the bottom and triggered the PV (Figure 2). Details of the camera settings for each digital image are available in the associated parameters file embedded in each electronic image file; for this survey, the ISO-equivalent was set at 640. The additional camera settings used were as follows: shutter speed was 1/20, f16, white balance set to flash, color mode to Adobe RGB, sharpening to none, noise reduction off, and storage in compressed raw Nikon Electronic Format (NEF) files (approximately 20 MB each).

Prior to field operations, the internal clock in the digital PV was synchronized with the GPS navigation system and the SPI camera. Each PV image acquired was assigned a time stamp in the digital file and redundant notations in the field and navigation logs. Throughout the survey, PV images were downloaded at the same time as the sediment profile images after collection and evaluated for successful image acquisition and image clarity.

The ability of the PV to collect usable images was dependent on the clarity of the water column. To minimize the effects of turbid bottom waters, the bounce trigger cable was shortened as much as possible in order to decrease the distance between the camera focal plane and the seafloor (24"). By limiting the distance between the camera lens port and the intended subject, picture clarity was improved. One major drawback to the short trigger cable length and close distance between the PV and the seafloor was that the field of view of the PV system was decreased so that a smaller area of the seafloor was photographed. Even with the short trigger cable, details in many of the PV images were obscured due to the highly turbid bottom waters.

At the end of each sampling day, all images collected that particular day in the field were converted to Joint Photographic Experts Group (jpeg) files using maximum image compression to make files a reasonable size (less than 300 KB) for transmission over the internet to Mr. Eugene Revelas at Integral Consulting. Mr. Revelas conducted a daily morning review with a representative from the Department of Ecology (Mr. Peter Striplin) to determine if any additional sampling locations were warranted to further delineate the spatial extent any specific features of interest seen in the SPI or PV images.

Following completion of the field operations, the raw NEF image files were converted to high-resolution jpeg (8-bit) format files (3264 x 4928 pixels) using Nikon Capture NX2 software. Once converted to jpeg format, the intensity histogram (RGB channel) for each image was adjusted in Adobe Photoshop® to maximize contrast without distortion. The jpeg images were then imported to Sigmascan Pro® (Aspire Software International) for image calibration and analysis. Calibration information was determined by measuring 1-cm gradations from the Kodak® Color Separation Guide. This calibration information was applied to all SPI images analyzed. Linear and area measurements were recorded as number of pixels and converted to scientific units using the calibration information.

Measured parameters were recorded on a Microsoft Excel© spreadsheet. G&A's senior scientist (Dr. J. Germano) subsequently checked all these data as an independent quality assurance/quality control review of the measurements before final interpretation was performed.

2.1 MEASURING, INTERPRETING, AND MAPPING SPI PARAMETERS

2.1.1 Sediment Type

The sediment grain-size major mode and range were visually estimated from the color images by overlaying a grain-size comparator that was at the same scale. This comparator was prepared by photographing a series of Udden-Wentworth size classes (equal to or less than coarse silt up to granule and larger sizes) with the SPI camera. Seven grain-size classes were on this comparator: >4 ϕ (silt-clay), 4-3 ϕ (very fine sand), 3-2 ϕ (fine sand), 2 - 1 ϕ (medium sand), 1-0 ϕ (coarse sand), 0 - (-1) ϕ (very coarse sand), < -1 ϕ (granule and larger). The lower limit of optical resolution of the photographic system was about 62 microns, allowing recognition of grain sizes equal to or greater than coarse silt (≥ 4 ϕ). The accuracy of this method has been documented by comparing SPI estimates with grain-size statistics determined from laboratory sieve analyses (Germano et al. 2011).

The comparison of the SPI images with Udden-Wentworth sediment standards photographed through the SPI optical system was also used to map near-surface stratigraphy such as sand-over-mud and mud-over-sand. When mapped on a local scale, this stratigraphy can provide information on relative transport magnitude and frequency.

2.1.2 Prism Penetration Depth

The SPI prism penetration depth was measured from the bottom of the image to the sediment-water interface. The area of the entire cross-sectional sedimentary portion of the image was digitized, and this number was divided by the calibrated linear width of the image to determine the average penetration depth. Linear maximum and minimum depths of penetration were also measured. All three measurements (maximum, minimum, and average penetration depths) were recorded in the data file.

Prism penetration is a noteworthy parameter; if the number of weights used in the camera is held constant throughout a survey, the camera functions as a static-load penetrometer. Comparative penetration values from sites of similar grain size give an indication of the relative water content of the sediment. Highly bioturbated sediments and rapidly accumulating sediments tend to have the highest water contents and greatest prism penetration depths.

The depth of penetration also reflects the bearing capacity and shear strength of the sediments. Overconsolidated or relic sediments and shell-bearing sands resist camera penetration. Highly bioturbated, sulfitic, or methanogenic muds are the least consolidated, and deep penetration is typical. Seasonal changes in camera prism penetration have been observed at the same station in other studies and are related to the control of sediment geotechnical properties by bioturbation (Rhoads and Boyer 1982). The effect of water temperature on bioturbation rates appears to be important in controlling both biogenic surface relief and prism penetration depth (Rhoads and Germano 1982).

2.1.3 Small-Scale Surface Boundary Roughness

Surface boundary roughness was determined by measuring the vertical distance between the highest and lowest points of the sediment-water interface. The surface boundary roughness (sediment surface relief) measured over the width of sediment profile images typically ranges from 0.02 to 3.8 cm, and may be related to either physical structures (ripples, rip-up structures, mud clasts) or biogenic features (burrow openings, fecal mounds, foraging depressions). Biogenic roughness typically changes seasonally and is related to the interaction of bottom turbulence and bioturbational activities.

The camera must be level in order to take accurate boundary roughness measurements. In sandy sediments, boundary roughness can be a measure of sand wave height. On silt-clay bottoms, boundary roughness values often reflect biogenic features such as fecal mounds or surface burrows. The size and scale of boundary roughness values can have dramatic effects on both sediment erodibility and localized oxygen penetration into the bottom (Huettel et al., 1996).

2.1.4 Thickness of Depositional Layers

Because of the camera's unique design, SPI can be used to detect the thickness of depositional and dredged material layers. SPI is effective in measuring layers ranging in thickness from 1 mm to 20 cm (the height of the SPI optical window). During image analysis, the thickness of the newly deposited sedimentary layers can be determined by measuring the distance between the pre- and post-disposal sediment-water interface. Recently deposited material is usually evident because of its unique optical reflectance and/or color relative to the underlying material representing the pre-disposal surface. Also, in most cases, the point of contact between the two layers is clearly visible as a textural change in sediment composition, facilitating measurement of the thickness of the newly deposited layer.

2.1.5 Mud Clasts

When fine-grained, cohesive sediments are disturbed, either by physical bottom scour or faunal activity, e.g., decapod foraging, intact clumps of sediment are often scattered about the seafloor. These mud clasts can be seen at the sediment-water interface in SPI images. During analysis, the number of clasts was counted, the diameter of a typical clast was measured, and their oxidation state was assessed. The abundance, distribution, oxidation state, and angularity of mud clasts can be used to make inferences about the recent pattern of seafloor disturbance in an area.

Depending on their place of origin and the depth of disturbance of the sediment column, mud clasts can be reduced or oxidized. In SPI images, the oxidation state is apparent from the reflectance; see Section 2.1.6. Also, once at the sediment-water interface, these mud clasts are subject to bottom-water oxygen concentrations and currents. Evidence from laboratory microcosm observations of reduced sediments placed within an aerobic environment indicates that oxidation of reduced surface layers by diffusion alone is quite rapid, occurring within 6 to 12 hours (Germano 1983). Consequently, the detection of reduced mud clasts in an obviously aerobic setting suggests a recent origin. The size and shape of the mud clasts are also revealing; some clasts seen in the profile images are artifacts caused by the camera deployment (mud clots falling off the back of the prism or the wiper blade). Naturally-occurring mud clasts may be moved and broken by bottom currents and animals (macro- or meiofauna; Germano 1983). Over time, these naturally-occurring, large angular clasts become small and rounded.

2.1.6 Apparent Redox Potential Discontinuity Depth

Aerobic near-surface marine sediments typically have higher reflectance relative to underlying hypoxic or anoxic sediments. Surface sands washed free of mud also have higher optical reflectance than underlying muddy sands. These differences in optical reflectance are readily apparent in SPI images; the oxidized surface sediment contains particles coated with ferric hydroxide (an olive or tan color when associated with particles), while reduced and muddy sediments below this oxygenated layer are darker, generally gray to black (Fenchel 1969; Lyle 1983). The boundary between the colored ferric hydroxide surface sediment and underlying gray to black sediment is called the apparent redox potential discontinuity (aRPD).

The depth of the apparent RPD in the sediment column is an important time-integrator of dissolved oxygen conditions within sediment porewaters. In the absence of bioturbating organisms, this high reflectance layer (in muds) will typically reach a thickness of 2 mm below the sediment-water interface (Rhoads 1974). This depth is related to the supply rate of molecular oxygen by diffusion into the bottom and the consumption of that oxygen by the sediment and associated microflora. In sediments that have very high sediment oxygen demand (SOD), the sediment may lack a high reflectance layer even when the overlying water column is aerobic.

In the presence of bioturbating macrofauna, the thickness of the high reflectance layer may be several centimeters. The relationship between the thickness of this high reflectance layer and the presence or absence of free molecular oxygen in the associated porewaters must be considered with caution. The actual RPD is the boundary or horizon that separates the positive Eh region of the sediment column from the underlying negative Eh region. The exact location of this Eh = 0 boundary can be determined accurately only with microelectrodes; hence, the relationship between the change in optical reflectance, as imaged with the SPI camera, and the actual RPD can be determined only by making the appropriate *in situ* Eh measurements. For this reason, the optical reflectance boundary, as imaged, was described in this study as the "apparent" RPD and it was mapped as a mean value. In general, the depth of the actual Eh = 0 horizon will be either equal to or slightly shallower than the depth of the optical reflectance boundary (Rosenberg et al., 2001). This is because bioturbating organisms can mix ferric hydroxide-coated particles downward into the bottom below the Eh = 0 horizon. As a result, the apparent mean RPD depth can be used as an estimate of the depth of porewater exchange, usually through porewater irrigation (bioturbation).

The rate of depression of the apparent RPD within the sediment is relatively slow in organic-rich muds, on the order of 200 to 300 micrometers per day; therefore this parameter has a long time constant (Germano and Rhoads 1984). The rebound in the apparent RPD is also slow (Germano 1983). Measurable changes in the apparent RPD depth using the SPI optical technique can be detected over periods of 1 or 2 months. This parameter is used effectively to document changes (or gradients) that develop over a seasonal or yearly cycle related to water temperature effects on bioturbation rates, seasonal hypoxia, SOD, and infaunal recruitment. Time-series RPD measurements following a disturbance can be a critical diagnostic element in monitoring the degree of recolonization in an area by the ambient benthos (Rhoads and Germano 1986).

The apparent mean RPD depth also can be affected by local erosion. The peaks of disposal mounds commonly are scoured by divergent flow over the mound. This scouring can wash away fines and shell or gravel lag deposits, and can result in very thin surface oxidized layer. During storm periods, erosion may completely remove any evidence of the apparent RPD (Fredette et al. 1988).

Another important characteristic of the apparent RPD is the contrast in reflectance at this boundary. This contrast is related to the interactions among the degree of organic loading, the bioturbation activity in the sediment, and the concentrations of bottom-water dissolved oxygen in an area. High inputs of labile organic material increase SOD and, subsequently, sulfate reduction rates and the associated abundance of sulfide end products. This results in more highly reduced, lower-reflectance sediments at depth and higher RPD contrasts. In a region of generally low RPD contrasts, images with high RPD contrasts indicate localized sites of relatively large inputs of organic-rich material such as phytoplankton, other naturally-occurring organic detritus, dredged material, or sewage sludge.

Because the determination of the apparent RPD requires discrimination of optical contrast between oxidized and reduced particles, it is difficult, if not impossible, to determine the depth of the apparent RPD in well-sorted sands of any size that have little to no silt or organic matter in them. When using SPI technology on sand bottoms, little information other than grain-size, prism penetration depth, and boundary roughness values can be measured; while oxygen no doubt penetrates the sand beneath the sediment-water interface just due to physical forcing factors acting on surface roughness elements (Ziebis et al., 1996; Huettel et al., 1998), estimates of the mean apparent RPD depths in these types of sediments are indeterminate with conventional white light photography.

2.1.7 Wood Debris Volume

In areas affected by log storage and transfer facilities, pulp mills, sawmills, and other timber product manufacture, the accurate identification and estimation of wood debris content within the sediment column can be an important variable in the evaluation of benthic health. In addition to determining the wood residue content within and upon the sediment column, the status (fresh or decomposed) and form (chips, fibers, sticks, etc.) can also provide useful information. The depth within the sediment column where wood particles are observed, along with whether the wood particles are present in a layer or admixed within the sediment column, can also have a substantial influence on benthic community dynamics.

SPI has been used to estimate the volume of wood residues in the sediment column in previous studies (Browning 2004, Germano and Associates 2004, 2007 a, b). To estimate the volume of wood residues in the sediment column, SPI images are compared to standard petrographic estimators (Folk 1974). Using this technique, the amount of the sediment column represented by wood particles in the SPI images is considered equivalent to the volume of wood debris in the sediment column. In essence, the planar representation of wood particles in the sediment column captured in the SPI images is projected into three dimensions. Ground-truth samples validating this technique have shown a linear relationship between estimated SPI wood residue volumes and true wood residue volumes in the sediment column (r=0.918; Browning 2004).

To estimate the volume of wood residue in the sediment column, the petrographic estimators (Williams et al. 1982) were placed over or adjacent to the SPI image and the corresponding area represented by wood residues was recorded. The wood residue content measurement in the biologically-active, oxidized surface layer was reported based on the following categories:

- None = no discernible wood material present
- Trace = <5 percent
- Low = 5-20 percent
- Medium = 21 – 50 percent
- High = > 50 percent

Key to the success of this technique is the proper identification of wood particles in the sediment column. Two factors can obfuscate the correct identification of wood particles: 1) the size of the wood particle, because very small wood fibers and fragments can be at the limit of camera resolution, and, 2) the presence of black, highly reduced sediment surrounding the wood particles, because most light is absorbed by the sediment; therefore, wood fibers and fragments frequently stain black in the presence of highly reducing sediments.

2.1.8 Organic Loading, Sedimentary Methane, and Thiophilic Bacterial Colonies

If organic loading is extremely high, porewater sulfate is depleted and methanogenesis occurs. The process of methanogenesis is indicated by the appearance of methane bubbles in the sediment column, and the number and total area covered by all methane pockets is measured. These gas-filled voids are readily discernable in SPI images because of their irregular, generally circular aspect and glassy texture (due to the reflection of the strobe off the gas bubble).

A primary diagnostic feature indicating an area is suffering from hypoxic conditions due to organic enrichment is the presence of the *Beggiatoa* or *Beggiatoa*-like colonies (note: while we cannot state with certainty that any bacterial colonies seen in profile or plan view images are indeed the genus *Beggiatoa* without microscopic identification, we can state with certainty that these are in the same family of sulfur-oxidizing bacteria that only appear in hypoxic or anoxic conditions). These colonies have diagnostic morphology that has been documented in numerous other sediment profile imaging surveys (Karakassis et al., 2002; Nilsson & Rosenberg, 1997; Rosenberg et al., 2001; Germano et al. 2011). The presence of sulfur-oxidizing bacterial colonies appear when boundary-layer dissolved oxygen concentrations drop into the “hypoxic” range between 0-1 ml/L (Rosenberg and Diaz, 1993).

2.1.9 Infaunal Successional Stage

The mapping of infaunal successional stages is readily accomplished with SPI technology. These stages are recognized in SPI images by the presence of dense assemblages of near-surface polychaetes and/or the presence of subsurface feeding voids; both may be present in the same image. Mapping of successional stages is based on the theory that organism-sediment interactions in fine-grained sediments follow a predictable sequence after a major seafloor perturbation. This theory states that primary succession results in “the predictable appearance of macrobenthic invertebrates belonging to specific functional types following a benthic disturbance. These invertebrates interact with sediment in specific ways. Because functional types are the biological units of interest..., our definition does not demand a sequential appearance of particular invertebrate species or genera” (Rhoads and Boyer 1982). This theory is presented in Pearson and Rosenberg (1978) and further developed in Rhoads and Germano (1982) and Rhoads and Boyer (1982).

This continuum of change in animal communities after a disturbance (primary succession) has been divided subjectively into four stages: Stage 0, indicative of a sediment column that is largely devoid of macrofauna, occurs immediately following a physical disturbance or in close proximity to an organic enrichment source; Stage 1 is the initial community of tiny, densely populated polychaete assemblages; Stage 2 is the start of the transition to head-down deposit feeders; and Stage 3 is the mature, equilibrium community of deep-dwelling, head-down deposit feeders (Figure 3).

After an area of bottom is disturbed by natural or anthropogenic events, the first invertebrate assemblage (Stage 1) appears within days of the disturbance. Stage 1 consists of assemblages of tiny tube-dwelling marine polychaetes that reach population densities of 10^4 to 10^6 individuals per m². These animals feed at or near the sediment-water interface and physically stabilize or bind the sediment surface by producing a mucous “glue” that they use to build their tubes. Sometimes deposited dredged material layers contain Stage 1 tubes still attached to mud clasts from their location of origin; these transported individuals are considered as part of the *in situ* fauna in our assignment of successional stages.

If there are no repeated disturbances to the newly colonized area, then these initial tube-dwelling suspension or surface-deposit feeding taxa are followed by burrowing, head-down deposit-feeders that rework the sediment deeper and deeper over time and mix oxygen from the overlying water into the sediment. The animals in these later-appearing communities (Stage 2 or 3) are larger, have lower overall population densities (10 to 100 individuals per m^2), and can rework the sediments to depths of 3 to 20 cm or more. These animals "loosen" the sedimentary fabric, increase the water content in the sediment, thereby lowering the sediment shear strength, and actively recycle nutrients because of the high exchange rate with the overlying waters resulting from their burrowing and feeding activities.

In dynamic estuarine and coastal environments, it is simplistic to assume that benthic communities always progress completely and sequentially through all four stages in accordance with the idealized conceptual model depicted in Figure 3. Various combinations of these basic successional stages are possible. For example, secondary succession can occur (Horn, 1974) in response to additional labile carbon input to surface sediments, with surface-dwelling Stage 1 or 2 organisms co-existing at the same time and place with Stage 3, resulting in the assignment of a "Stage 1 on 3" or "Stage 2 on 3" designation.

While the successional dynamics of invertebrate communities in fine-grained sediments have been well-documented, the successional dynamics of invertebrate communities in sand and coarser sediments are not well-known. Subsequently, the insights gained from sediment profile imaging technology regarding biological community structure and dynamics in sandy and coarse-grained bottoms are fairly limited.

2.1.10 Biological Mixing Depth

During the past two decades, there has been a considerable emphasis on studying the effects of bioturbation on sediment geotechnical properties as well as sediment diagenesis (Ekman et al., 1981; Nowell et al., 1981; Rhoads and Boyer, 1982; Grant et al., 1982; Boudreau, 1986; 1994; 1998). However, an increasing focus of research is centering on the rates of contaminant flux in sediments (Reible and Thibodeaux, 1999; François et al., 2002; Gilbert et al., 2003), and the two parameters that affect the time rate of contaminant flux the greatest are erosion and bioturbation (Reible and Thibodeaux, 1999). The depth to which sediments are bioturbated, or the biological mixing depth, can be an important parameter for studying either nutrient or contaminant flux in sediments. As noted in Section 2.1.6, the apparent mean RPD depth provides an estimate of the depth of porewater exchange, usually through porewater irrigation. While the apparent RPD is one potential measure of biological mixing depth, it is quite common in profile images to see evidence of biological activity (burrows, voids, or actual animals) well below the mean apparent RPD. Biogenic particle mixing depths can be estimated by measuring the maximum and minimum depths of imaged feeding voids in the sediment column. This parameter represents the particle mixing depths of head-down feeders, mainly polychaetes. Both the minimum and maximum linear distance from the sediment surface to both the shallowest and deepest feature of biological activity are measured along with a notation of the type of biogenic structure measured. From these, either the minimum, maximum, or average biological mixing depth can be mapped across a surveyed area of interest.

2.2 PLAN VIEW IMAGE ANALYSIS

The plan view images provide a much larger field of view than the sediment profile images and provide valuable information about the landscape ecology and sediment topography in the area where the pinpoint "optical core" of the sediment profile was taken. Unusual surface sediment layers/textures or structures detected in any of the sediment profile images can be interpreted in light of the larger context of surface sediment features, i.e. is a surface layer or topographic feature a regularly occurring feature and typical of the bottom in this general vicinity or just an isolated anomaly? The scale information provided by the underwater lasers allows accurate density counts (number per square meter) of attached epifaunal colonies, sediment burrow openings, or larger macrofauna or fish which may be missed in the sediment profile cross-section. Presence of *Beggiatoa* colonies along with information on sediment transport dynamics and bedform wavelength were also available from plan view image analysis. In addition, percent cover of wood debris was visually estimated using the same analytical approach described above in Section 2.1.8.

2.3 USING SPI DATA TO ASSESS BENTHIC QUALITY & HABITAT CONDITIONS

While various measurements of water quality such as dissolved oxygen, contaminants, or nutrients are often used to assess regional ecological quality, interpretation is difficult because of the transient nature of water-column phenomena. Measurement of a particular value of any water-column variable represents an instantaneous "snapshot" that can change within minutes after the measurement is taken. By the time an adverse signal in the water column such as a low dissolved oxygen concentration is persistent, the system may have degraded to the point where resource managers can do little but map the spatial extent of the phenomenon while gaining a minimal understanding of factors contributing to the overall degradation.

The seafloor, on the other hand, is a long-term time integrator of sediment and overlying water quality; values for any variable measured are the result of physical, chemical, and biological interactions on time scales much longer than those present in a rapidly moving fluid. The seafloor is thus an excellent indicator of environmental quality, both in terms of historical impacts and of future trends for any particular variable.

Physical measurements made from the “optical cores” obtained with the SPI system provide background information about gradients in physical disturbance (caused by dredging, disposal, oil platform cuttings and drilling muds discharge, trawling, or storm resuspension and transport) in the form of maps of sediment grain size, boundary roughness, sediment textural fabrics, and structures. The concentration of organic matter and the SOD can be inferred from the optical reflectance of the sediment column and the apparent RPD depth. Organic matter is an important indicator of the relative value of the sediment as a carbon source for both bacteria and infaunal deposit feeders. SOD is an important measure of ecological quality; oxygen can be depleted quickly in sediment by the accumulation of organic matter and by bacterial respiration, both of which place an oxygen demand on the porewater and compete with animals for a potentially limited oxygen resource (Kennish 1986).

The apparent RPD depth is useful in assessing the quality of a habitat for epifauna and infauna from both physical and biological points of view. The apparent RPD depth in profile images has been shown to be directly correlated to the quality of the benthic habitat in polyhaline and mesohaline estuarine zones (Rhoads and Germano 1986; Revelas et al. 1987; Valente et al. 1992). Controlling for differences in sediment type and physical disturbance factors, relatively shallow aRPD depths can indicate chronic benthic environmental stress or recent catastrophic disturbance.

The distribution of successional stages in the context of the mapped disturbance gradients is one of the most sensitive indicators of the ecological quality of the seafloor (Rhoads and Germano 1986). The presence of Stage 3 equilibrium taxa (mapped from subsurface feeding voids as observed in profile images) can be a good indication of high benthic habitat stability and relative quality. A Stage 3 assemblage indicates that the sediment surrounding these organisms has not been disturbed severely in the recent past and that the inventory of bioavailable contaminants is relatively small. These inferences are based on past work, primarily in temperate latitudes, showing that Stage 3 species are relatively intolerant to sediment disturbance, organic enrichment, and sediment contamination (Pearson and Rosenberg 1978; Santos and Simon 1980a, b; Rhoads and Germano 1982, 1986; Germano et al. 2011) . Stage 3 species expend metabolic energy on sediment bioturbation (both particle advection and porewater irrigation) to control sediment properties, including porewater profiles of sulfate, nitrate, and RPD depth in the sedimentary matrix near their burrows or tubes (Aller and Stupakoff 1996; Rice and Rhoads 1989). This bioturbation results in an enhanced rate of decomposition of polymerized organic matter by stimulating microbial decomposition (“microbial gardening”). Stage 3 benthic assemblages are very stable and are also called climax or equilibrium seres.

The metabolic energy expended in bioturbation is rewarded by creating a sedimentary environment where refractory organic matter is converted to usable food. Stage 3 bioturbation has been likened to processes such as stirring and aeration used in tertiary sewage treatment plants to accelerate organic decomposition (Rice and Rhoads 1989). Physical disturbance, contaminant loading, and/or over-enrichment result in habitat destruction and in local extinction of the climax seres. Loss of Stage 3 species results in the loss of sediment stirring and aeration and may be followed by a buildup of organic matter (sediment eutrophication). Because Stage 3 species tend to have relatively conservative rates of recruitment, intrinsic population increase, and ontogenetic growth, they may not reappear for several years once they are excluded from an area.

The presence of Stage 1 seres (in the absence of Stage 3 seres) can indicate that the bottom is an advanced state of organic enrichment, has received high contaminant loading, or experienced a substantial physical disturbance. Unlike Stage 3 communities, Stage 1 seres have a relatively high tolerance for organic enrichment and contaminants. These opportunistic species have high rates of recruitment, high ontogenetic growth rates, and live and feed near the sediment-water interface, typically in high densities. Stage 1 seres often co-occur with Stage 3 seres in marginally enriched areas. In this case, Stage 1 seres feed on labile organic detritus settling onto the sediment surface, while the subsurface Stage 3 seres tend to specialize on the more refractory buried organic reservoir of detritus.

Stage 1 and 3 seres have dramatically different effects on the geotechnical properties of the sediment (Rhoads and Boyer 1982). With their high population densities and their feeding efforts concentrated at or near the sediment-water interface, Stage 1 communities tend to bind fine-grained sediments physically, making them less susceptible to resuspension and transport. Just as a thick cover of grass will prevent erosion on a terrestrial hillside, so too will these dense assemblages of tiny polychaetes serve to stabilize the sediment surface. Conversely, Stage 3 taxa increase the water content of the sediment and lower its shear strength through their deep burrowing and pumping activities, rendering the bottom more susceptible to erosion and resuspension. In shallow areas of fine-grained sediments that are susceptible to storm-induced or wave orbital energy, it is quite possible for Stage 3 taxa to be carried along in the water column in suspension with fluid muds. When redeposition occurs, these Stage 3 taxa can become quickly re-established in an otherwise physically disturbed surface sedimentary fabric.

SPI has been shown to be a powerful reconnaissance tool that can efficiently map gradients in sediment type, biological communities, or disturbances from physical forces or organic enrichment. The conclusions reached at the end of this report are about dynamic processes that have been deduced from imaged structures; as such, they should be considered hypotheses available for further testing/confirmation. By employing Occam’s Razor, we feel reasonably assured that the most parsimonious explanation is usually the one borne out by subsequent data confirmation.

3.0
RESULTS

A list of specific station replicate images to be analyzed was provided to G&A scientists by Integral Consulting following completion of the field effort; one replicate image set (one SPI and one PV image) was analyzed from 95 of the stations surveyed, with a duplicate image set analyzed from an additional 19 locations (20% of the 95 WPAHG stations sampled). A complete set of all the summary data measured from each sediment profile image is presented in Appendix A; data from the plan view images are presented in Appendix B.

Parameters such as boundary roughness and mud clast data (number, size) provide supplemental information pertaining to the physical regime and bottom sediment transport activity at a site. Even though mud clasts are definitive characteristics whose presence can indicate physical disturbance of some form, the mud clasts noted in the images from this survey were either biogenic in origin or artifacts due to sampling (mud clumps clinging to the frame base) and not indicative of physical disturbance or sediment transport activities. Therefore, mud clast data were not used as individual parameters for interpretation.

The results for some SPI parameters are sometimes indicated in the data appendix or on the maps as being “Indeterminate” (Ind). This is a result of the sediments being either: 1) too compact for the profile camera to penetrate adequately, preventing observation of surface or subsurface sediment features, 2) too soft to bear the weight of the camera, resulting in over-penetration to the point where the sediment/water interface was above the window (imaging area) on the camera prism (the sediment/water interface must be visible to measure most of the key SPI parameters like aRPD depth, penetration depth, and infaunal successional stage), or 3) the sediment consisted of uniformly-colored sand lacking a visible aRPD contrast and for which infaunal successional dynamics, generally speaking, are not well-known. All mapped values represent the measurement obtained from a single image, except at those 19 locations where duplicate images were analyzed and the average value is mapped instead.

3.1 GRAIN SIZE

The sediments throughout the entire area surveyed were primarily muds (fine-grained, silt-clay sediments with a major mode of ≥ 4 ϕ; Figure 4) except for nine locations close to shore in shallower waters where a higher percentage of very fine to medium sand was found (Figure 5). While most of the nine stations with a higher sand fraction had a sediment grain-size major mode of very fine sand (Figure 6), Station WPAH053 in the western shallow area of the harbor had a particularly distinct, poorly-sorted grain size distribution with a mixed silty-sand and cobble bottom (Figure 7).

3.2 PRISM PENETRATION DEPTH

Even though sediment grain-size fairly uniform across the entire study area, the variation in prism penetration was often a function of the amount of wood debris found at the surface as well as the relative sediment shear strength as a function of biological mixing depth; both the camera stop collar settings and weights were changed frequently in the field to compensate for the changes in sediment bearing strength and consolidation (see Appendix A). The prism penetration depth in the study area ranged from 1.98 to 21.09 cm, with an overall site average prism penetration depth of 14.13 cm; the spatial distribution of mean penetration depth at all stations sampled is shown in Figure 8. Those stations with sandier sediments naturally had shallower penetration values (Figure 9).

3.3 SURFACE BOUNDARY ROUGHNESS

Surface boundary roughness ranged from 0.27 to 4.82 cm, with the origins of these small-scale topographic elevations split just about evenly between biogenic and physical processes (Appendix A). Most of the larger roughness values were found closer to shore (Figure 10), with the largest value measured being a sampling artifact caused by the camera prism disrupting surface wood debris at Station WPAH012 (Figure 11). Most of the locations in deeper water with fine-grained sediments had boundary roughness values due to biogenic burrow openings and mounds less than 1.5 cm (Figure 10); the overall site average boundary roughness value was 1.52 cm.

3.4 APPARENT REDOX POTENTIAL DISCONTINUITY DEPTH

The distribution of mean apparent RPD depths is shown in Figure 12; aRPD depths ranged from 0 to 6.87 cm, with an overall site average value of 2.70 cm. There were six nearshore locations where aRPD depths were less than 0.5 cm (Figure 12) due to organic enrichment (see Section 3.6 below) from decomposing wood or macrophytes (Figure 13). While the locations further away from the shoreline in deeper water generally had the greater aRPD values found at the site (Figure 12), one of the highest measured values occurred close to shore at Station WPAH036 (Figure 14), just off the former K Ply facility.

3.5 PRESENCE OF WOOD DEBRIS

The presence of wood debris was quite evident in both the SPI and PV images, either as decomposed, individual fibers mixed in with the sediment (Figure 15) or larger pieces of intact wood chips/chunks/logs (Figures 11 and 16). Figure 17 shows the distribution and estimated amount of wood debris observed in the images. The wood debris levels mapped in Figure 17 represent the higher wood content measured in either the SPI or PV image from each location. The high volumes of wood were generally found closer to shore and where former log-rafting sites had been located. Many of the locations had trace or low volumes of wood in the surface layers but higher volumes of wood at depth, buried by natural depositional processes. Also, several stations in the western portion of the harbor had buried pockets of what looked like wood pulp or high concentrations of semi-consolidated wood fibers that gave the appearance of a “cottage cheese” texture to the sediments (Figure 18). The distribution of this pulpy material is noted in Figure 17.

3.6 ORGANIC LOADING, SEDIMENTARY METHANE, AND THIOPHILIC BACTERIAL COLONIES

There was no subsurface methane detected in any of the images specified by Integral Consulting for analysis (Figure 19); however, this does not mean that organic enrichment was uniformly above the threshold for anaerobic decomposition at all locations, because some of the (non-analyzed) replicates did show presence of subsurface methane (Figure 20). Stations showing the effects of excess organic enrichment and low dissolved oxygen were generally confined to the nearshore, shallow areas (Figure 19). For the most part, subsurface sediments were not showing the dark color normally associated with organically-enriched anaerobic muds (Figure 21) that were quite prevalent in the profile images collected in Port Angeles in 1998 (SAIC, 1999). Also, there was an obvious increase in organic enrichment at some locations in the vicinity of the fish pen operations in the northeast corner of the site (Figure 22).

Traces or mats of *Beggiatoa* (or other thiophilic bacterial) colonies were found at 14 of the locations sampled (Figure 19). At many of the locations where these bacterial colonies were found, evidence of both epifaunal foraging and infaunal deposit feeding was also found (Figure 23; see next section).

3.7 INFAUNAL SUCCESSIONAL STAGE

The mapped distribution of infaunal successional stages is shown in Figure 24; evidence of Stage 3 taxa was found in the majority of the images analyzed, with the exception of the five locations where the successional status was indeterminate (because of either inadequate prism penetration or disturbance of the profile image from the camera prism dragging down wood debris; see Figure 24) and two locations where no evidence of late stage deposit feeders were found: Station WPAH025 (Figure 13) and Station WPAH061. Due apparently to the refractory nature of the organics in wood, even locations with relatively high volumes of wood debris, e.g., Station WPAH068 (see Figure 17), had Stage 3 assemblages present (Figure 25). Most of the locations also had evidence of secondary succession with Stage 1 polychaetes present (Figure 24), sometimes in rather dense assemblages (Figure 26).

3.8 BIOLOGICAL MIXING DEPTH

Zones of biological mixing can be considered in terms of active particle advection (depth of active feeding voids) and total range of animal burrowing (which usually spans a greater depth in the sediment). Average feeding void depth ranged from 0 – 16.68 cm, with an overall site average feeding void depth of 6.3 cm (Figure 27). The total range of infaunal burrowing and the depths to which animals bioturbated the sediments (Figure 28) spanned from a low of 2.75 cm (at Station WPAH047 where camera prism penetration was limited to this depth by compact, very fine sand) to locations where the bioturbation depth exceeded 21 cm, the maximum depth of the camera prism penetration (Figure 29); maximum bioturbation depths track the prism penetration depth quite consistently at this site, so locations with lower maximum bioturbation depths correspond to those with lower prism penetration values. The overall site average maximum bioturbation depth was 14.07 cm, which is a conservative estimate given that many of the bioturbation maxima were limited by the depth of the camera prism penetration. The depth to which sediments are being reworked in Port Angeles is consistent with the number and size of some of the burrow openings seen in the PV images (Figure 30).

4.0
DISCUSSION

The results from the SPI/PV survey in Port Angeles show that the higher concentrations of wood waste on the sediment surface from both historical and on-going activities from the surrounding shoreline industries are focused in the nearshore areas, and the contours of the highest concentrations of wood waste more or less follow the contours of the shoreline (Figure 17). While it is true that substantial amounts of bark or wood waste can have deleterious effects on the marine ecosystem (e.g., Pearson 1972; Conlan and Ellis 1979; Kurau 1975; Freese et al. 1988), it is clear from the results found in this study that a normal process of benthic habitat recovery and infaunal succession (Figure 3) has been and is occurring throughout most of the western harbor, including in areas with high wood content. The infaunal community has recovered in the majority of locations (Figure 24); noticeably stressed areas of bottom with apparent low dissolved oxygen in the overlying benthic boundary layer were only found at 3 locations (Figure 19). At two of these stations (WPAH025 and WPAH024), macroalgae detritus and/or beds appear to be the major contributor to the sediment oxygen depression.

The area surveyed is primarily a low-energy, depositional environment, as evidenced by the detrital mantling that was seen covering most of the surface of the bottom in the deeper areas (> 8 m) as one moves out from the shoreline; most of the wood waste seen in the PV images had a layer of fine sediment covering the pieces of wood (Figure 31), and many of the profile images (Figure 32) showed accumulation of fine sediments over buried wood waste at depth (evidence of steady deposition over time).

The sediments in Port Angeles appear to be supporting a rather diverse benthic infaunal community; while it was quite apparent from the profile images that diversity and abundance of the Stage 3 assemblages did vary among the locations sampled, one of the more striking features documented was the amount of apparent prey items at the sediment surface for epifaunal foragers. Many of the PV images had surprisingly high densities of shrimp present (Figure 33) which were most likely attracted by the high secondary benthic production.

5.0
REFERENCES CITED

Aller, J.Y. and I. Stupakoff. 1996. The distribution and seasonal characteristics of benthic communities on the Amazon shelf as indicators of physical processes. Cont. Shelf Res. 16: 717-751.

Boudreau, B.P. 1986. Mathematics of tracer mixing in sediment. I-Spatially-dependent, diffusive mixing. II: Non-local mixing and biological conveyor-belt phenomena. Am. Jour. Sci. 286: 161-238.

Boudreau, B.P. 1994. Is burial velocity a master parameter for bioturbation? Geochimica et Cosmochemica Acta 58: 1243-1249.

Boudreau, B. P. 1998. Mean mixed depth of sediments: The wherefore and the why. Limnol. Oceanogr. 43: 524-526.

Browning, D.G. 2004. A SPI-based technique for determining wood waste volumes in marine sediments. Presentation made at Sediment Profile Imagery Colloquium of Experts, University of Galway, April 5-7, 2004.

Conlan, K.E. and D.V. Ellis. 1979. Effects of wood waste on sandbed benthos. Mar. Pollut. Bul. 10:262-267.

Diaz, R. J. and L. C. Schaffner. 1988. Comparison of sediment landscapes in the Chesapeake Bay as seen by surface and profile imaging, p. 222-240 In M. P. Lynch and E. C. Krome (eds.), Understanding the Estuary: Advances in Chesapeake Bay Research, Chesapeake Bay Research Consortium Publication 129, Chesapeake Bay Program 24/88.

Ekman, J.E., Nowell, A.R.M., and P.A. Jumars. 1981. Sediment destabilization by animal tubes. Journal of Marine Research 39: 361-374.

Fenchel, T. 1969. The ecology of marine macrobenthos IV. Structure and function of the benthic ecosystem, its chemical and physical factors and the microfauna communities with special reference to the ciliated protozoa. Ophelia 6: 1-182.

Folk, R.L. 1974. Petrology of Sedimentary Rocks. Hemphill Publishg Company, Austin, Texas.

François, F., Gerino, M., Stora, G., Durbec, J.P., and J.C. Poggiale. 2002. Functional approach to sediment reworking by gallery-forming macrobenthic organisms: modeling and application with the polychaete *Nereis diversicolor.* Marine Ecology Progress Series 229: 127–136.

Fredette, T.J., W.F. Bohlen, D.C. Rhoads, and R.W. Morton. 1988. Erosion and resuspension effects of Hurricane Gloria at Long Island Sound dredged material disposal sites. In: Proceedings of the Water Quality ‘88 seminar, February Meeting, Charleston, South Carolina. U.S. Army Corps of Engineers, Hydraulic Engineering Center, Davis, CA.

Freese, J. L., R.P. Stone, and C.E. O’Clair. 1988. Factors affecting benthic deposition of bark debris at log transfer facilities in southeastern Alaska: A short-term retrospective evaluation. National Marine Fisheries Service, Alaska Region, NOAA Technical Memorandum NMFS F/NWC-136, Juneau, AK.

Germano, J.D. 1983. Infaunal succession in Long Island Sound: Animal-sediment interactions and the effects of predation. Ph.D. dissertation. Yale University, New Haven, CT. 206 pp.

Germano, J.D. and D.C. Rhoads. 1984. REMOTS sediment profiling at the Field Verification Program (FVP) Disposal Site. In: Dredging '84 Proceedings, ASCE, Nov. 14-16, Clearwater, FL. pp. 536-544.

Germano, J.D., D.C. Rhoads, R.M. Valente, D.A. Carey, and M. Solan. 2011. The use of Sediment Profile Imaging (SPI) for environmental impact assessments and monitoring studies – lessons learned from the past four decades. Oceanography and Marine Biology: An Annual Review 49: 247-310.

Germano & Associates, 2004. Sediment Quality at the Former Pope and Talbot, Inc. Mill Site, Port Gamble, WA. Report submitted to Parametrix, Inc., Bellevue, WA. July 2004.

Germano & Associates, 2007 (a). Schulze Cove Bark and Benthic Assessment. Final report to Alaska Department of Environmental Conservation. Contract Number 18-2019-11.

Germano & Associates, 2007 (b). Thorne Bay Bark and Benthic Assessment. Final report to Alaska Department of Environmental Conservation. Contract Number 18-2019-11.

Gilbert, F. S. Hulth, N. Strömberg, K. Ringdahl, and J.-C. Poggiale. 2003. 2-D optical quantification of particle reworking activities in marine surface sediments. Jour. Exp. Mar. Biol. Ecol. 285-286: 251-264.

Grant, W.D., Jr., Boyer, L.F., and Sanford, L.P. 1982. The effects of bioturbation on the initiation of motion of intertidal sands: Jour. Mar. Res., Vol. 40, pp. 659-677.

Horn, H.S. 1974. The ecology of secondary succession. Ann. Rev. Ecol. Syst. 5: 25-37.

Huettel, M., W. Ziebis, and S. Forster. 1996. Flow-induced uptake of particulate matter in permeable sediments. Limnol. Oceanogr. 41: 309-322.

Huettel, M., Ziebis, W., Forster., S., and G.W. Luther III. 1998. Advective transport affecting metal and nutrient distributions and interfacial fluxes in permeable sediments. Geochimica et Cosmochemica Acta 62: 613-631.

Karakassis, I, M. Tsapakis, C.J. Smith, and H. Rumohr. 2002. Fish farming impacts in the Mediterranean studied through sediment profiling imagery. Marine Ecology Progress Series 227: 125-133.

Kennish, M.J. 1986. Ecology of estuaries. Vol. I: Physical and chemical aspects. CRC Press, Boca Raton, FL.

Kurau, J. 1975. Water transport of wood: the current situation. Report No. EPS3-WP-75-3. Environmental Protection Service, Water Pollution Control Directorate, Ottawa, Ontario. 72 pp.

Lyle, M. 1983. The brown-green colour transition in marine sediments: A marker of the Fe (III) – Fe(II) redox boundary. Limnol. Oceanogr. 28: 1026-1033.

Nilsson, H.C. and R. Rosenberg. 1997. Benthic habitat quality assessment of an oxygen stressed fjord by surface and sediment profile images. Journal of Marine Systems 11: 249-264.

Nowell, A.R.M., P.A. Jumars, and J.E. Ekman. 1981. Effects of biological activity on the entrainment of marine sediments. Mar. Geol. 42: 133-153.

Pearson, T. H. 1972. The effects of industrial effluent from pulp and paper mills on the marine benthic environment. Proceedings of the Royal Society of London 180: 469-485.

Pearson, T.H. and R. Rosenberg. 1978. Macrobenthic succession in relation to organic enrichment and pollution of the marine environment. Oceanogr. Mar. Biol. Ann. Rev. 16:229-311.

Reible, D and Thibodeaux, L. 1999. Using Natural Processes to Define Exposure From Sediments., in Sediment Management Work Group; Contaminated Sediment Management Technical Papers, Sediment Management Work Group, http://www.smwg.org/index.htm.

Revelas, E.C., J.D. Germano, and D.C. Rhoads. 1987. REMOTS reconnaissance of benthic environments. pp. 2069-2083. In: Coastal Zone '87 Proceedings, ASCE, WW Division, May 26-29, Seattle, WA.

Rhoads, D.C. 1974. Organism-sediment relations on the muddy seafloor. Oceanography and Marine Biology: An Annual Review 12: 263-300.

Rhoads, D.C. and L.F. Boyer. 1982. The effects of marine benthos on physical properties of sediments. pp. 3-52. In: Animal-Sediment Relations. McCall, P.L. and M.J.S. Tevesz (eds). Plenum Press, New York, NY.

Rhoads, D.C. and J.D. Germano. 1982. Characterization of benthic processes using sediment profile imaging: An efficient method of remote ecological monitoring of the seafloor (REMOTS™ System). Mar. Ecol. Prog. Ser. 8:115-128.

Rhoads, D.C. and J.D. Germano. 1986. Interpreting long-term changes in benthic community structure: A new protocol. Hydrobiologia. 142:291-308.

Rhoads, D.C. and J.D. Germano. 1990. The use of REMOTS® imaging technology for disposal site selection and monitoring. pp. 50-64. In: Geotechnical Engineering of Ocean Waste Disposal, K. Demars and R. Chaney (eds). ASTM Symposium Volume, January, 1989. Orlando, FL.

Rice, D.L. and D.C. Rhoads. 1989. Early diagenesis of organic matter and the nutritional value of sediment. pp. 59-97. In: Ecology of Marine Deposit Feeders, Vol. 31, Lecture notes on coastal and estuarine deposit feeders. Lopez, G., G. Tagon, and J. Levinton, (eds.). Springer-Verlag, New York, NY.

Rosenberg, R. and R.J. Diaz. 1993. Sulphur bacteria (*Beggiatoa* spp.) mats indicate hypoxic conditions in the Inner Stockhold Archipelago. Ambio 22: 22-36.

Rosenberg, R., H.C. Nilsson, and R.J. Diaz. 2001. Response of benthic fauna and changing sediment redox profiles over a hypoxic gradient. Estuarine, Coastal and Shelf Science 53: 343-350.

SAIC. 1999. Port Angeles Harbor Wood Waste Study, Port Angeles Harbor, Final. Prepared for Washington Department of Ecology, Olympia, WA. Prepared by SAIC, Bothell, WA.

Santos, S. L. and J. L. Simon. 1980a. Marine soft-bottom community establishment following annual defaunation: Larval or adult recruitment? Mar. Ecol. Prog. Ser. 2: 235-241.

Santos, S. L. and J. L. Simon. 1980b. Response of soft-bottom benthos to annual catastrophic disturbance in a south Florida estuary. Mar. Ecol. Prog. Ser. 3: 347-355

Valente, R.M., D.C. Rhoads, J.D. Germano, and V.J. Cabelli. 1992. Mapping of benthic enrichment patterns in Narragansett Bay, RI. Estuaries 15:1-17.

Williams H., Turner J., and Gilbert C.M. 1982. Petrography -An Introduction to the Study of Rocks in Thin Section. 626 pp. W.H Freeman and Company.

Ziebis, W., Huettel, M., and S. Forster. 1996. Impact of biogenic sediment topography on oxygen fluxes in permeable seabeds. Mar. Ecol. Prog. Ser. 1409: 227-237.

FIGURES

Ecology = Washington State Department of Ecology
SAIC = Science Applications International Corporation
SPI = Sediment profile image

Background imagery is provided courtesy of the City of Port Angeles, is dated 2006, and is for reference purposes only.

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Figure 1: Location of SPI/PV stations surveyed in Port Angeles Harbor in July, 2013.

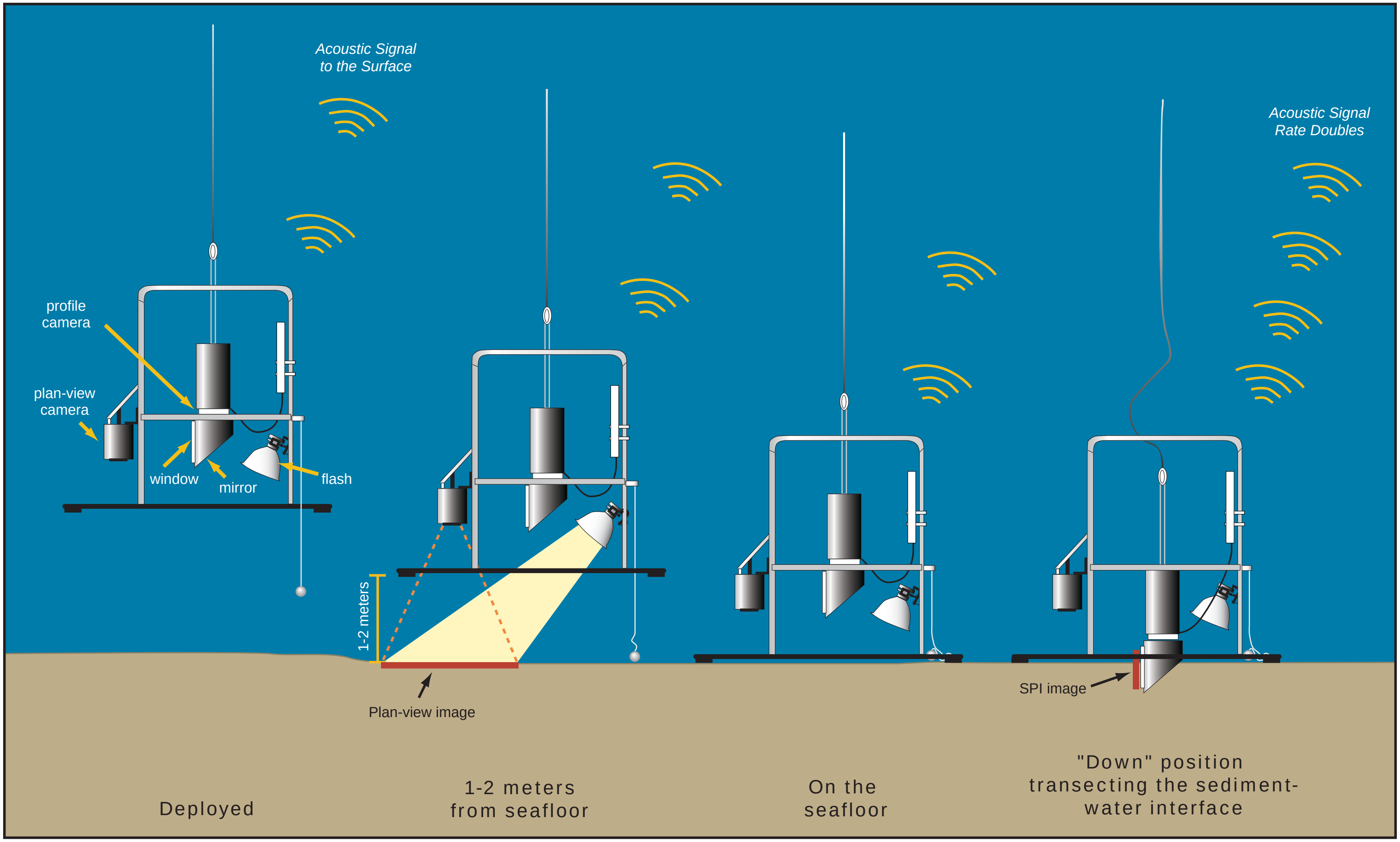

Figure 2: Deployment and operation of the Ocean Imaging Model 3731 Sediment Profile and Model DSC 16000 Plan View cameras.

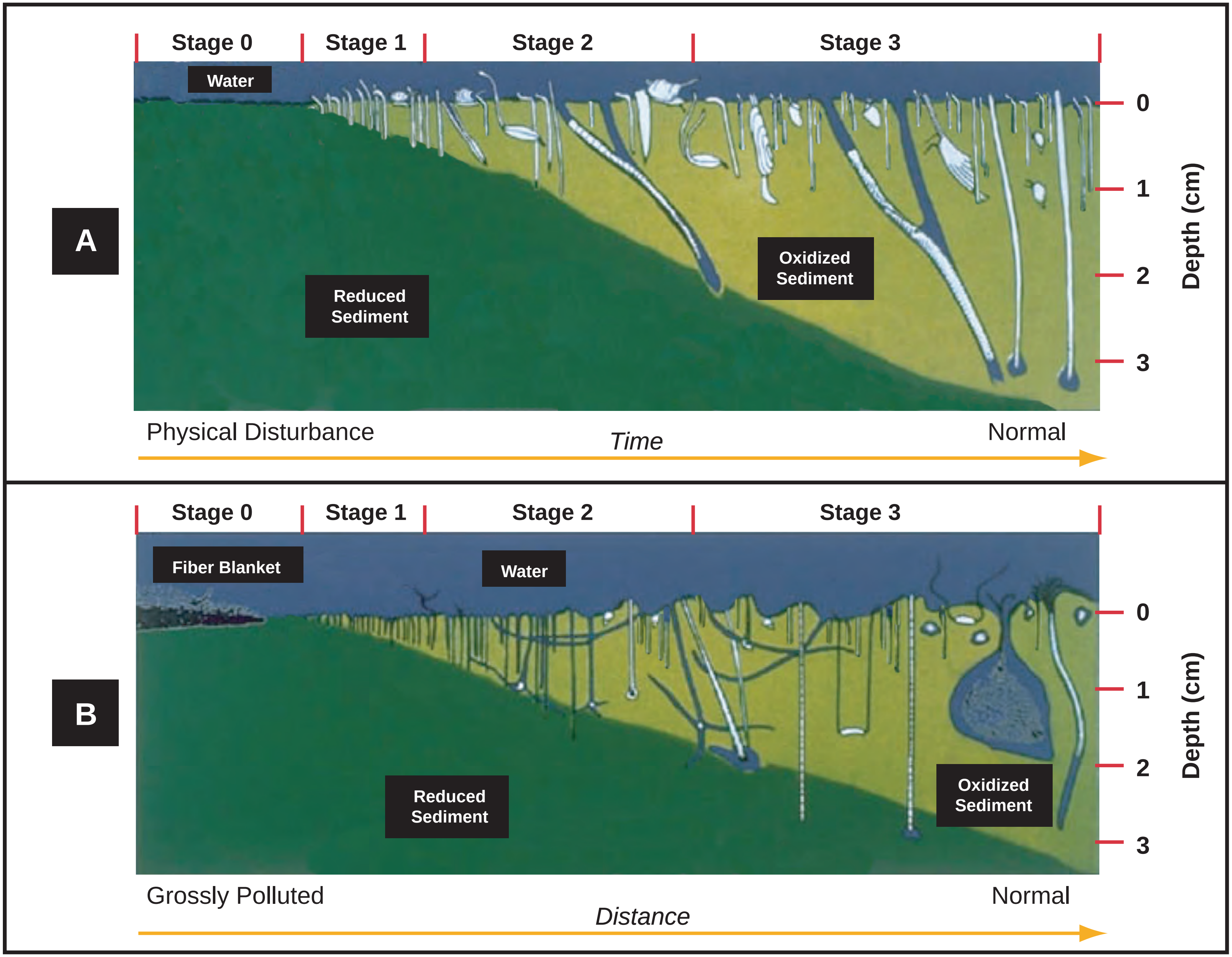

Figure 3: Soft-bottom benthic community response to physical disturbance (top panel) or organic enrichment (bottom panel). From Rhoads and Germano (1982).

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Figure 4: Spatial distribution of sediment grain size major mode (phi units) at Port Angeles in July, 2013.

WPAH011 B

WPAH027 C

Figure 5: The sediment profile image on the left from Station WPAH011 is a typical example of the silt-clay sediments found at the majority of stations surveyed, while the profile image on the right from Station WPAH027 shows coarser, sandy sediments with a layer of wood debris on the surface. Scale: width of each image = 14.4 cm.

Figure 6: This profile image from Station WAPH046 with a major grain size mode of 4-3 phi (very fine sand) typified the sandier sediment found in the more shallow areas close to shore where fine sediments were not accumulating. Scale: width of profile image = 14.4 cm.

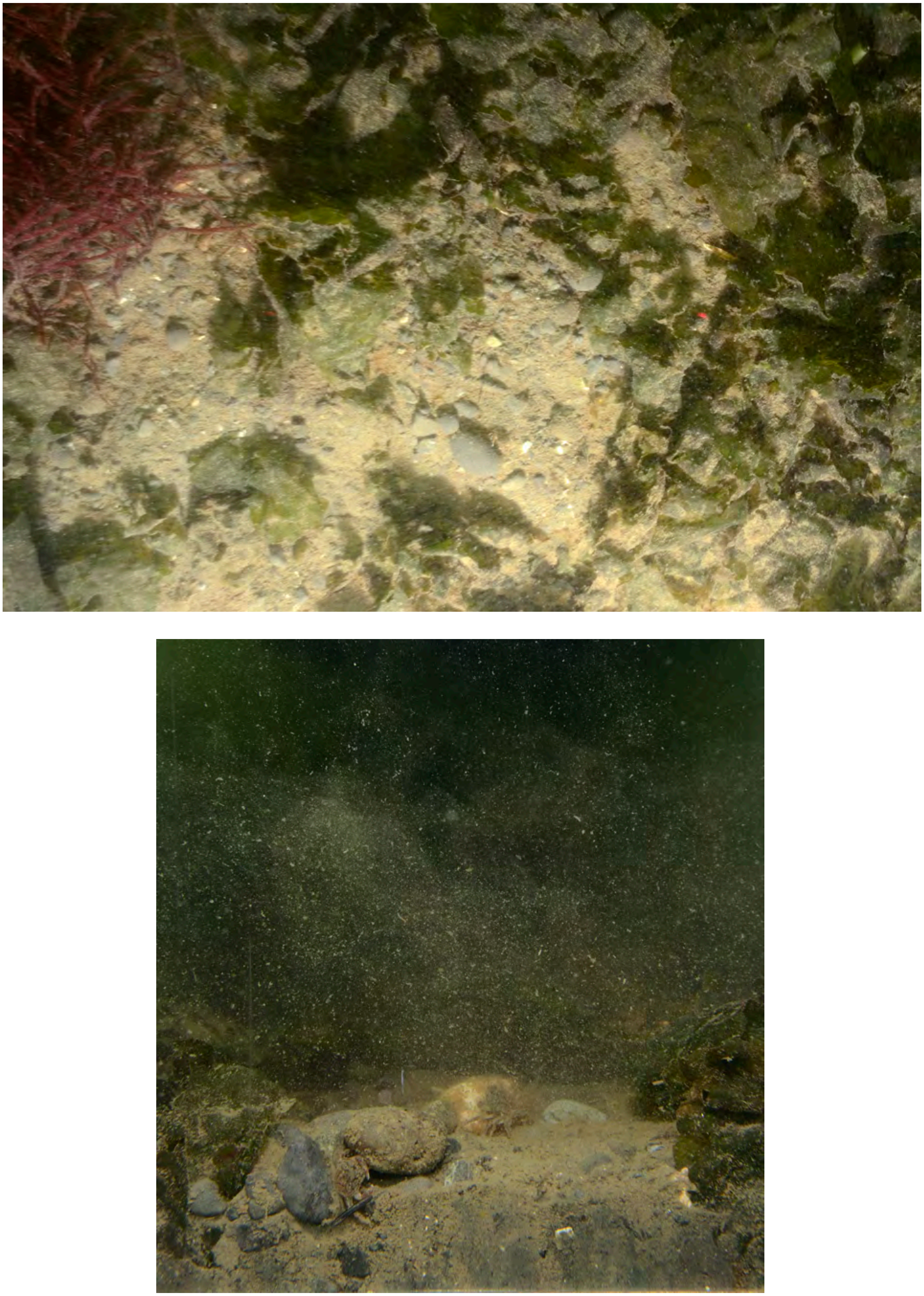

Figure 7: This profile and plan view image from Station WPAH053 shows poorly-sorted sediments with a mixed cobble and silty sand surface. Scale: width of profile image = 14.4 cm; width of PV image = 55.2 cm.

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Figure 8: Spatial distribution of camera prism penetration depth (cm) in Port Angeles in July 2013.

Figure 9: Despite the profile camera having the stop collars set at the maximum height and all the lead (250 lbs) in the weight carriages, the compact, very fine sand at Station WPAH047 only allowed minimal (2.06 cm) prism penetration. Scale: width of profile image = 14.4 cm.

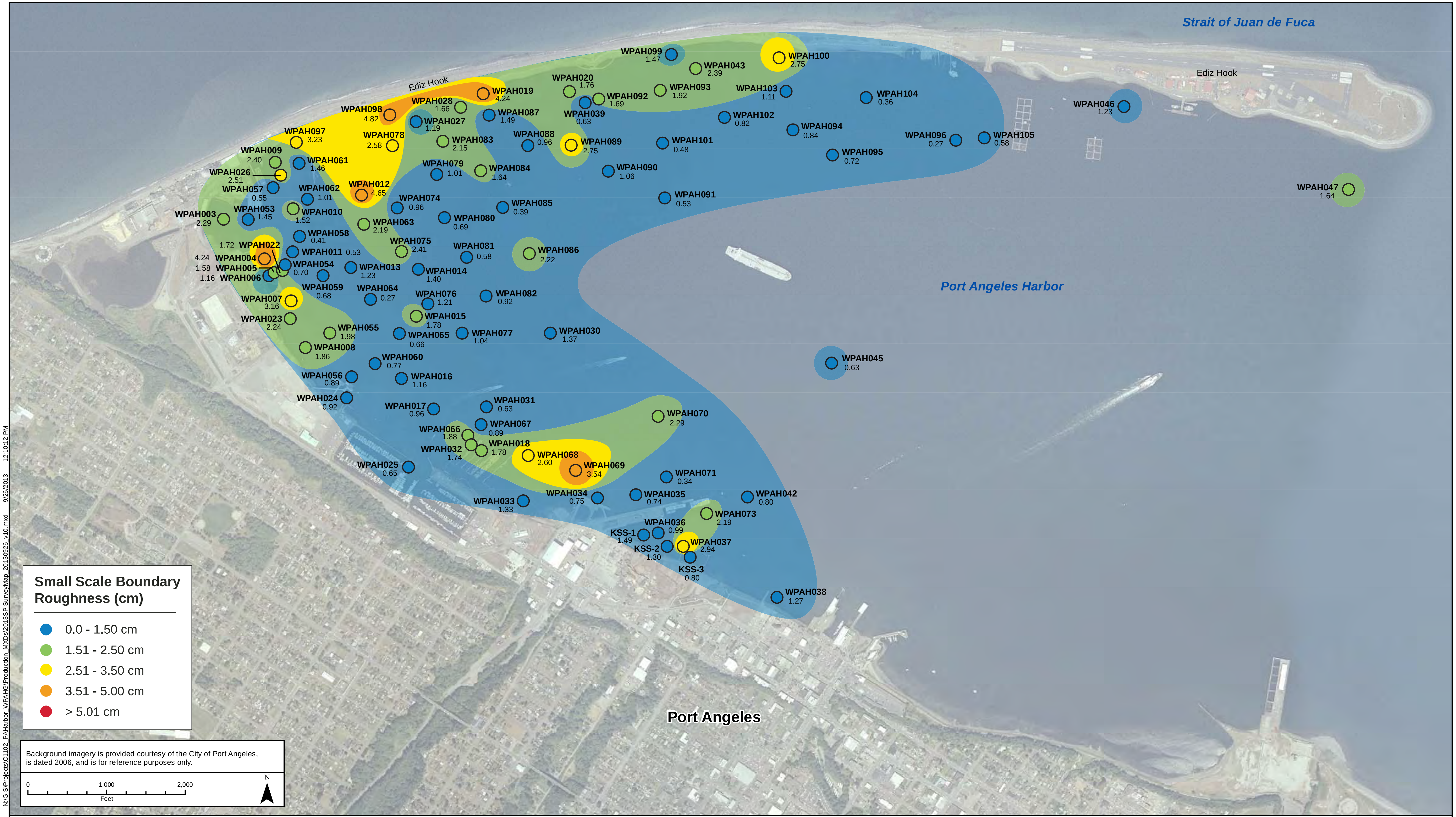

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Figure 10: Spatial distribution of small scale boundary roughness values (cm) in Port Angeles Harbor in July, 2013.

Figure 11: The disturbed sediment water interface in this profile image from Station WPAH012 is due to the camera prism dragging down some surface wood debris, resulting in a high measured value for boundary roughness. Scale: width of profile image = 14.4. cm.

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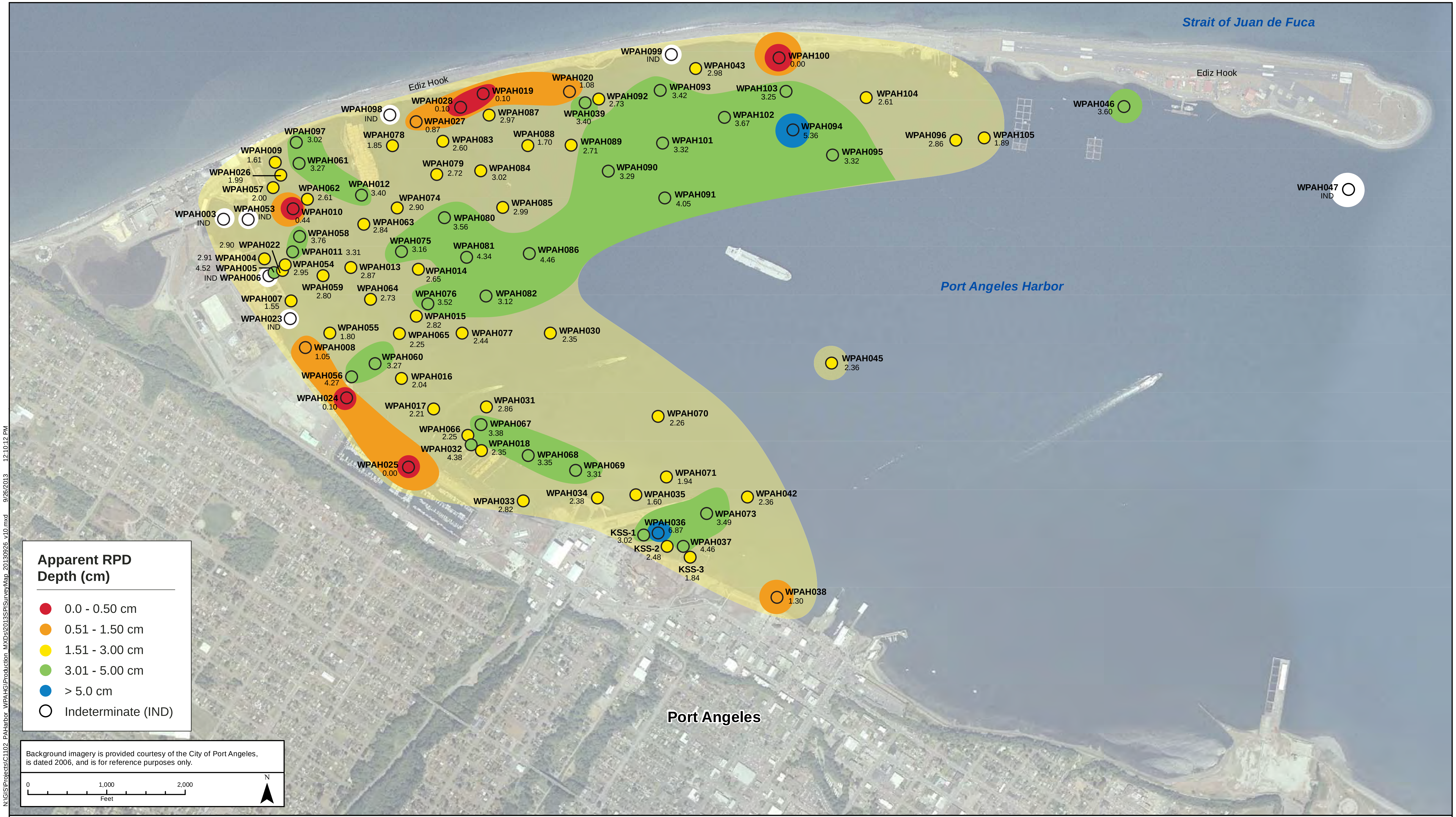

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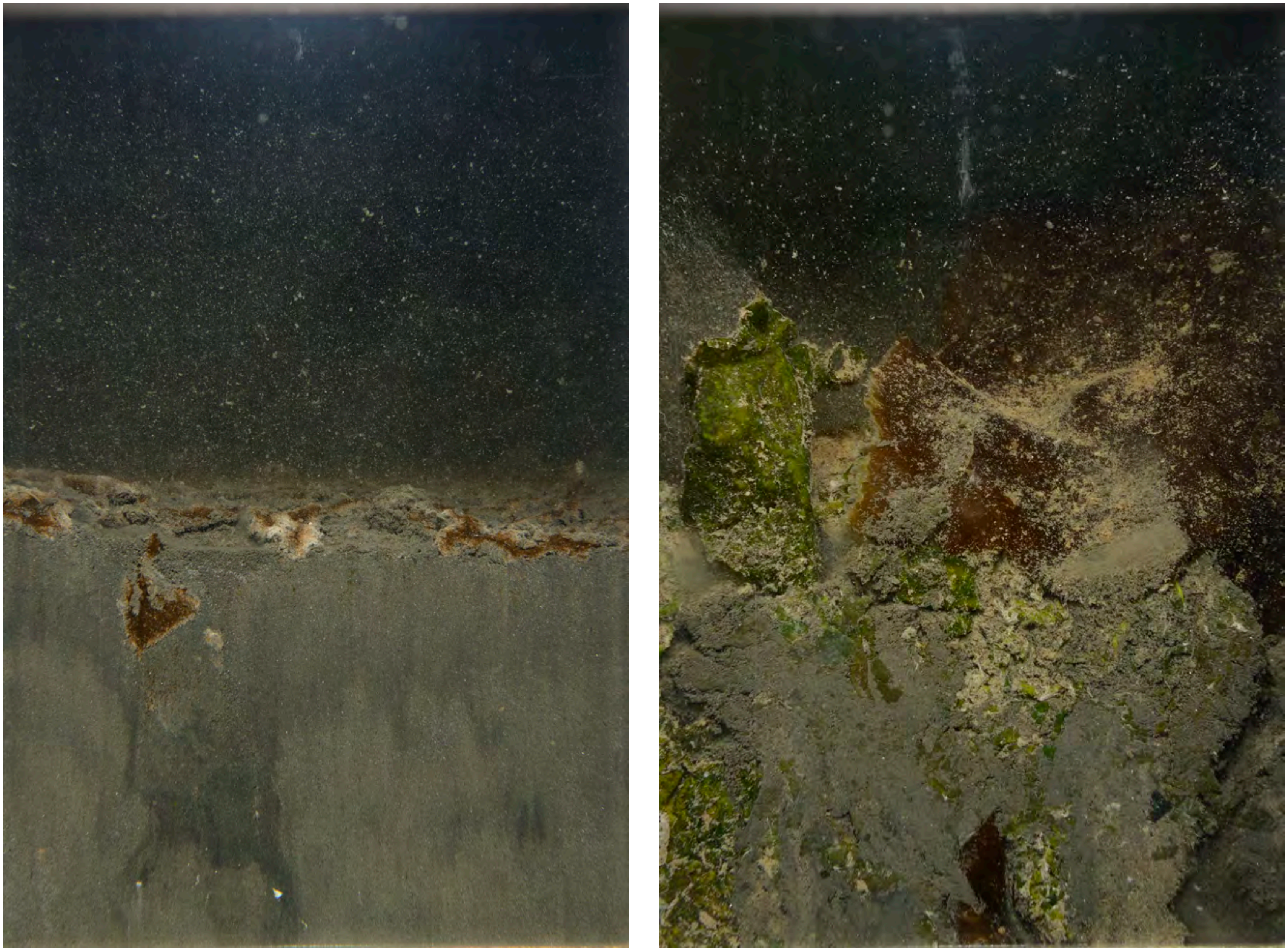
Figure 12: Spatial distribution of aRPD depth (cm) in Port Angeles in July 2013.



WPAH025 A

WPAH100 A

Figure 13: The profile images from Station WPAH025 (left) and WPAH100 (right) had no detectable oxidized surface layer because of decomposing macroalgae (left) and/or wood debris (right). Scale: width of each profile image = 14.4 cm.

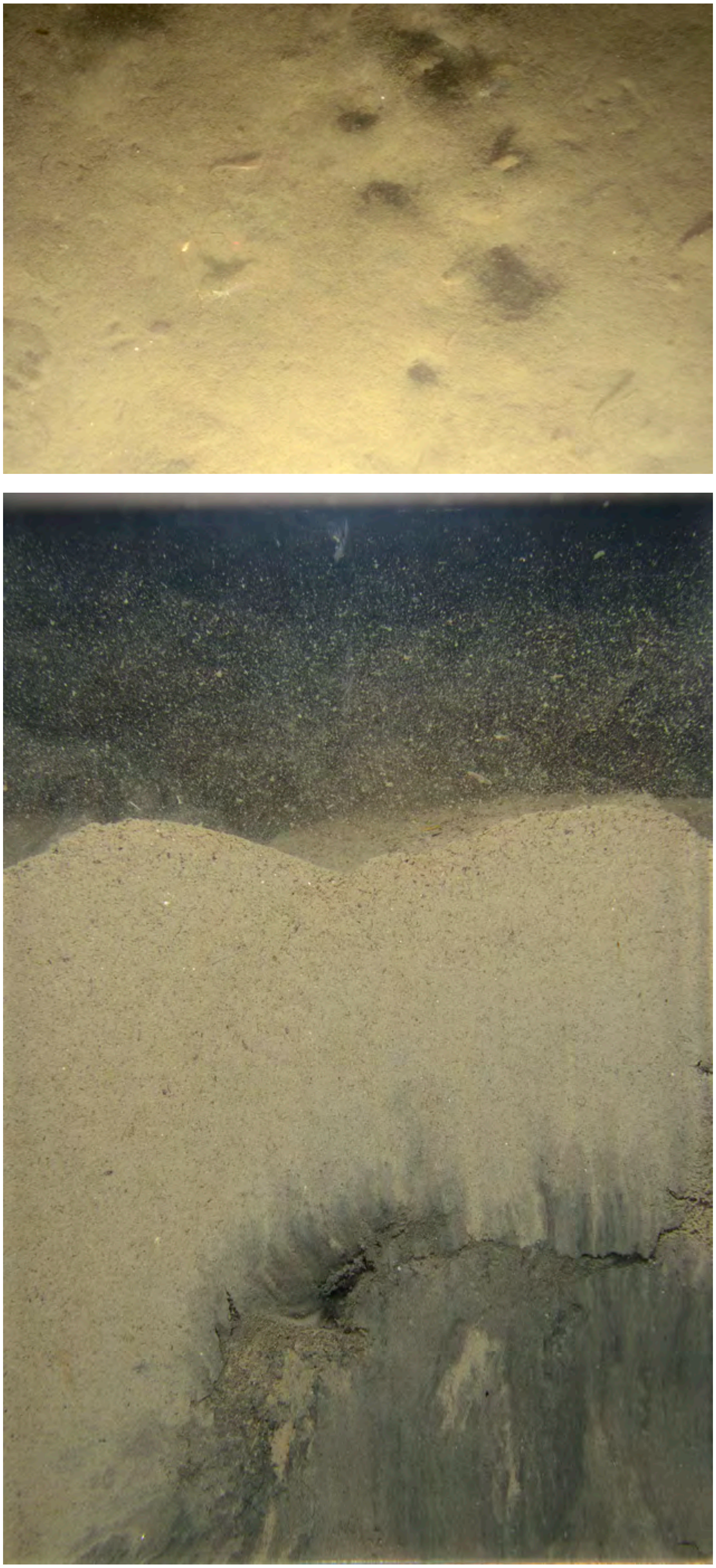
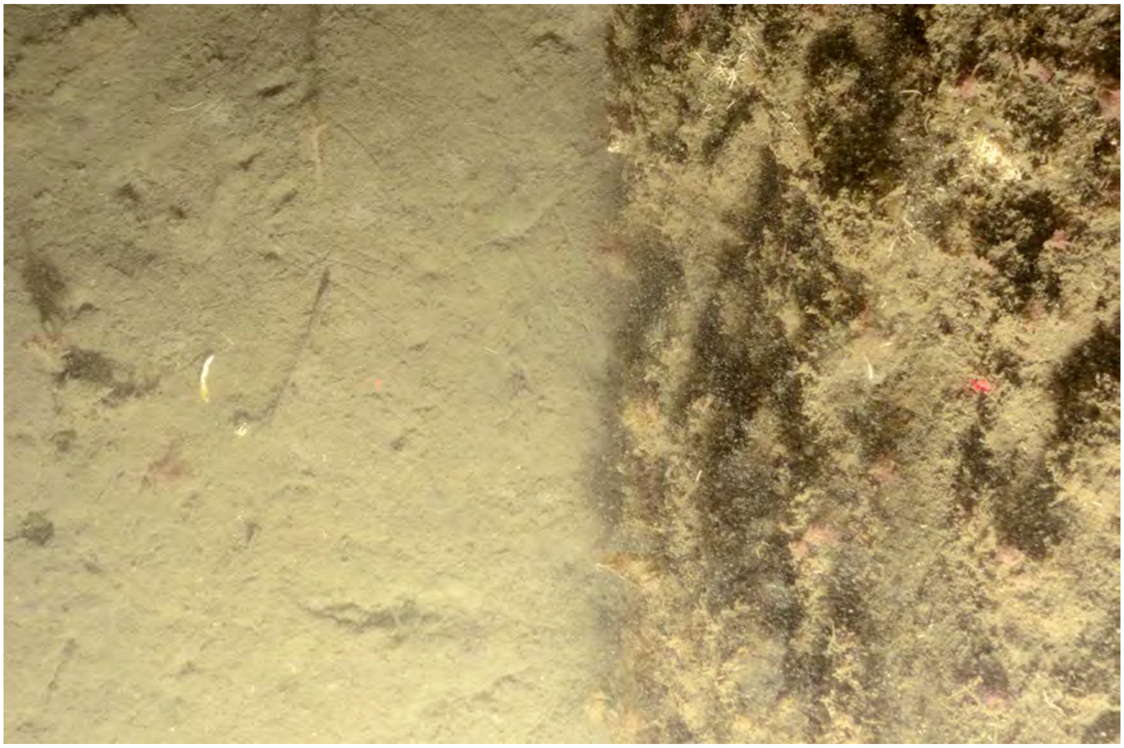


Figure 14: Even though there is a relatively high percentage of wood fibers in the surface layer of the profile image from this silt-clay bottom, the active bioturbation by large resident infauna (note the large burrow openings in the plan view image) have resulted in one of the highest aRPD values measured at Station WPAH036. Scale: width of profile image = 14.4 cm; width of PV image = 66.3 cm.

Figure 15: This profile image from Station WPAH099 shows a high percentage of wood fibers mixed in with the sediment. Scale: width of profile image = 14.4 cm.

WPAH028 C



WPAH078 B

Figure 16: These PV images from Station WPAH028 (top) and WPAH078 (bottom) show some of the different sizes of wood waste found on the bottom in Port Angeles, from 5-10 cm long chunks (top) and logs (bottom). Scale: width of top PV image = 67.5 cm; width of bottom PV image = 48.4 cm.

Background imagery is provided courtesy of the City of Port Angeles, is dated 2006, and is for reference purposes only.

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Figure 17: Spatial distribution of wood debris volume found at Port Angeles in July, 2013.

Figure 18: Even though the sediment surface cannot be seen in this profile image from Station WPAH010 where the camera over-penetrated, the "cottage cheese" texture of the pocket of wood pulp at depth is quite evident in this image. Scale: width of profile image = 14.4 cm.

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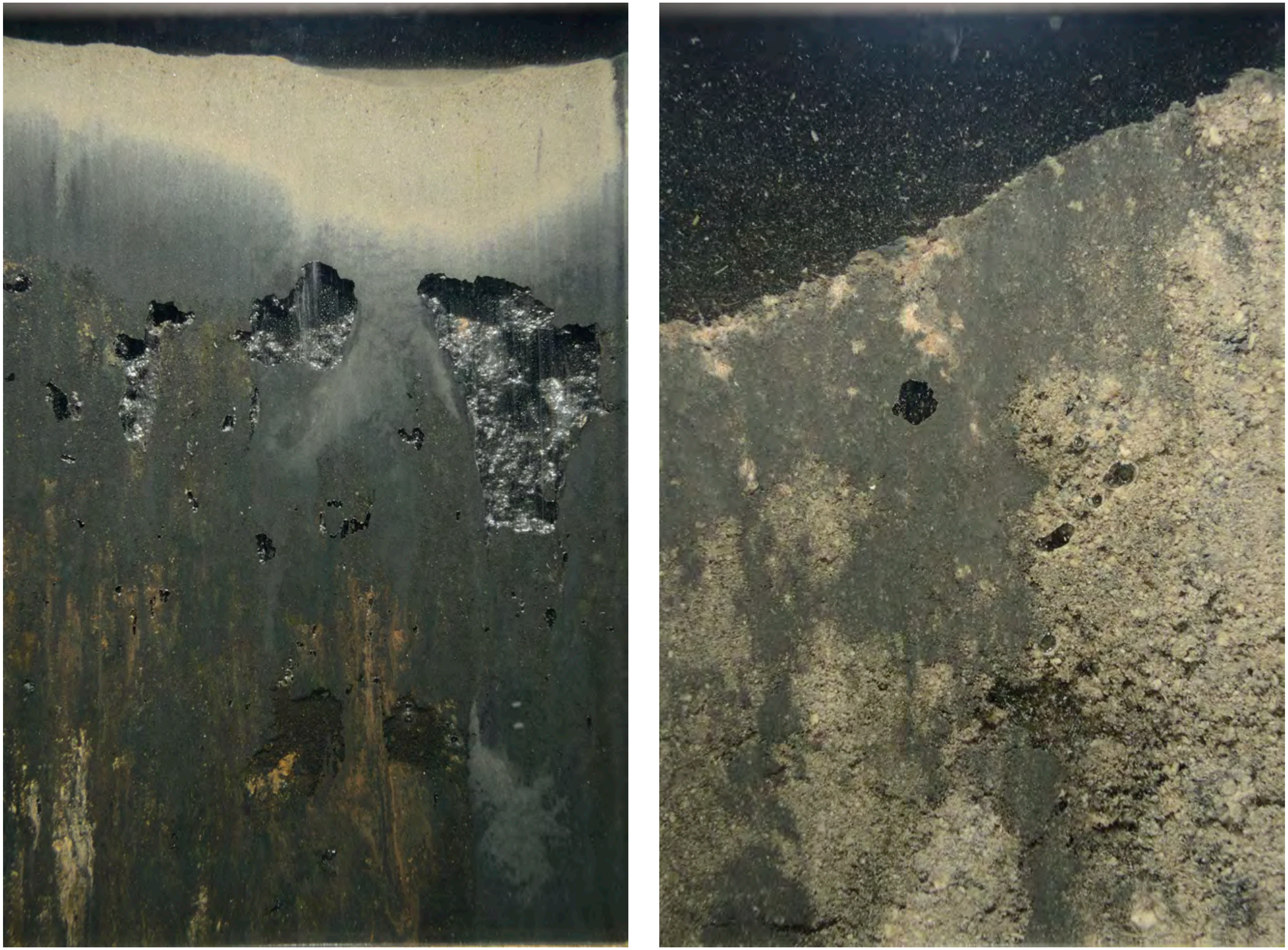
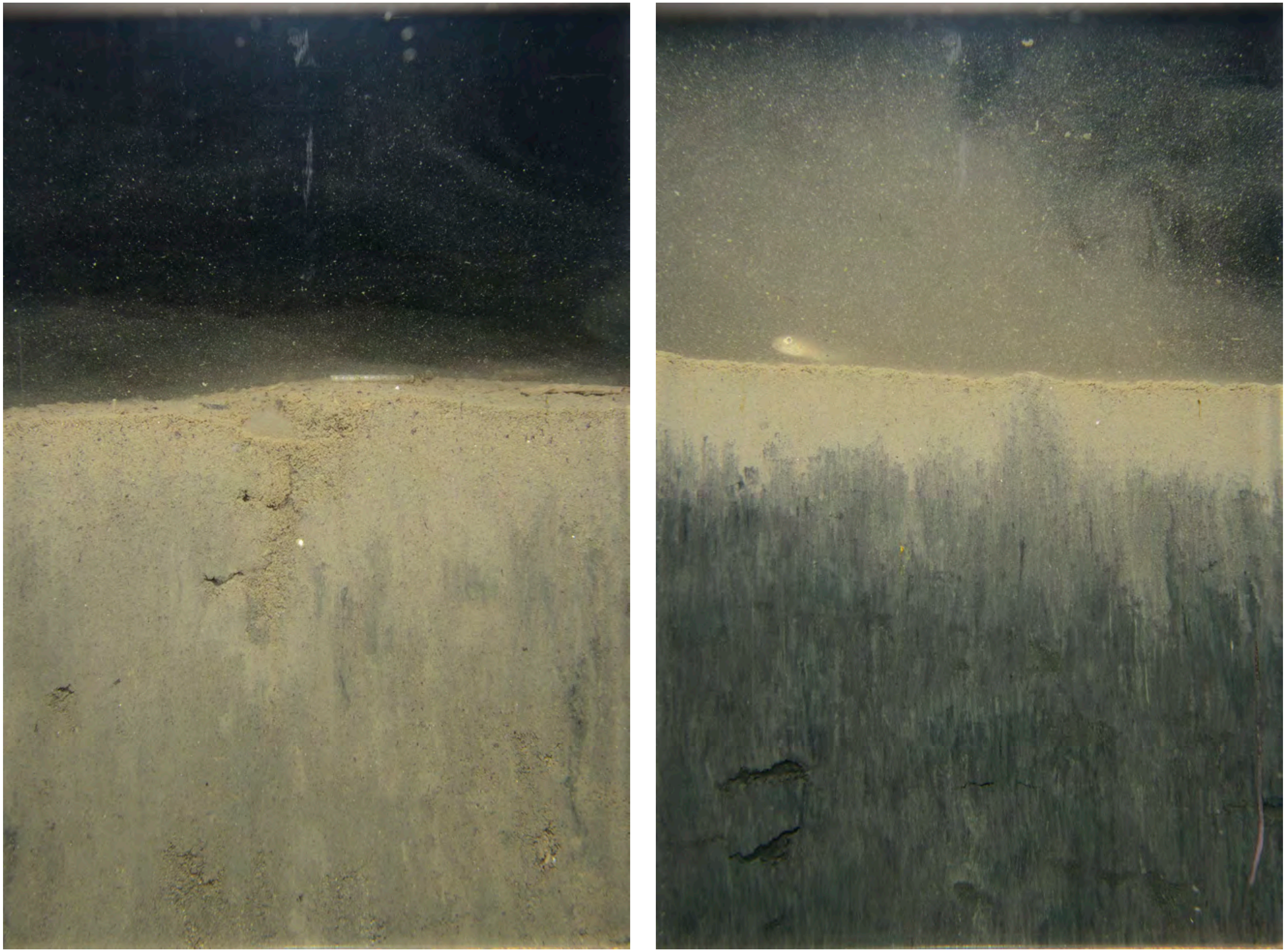
Figure 19: Presence/absence of thiophilic bacterial colonies, low dissolved oxygen in the benthic boundary layer, or subsurface methane in SPI and PV images analyzed from the July 2013 Port Angeles survey.



WPAH096 D

WPAH057 C

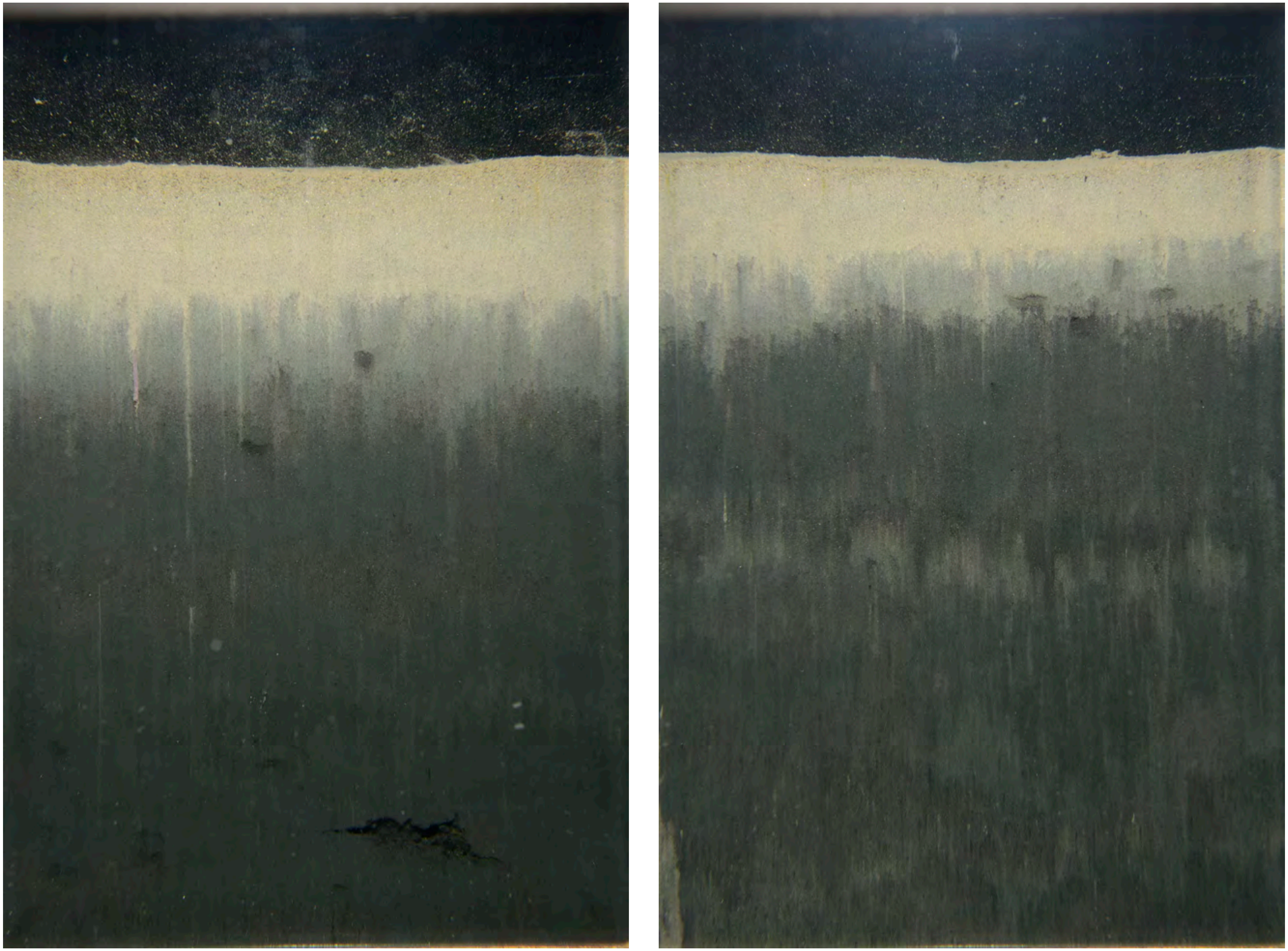
Figure 20: These replicate profile images from Station WPAH096 (left) and WPAH057 (right) are examples of unanalyzed samples where subsurface methane was present. Scale of each profile image = 14.4 cm.



WPAH064 A

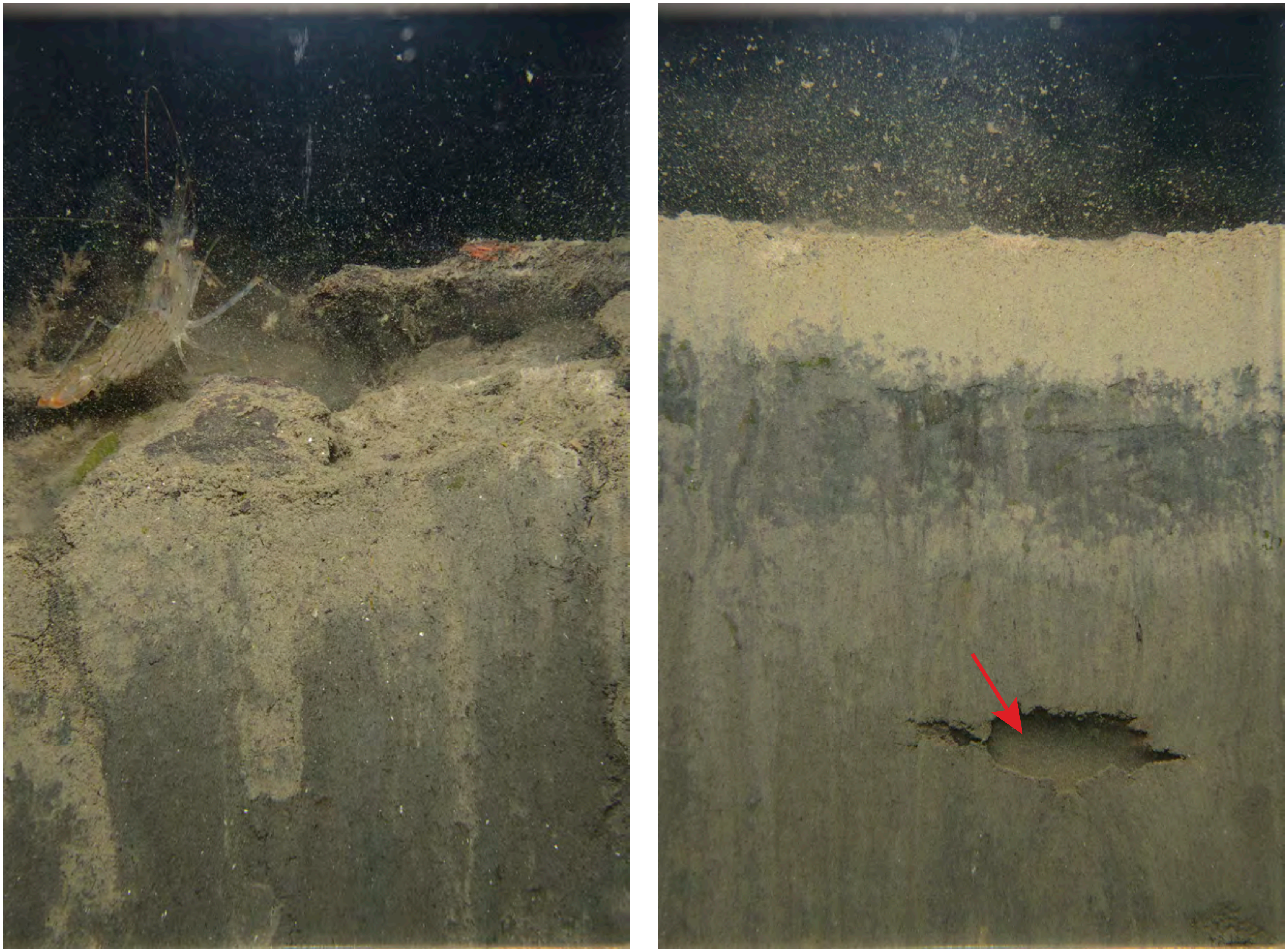
WPAH088 A

Figure 21: These profile images from Station WPAH064 (left) and WPAH088 (right) show the difference in subsurface sediment color from organic enrichment. Scale: width of each profile image = ca. 14.5 cm.



WPAH0296 A **WPAH105 A**

Figure 22: The dark subsurface anaerobic sediments in these profile images from Stations WPAH096 (left) and WPAH105 (right) show the effects of increased organic enrichment from the nearby fish pens. Scale: width of each profile image = 14.4 cm.



WPAH007 D

WPAH007 E

Figure 23: While these replicate images from Station WPAH007 show evidence of organic enrichment (darker subsurface sediments, thiophilic bacterial colonies at the surface), there are both Stage 3 assemblages present (arrow) and epifaunal predators (shrimp) foraging on the small polychaetes at the sediment surface. Scale: width of each image = 14.4 cm.

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Figure 24: Spatial distribution of infaunal successional stages found in Port Angeles in July 2013.

Figure 25: Even though there was a high percent cover of wood debris at Station WPAH068 as shown in this PV image, the presence of Stage 3 taxa and subsurface feeding voids (arrows) were evident in the corresponding profile image from this station. Scale: width of profile image = 14.4 cm; width of PV image = 61.5 cm

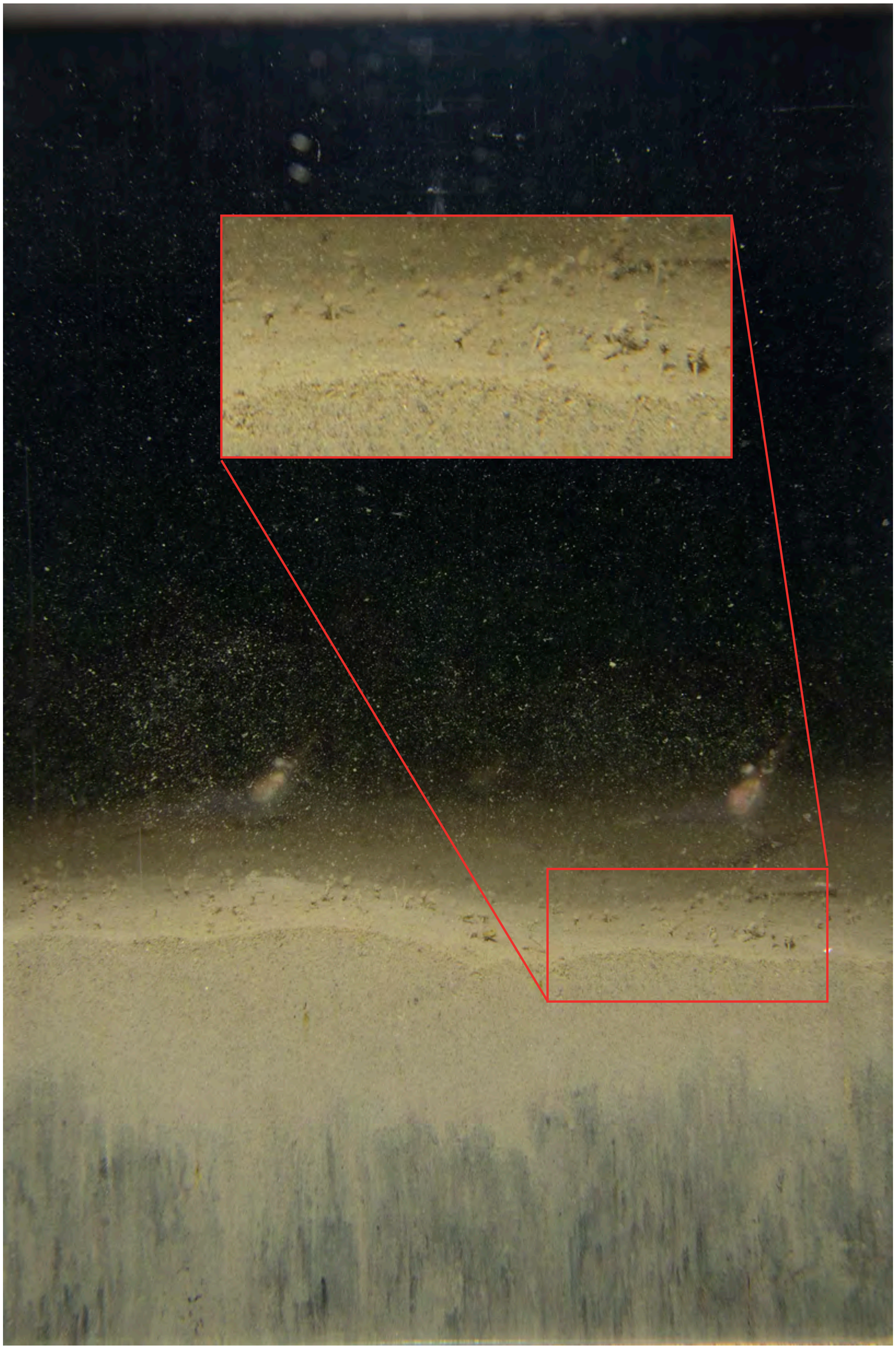
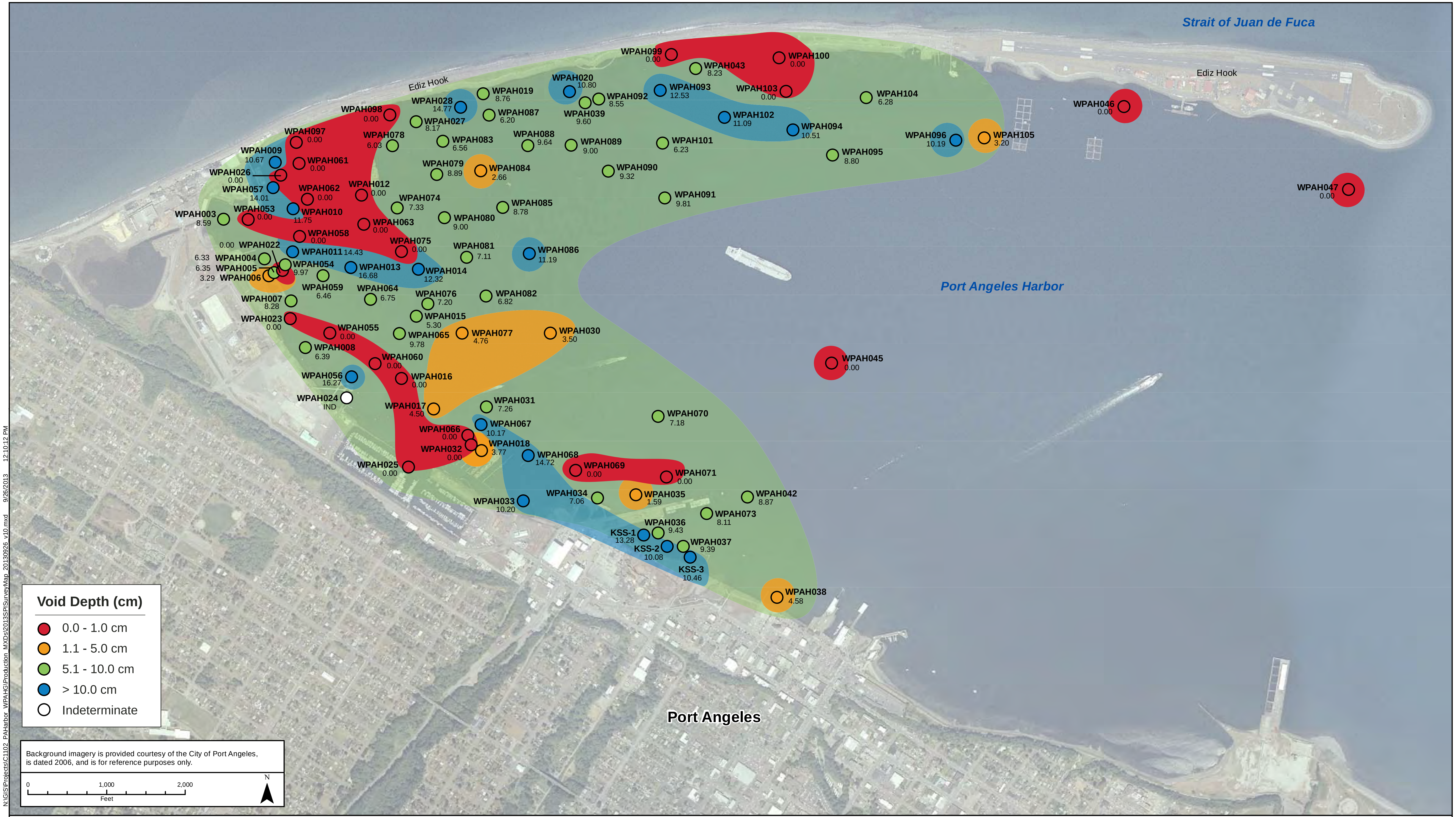


Figure 26: This profile image from Station WPAH045 shows a relatively dense assemblage of Stage 1 polychaetes (see magnified inset); two shrimp can be seen foraging on the sediment surface in the background of the image. Scale: width of image = 14.4 cm.



N:\GIS\Projects\C1102_PAHarbor_WPAH\GIS\Production_MXDs\2013SPISurveyMap_20130926_v10.mxd 9/26/2013 12:10:12 PM

Figure 27: Spatial distribution of feeding void depth (cm) at locations surveyed in Port Angeles in July, 2013.

Background imagery is provided courtesy of the City of Port Angeles, is dated 2006, and is for reference purposes only.

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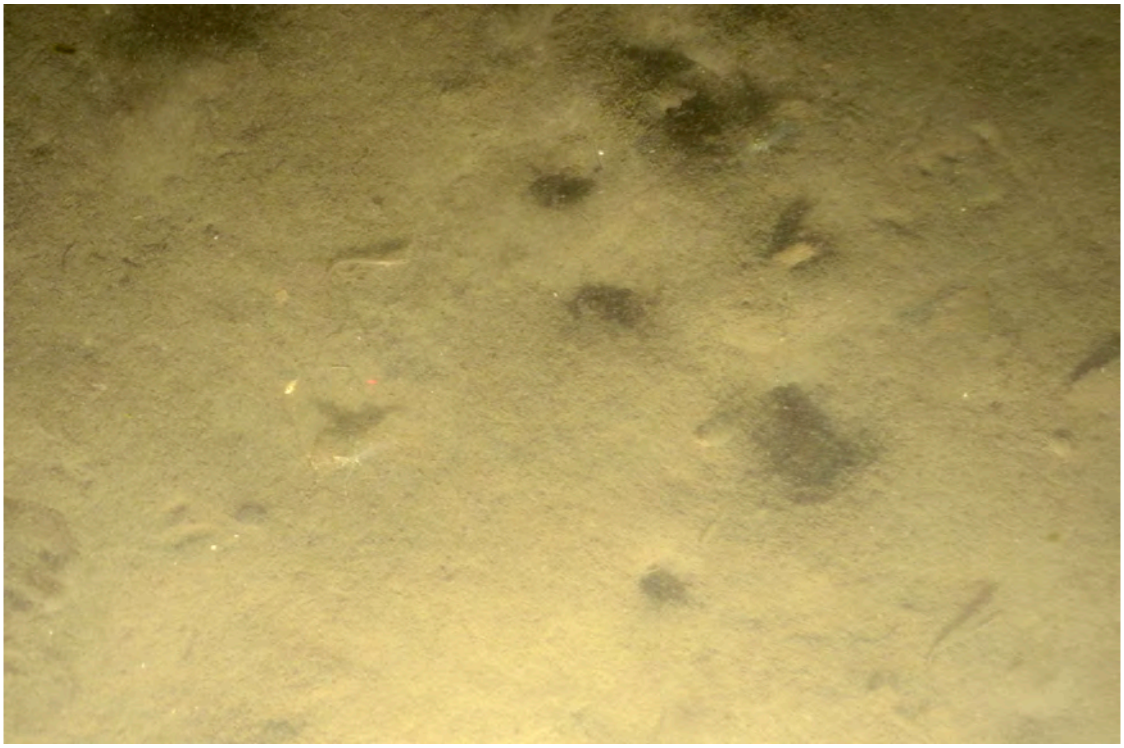
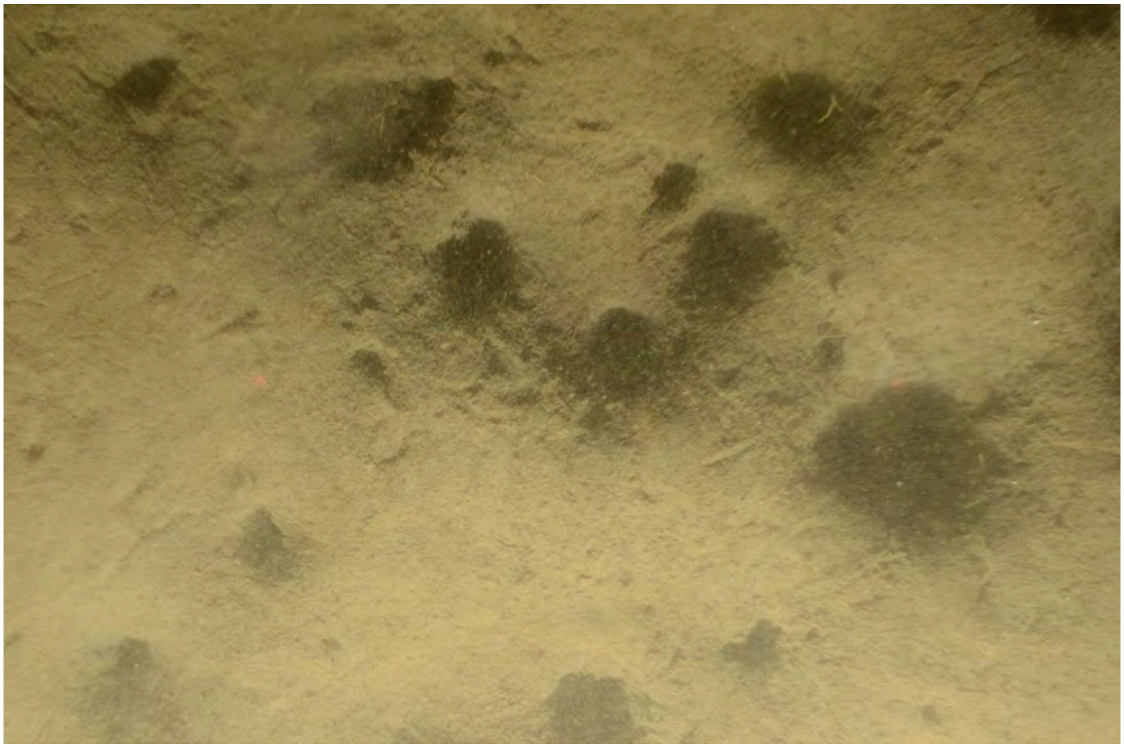
Figure 28: Spatial distribution of maximum bioturbation depth (cm) at locations surveyed in Port Angeles in July, 2013.

Figure 29: This profile image from Station WPAH057 showed evidence of subsurface burrowing that exceeded the depth of the prism penetration. Scale: width of profile image = 14.4 cm.



WPAH036 A



WPAH037 D

Figure 30: These PV images from Station WPAH036 (top) and WPAH037 (bottom) show large infaunal burrow openings which provide additional evidence as to why biological mixing depths are so high at this site. Scale: width of top PV image = 66.3 cm; width of bottom PV image = 45.2 cm

WPAH006 C

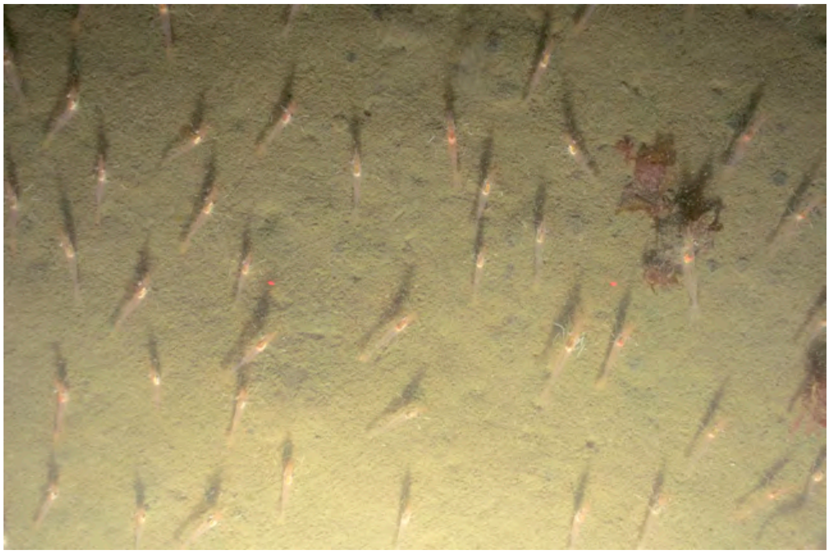
WPAH068 A

WPAH092 B

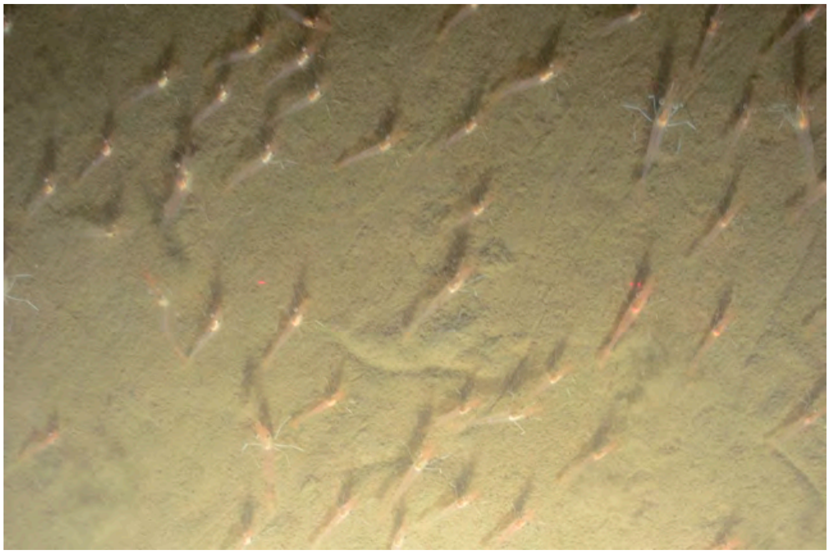
Figure 31: These PV images from Station WPAH006 (top; water depth = 7.6 m), WPAH068 (middle; water depth = 13 m), and WPAH092 (bottom; water depth=28.4 m) show large pieces of wood covered by a layer of fine sediments from natural depositional processes. Scale: width of top PV image ca. 64 cm; middle image ca. 62 cm; bottom image ca. 81 cm.

Figure 32: This profile image from Station WPAH058 shows a subsurface layer of wood waste (arrow) that was originally deposited at the sediment surface and has since been buried by an accumulation of fine sediment from natural depositional processes. Scale: width of profile image = 14.4 cm.

WPAH040 E



WPAH044 C



WPAH095 B

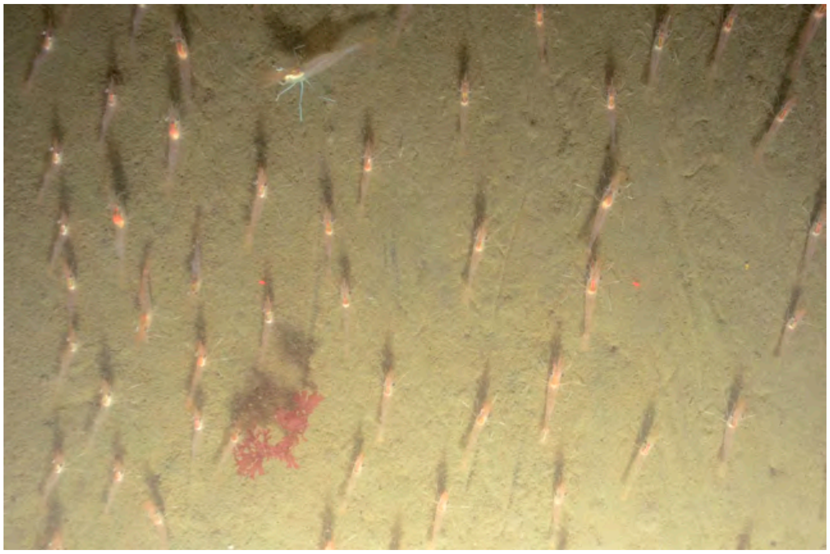


Figure 33: These PV images from Stations WPAH040 (top), WPAH044 (middle) and WPAH095 (bottom) show some of the high densities of shrimp found in Port Angeles. Scale: width of top PV image ca. 63 cm; width of middle PV image ca. 58 cm; width of bottom PV image ca. 57 cm.

APPENDIX A

Sediment Profile Image Analysis Results

STATION	Rep	Stop Collar Settings (in.)	# of weights per chassis	DATE	TIME	Water Depth (m)	Calibration Constant	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	GrnSize RANGE	Penetration Area (sq.cm)	Average Penetration (cm)	Minimum Penetration (cm)	Maximum Penetration (cm)	Boundary Roughness (cm)	Origin of Boundary Roughness	RPD Area (sq.cm)	Mean RPD (cm)	Methane	Low DO?
WPAH003	D	16	5	7/17/2013	16:46:31	4.6	14.44	4-3	1	>4	>4 to 1	238.10	16.49	15.12	17.41	2.29	Physical	IND	IND	No	No
WPAH004	A	15	2	7/16/2013	15:00:10	8.8	14.44	>4	2	>4	>4 to 2	257.12	17.80	16.85	19.19	2.34	Physical	42.04	2.91	No	No
WPAH004	D	15	2	7/16/2013	15:03:46	8.2	14.44	>4	2	>4	>4 to 2	215.67	14.93	10.80	16.95	6.15	Physical	IND	IND	No	No
WPAH005	A	15	0	7/16/2013	15:24:03	13.0	14.44	>4	2	>4	>4 to 2	268.98	18.63	17.62	19.38	1.76	Biogenic	82.22	5.69	No	No
WPAH005	B	15	0	7/16/2013	15:25:48	13.0	14.44	>4	2	>4	>4 to 2	257.09	17.80	17.24	18.64	1.40	Biogenic	48.45	3.35	No	No
WPAH006	C	15	2	7/16/2013	15:10:44	7.6	14.44	>4	1	>4	>4 to 1	233.88	16.20	15.60	16.76	1.16	Physical	IND	IND	No	No
WPAH007	D	14	0	7/16/2013	17:20:23	12.0	14.44	>4	2	>4	>4 to 2	157.93	10.94	8.99	12.15	3.16	Physical	22.41	1.55	No	No
WPAH008	A	16	5	7/18/2013	13:22:38	6.8	14.44	>4	2	>4	>4 to 2	209.33	14.50	13.02	15.55	2.53	Biogenic	27.49	1.90	No	No
WPAH008	D	16	5	7/18/2013	13:25:34	8.2	14.44	>4	2	>4	>4 to 2	147.59	10.22	9.74	10.92	1.18	Physical	diffusional	0.20	No	No
WPAH009	A	14	0	7/17/2013	15:25:29	8.6	14.44	>4	2	>4	>4 to 2	112.33	7.78	6.73	10.05	3.33	Physical	17.01	1.18	No	No
WPAH009	D	14	0	7/17/2013	15:29:32	9.6	14.44	>4	2	>4	>4 to 2	289.29	20.03	19.58	21.05	1.47	Biogenic	29.61	2.05	No	No
WPAH010	C	14	0	7/17/2013	15:10:20	16.0	14.44	>4	2	>4	>4 to 2	255.33	17.68	16.78	18.30	1.52	Physical	6.39	0.44	No	No
WPAH011	B	15	0	7/16/2013	15:49:11	16.4	14.44	>4	2	>4	>4 to 2	291.22	20.17	19.94	20.47	0.53	Biogenic	47.87	3.31	No	No
WPAH012	B	15	2	7/16/2013	13:48:16	27.4	14.44	>4	2	>4	>4 to 2	216.28	14.98	12.66	18.39	5.74	Physical	Ind	3.43	No	No
WPAH012	C	15	2	7/16/2013	13:49:31	27.4	14.44	>4	2	>4	>4 to 2	216.92	15.02	14.08	17.65	3.57	Physical	IND	3.37	No	No
WPAH013	A	15	0	7/16/2013	14:06:16	17.8	14.44	>4	2	>4	>4 to 2	248.81	17.23	16.68	17.91	1.23	Biogenic	41.48	2.87	No	No
WPAH014	A	14	0	7/15/2013	10:14:43	21.2	14.44	>4	2	>4	>4 to 2	278.13	19.26	18.71	20.11	1.40	Physical	38.32	2.65	No	No
WPAH015	A	14	0	7/15/2013	10:30:48	19.6	14.44	>4	2	>4	>4 to 2	187.97	13.02	12.27	14.06	1.78	Biogenic	40.70	2.82	No	No
WPAH016	A	14	0	7/15/2013	10:52:03	16.0	14.44	>4	2	>4	>4 to 2	226.02	15.65	14.97	16.13	1.16	Biogenic	29.44	2.04	No	No
WPAH017	A	14	0	7/15/2013	11:12:46	15.4	14.44	>4	2	>4	>4 to 2	218.83	15.15	14.75	15.72	0.96	Biogenic	31.89	2.21	No	No
WPAH018	A	14	0	7/15/2013	11:34:31	12.2	14.44	>4	2	>4	>4 to 2	157.32	10.89	9.50	11.28	1.78	Biogenic	33.93	2.35	No	No
WPAH019	C	15.5	0	7/16/2013	11:27:20	14.0	14.44	4-3	0	>4	>4 to 0	186.00	12.88	10.61	14.85	4.24	Physical	diffusiona	0.10	No	Yes
WPAH020	B	15	1	7/15/2013	16:25:38	14.6	14.44	>4	2	>4	>4 to 2	264.41	18.31	17.67	19.43	1.76	Physical	15.54	1.08	No	No

STATION	Rep	Stop Collar Settings (in.)	# of weights per chassis	DATE	TIME	Water Depth (m)	Calibration Constant	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	GrnSize RANGE	Penetration Area (sq.cm)	Average Penetration (cm)	Minimum Penetration (cm)	Maximum Penetration (cm)	Boundary Roughness (cm)	Origin of Boundary Roughness	RPD Area (sq.cm)	Mean RPD (cm)	Methane	Low DO?
WPAH022	B	15	0	7/16/2013	15:34:05	12.6	14.44	>4	2	>4	>4 to 2	138.00	9.56	8.22	10.73	2.51	Biogenic	36.06	2.50	No	No
WPAH022	C	15	0	7/16/2013	15:35:24	12.8	14.44	>4	2	>4	>4 to 2	279.79	19.37	18.76	19.70	0.94	Biogenic	47.70	3.30	No	No
WPAH023	A	16	5	7/18/2013	12:47:16	7.4	14.44	>4	0	>4	>4 to 0	196.19	13.59	12.37	14.61	2.24	Physical	IND	IND	No	No
WPAH024	F	16	0	7/18/2013	8:36:41	5.6	14.44	>4	2	>4	>4 to 2	176.82	12.24	11.79	12.71	0.92	Physical	diffusiona	0.10	No	Yes
WPAH025	A	16	3	7/17/2013	17:18:47	6.8	14.44	>4	2	>4	>4 to 2	135.41	9.38	9.06	9.72	0.65	Physical	0.00	0.00	No	Yes
WPAH026	A	14	0	7/18/2013	8:47:50	13.6	14.44	>4	2	>4	>4 to 2	278.43	19.28	17.84	20.35	2.51	Physical	28.80	1.99	No	No
WPAH027	A	16	3	7/16/2013	11:51:47	4.8	14.44	3-2	0	>4	>4 to 0	188.00	13.02	12.32	13.57	1.25	Physical	17.02	1.18	No	No
WPAH027	C	16	3	7/16/2013	11:54:18	4.6	14.44	2-1	-1	>4	>4 to -1	151.23	10.47	9.64	10.78	1.13	Physical	8.13	0.56	No	No
WPAH028	A	15.5	0	7/16/2013	11:33:59	11.4	14.44	>4	1	>4	>4 to 1	224.19	15.52	14.56	16.23	1.66	Physical	diffusional	0.10	No	No
WPAH030	A	15	2	7/16/2013	8:54:59	23.6	14.44	>4	2	>4	>4 to 2	161.70	11.20	10.15	12.15	2.00	Biogenic	34.71	2.40	No	No
WPAH030	B	15	2	7/16/2013	8:56:33	23.6	14.44	>4	2	>4	>4 to 2	212.74	14.73	14.47	15.21	0.75	Biogenic	33.26	2.30	No	No
WPAH031	A	14	0	7/15/2013	11:50:54	17.6	14.44	>4	2	>4	>4 to 2	176.59	12.23	11.67	12.30	0.63	Biogenic	41.32	2.86	No	No
WPAH032	B	14	0	7/15/2013	11:27:48	14.0	14.44	>4	2	>4	>4 to 2	195.25	13.52	12.71	14.44	1.74	Physical	63.31	4.38	No	No
WPAH033	A	16	3	7/16/2013	8:20:45	10.6	14.44	>4	2	>4	>4 to 2	247.79	17.16	16.66	17.99	1.33	Biogenic	40.74	2.82	No	No
WPAH034	A	16	3	7/16/2013	8:30:25	14.8	14.44	>4	2	>4	>4 to 2	151.88	10.52	10.08	10.82	0.75	Biogenic	34.39	2.38	No	No
WPAH035	A	16	3	7/16/2013	8:41:29	15.8	14.44	4-3	0	>4	>4 to 0	57.55	3.99	3.64	4.27	0.63	Biogenic	23.47	1.62	No	No
WPAH035	D	16	3	7/16/2013	8:46:02	16.0	14.44	4-3	1	>4	>4 to 1	66.13	4.58	4.07	4.92	0.84	Biogenic	22.83	1.58	No	No
WPAH036	A	15	2	7/17/2013	9:25:39	11.8	14.44	>4	1	>4	>4 to 1	214.73	14.87	14.13	15.12	0.99	Biogenic	99.25	6.87	No	No
WPAH037	A	15	2	7/17/2013	9:34:00	10.2	14.44	>4	1	>4	>4 to 1	230.66	15.97	14.75	17.70	2.94	Biogenic	64.44	4.46	No	No
WPAH038	A	16	5	7/17/2013	8:50:13	7.0	14.44	4-3	1	>4	>4 to 1	149.60	10.36	9.21	11.19	1.98	Biogenic	17.90	1.24	No	No
WPAH038	D	16	5	7/17/2013	8:53:58	5.8	14.44	4-3	1	>4	>4 to 1	123.93	8.58	8.32	8.87	0.55	Biogenic	19.64	1.36	No	No
WPAH039	A	15	1	7/15/2013	16:45:46	31.2	14.44	>4	1	>4	>4 to 1	227.71	15.77	15.36	15.98	0.63	Biogenic	49.12	3.40	No	No
WPAH042	A	15	1	7/15/2013	14:15:57	15.8	14.44	>4	1	>4	>4 to 1	147.23	10.20	9.76	10.56	0.80	Biogenic	34.04	2.36	No	No
WPAH043	A	15	2	7/15/2013	15:59:39	26.4	14.44	>4	2	>4	>4 to 2	236.13	16.35	15.28	17.67	2.39	Physical	43.01	2.98	No	No
WPAH045	A	15	1	7/15/2013	14:06:37	25.4	14.44	>4	2	>4	>4 to 2	93.47	6.47	6.12	6.75	0.63	Biogenic	34.02	2.36	No	No

STATION	Rep	Stop Collar Settings (in.)	# of weights per chassis	DATE	TIME	Water Depth (m)	Calibration Constant	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	GrnSize RANGE	Penetration Area (sq.cm)	Average Penetration (cm)	Minimum Penetration (cm)	Maximum Penetration (cm)	Boundary Roughness (cm)	Origin of Boundary Roughness	RPD Area (sq.cm)	Mean RPD (cm)	Methane	Low DO?
WPAH046	A	16.5	5	7/15/2013	13:22:01	16.8	14.44	4-3	1	>4	>4 to 1	61.47	4.26	3.38	4.77	1.40	Physical	61.47	4.26	No	No
WPAH046	B	16.5	5	7/15/2013	13:23:03	16.2	14.44	4-3	1	>4	>4 to 1	42.51	2.94	2.43	3.50	1.06	Physical	42.51	2.94	No	No
WPAH047	A	16.5	5	7/15/2013	13:10:38	46.0	14.44	3-2	1	>4	>4 to 1	29.69	2.06	1.11	2.75	1.64	Physical	IND	IND	No	No
WPAH053	D	15	2	7/17/2013	16:35:10	6.4	14.44	-3	-4	>4	>4 to -4	28.59	1.98	1.06	2.51	1.45	Physical	IND	IND	No	No
WPAH054	A	15	0	7/16/2013	15:39:44	13.2	14.44	>4	2	>4	>4 to 2	244.69	16.94	16.59	17.29	0.70	Biogenic	42.58	2.95	No	No
WPAH055	A	14	0	7/16/2013	17:24:10	14.4	14.44	>4	2	>4	>4 to 2	244.64	16.94	16.25	18.23	1.98	Biogenic	25.96	1.80	No	No
WPAH056	A	14	0	7/16/2013	17:31:46	12.8	14.44	>4	2	>4	>4 to 2	277.62	19.22	18.59	19.48	0.89	Biogenic	61.66	4.27	No	No
WPAH057	B	14	0	7/17/2013	15:18:11	14.0	14.44	>4	2	>4	>4 to 2	304.62	21.09	20.66	21.22	0.55	Biogenic	28.91	2.00	No	No
WPAH058	C	15	0	7/16/2013	15:57:59	17.0	14.44	>4	2	>4	>4 to 2	293.65	20.33	20.20	20.61	0.41	Biogenic	54.26	3.76	No	No
WPAH059	A	13.5	0	7/16/2013	17:02:30	17.2	14.44	>4	2	>4	>4 to 2	254.95	17.65	17.14	17.82	0.68	Physical	40.42	2.80	No	No
WPAH060	A	14	0	7/15/2013	10:44:15	15.0	14.44	>4	2	>4	>4 to 2	222.75	15.42	15.04	15.82	0.77	Biogenic	47.27	3.27	No	No
WPAH061	B	13.5	0	7/16/2013	16:46:56	14.8	14.44	>4	2	>4	>4 to 2	135.10	9.36	8.70	10.46	1.76	Biogenic	49.59	3.43	No	No
WPAH061	E	15	1	7/18/2013	9:02:50	13.0	14.44	>4	2	>4	>4 to 2	103.18	7.15	6.39	7.55	1.16	Biogenic	44.87	3.11	No	No
WPAH062	B	13.5	0	7/16/2013	16:55:46	18.6	14.44	>4	2	>4	>4 to 2	226.27	15.67	15.21	16.23	1.01	Biogenic	37.63	2.61	No	No
WPAH063	A	15	2	7/16/2013	13:55:34	19.6	14.44	>4	2	>4	>4 to 2	273.95	18.97	18.11	20.30	2.19	Biogenic	41.04	2.84	No	No
WPAH064	A	15	0	7/16/2013	14:14:16	18.0	14.44	>4	2	>4	>4 to 2	179.15	12.41	12.37	12.63	0.27	Biogenic	39.39	2.73	No	No
WPAH065	A	14	0	7/15/2013	10:37:49	18.2	14.44	>4	2	>4	>4 to 2	208.18	14.42	14.10	14.56	0.46	Biogenic	32.01	2.22	No	No
WPAH065	B	14	0	7/15/2013	10:38:46	18.2	14.44	>4	2	>4	>4 to 2	208.81	14.46	14.20	15.07	0.87	Biogenic	32.84	2.27	No	No
WPAH066	A	14	0	7/15/2013	11:20:55	14.2	14.44	>4	2	>4	>4 to 2	204.51	14.16	13.28	15.16	1.88	Physical	32.45	2.25	No	No
WPAH067	A	14	0	7/15/2013	11:43:35	15.6	14.44	>4	2	>4	>4 to 2	185.10	12.82	12.34	13.24	0.89	Biogenic	48.87	3.38	No	No
WPAH068	A	15	2	7/16/2013	8:00:54	13.0	14.44	>4	2	>4	>4 to 2	261.87	18.13	17.12	19.72	2.60	Physical	48.39	3.35	No	No
WPAH069	A	15	2	7/16/2013	8:09:36	14.0	14.44	>4	2	>4	>4 to 2	147.82	10.24	7.76	11.31	3.54	Physical	47.76	3.31	No	No
WPAH070	A	15	2	7/15/2013	15:03:17	20.4	14.44	>4	2	>4	>4 to 2	147.13	10.19	9.47	11.77	2.29	Biogenic	32.70	2.26	No	No
WPAH071	A	15	2	7/15/2013	14:55:09	15.8	14.44	4-3	1	>4	>4 to 1	103.35	7.16	6.85	7.18	0.34	Physical	26.54	1.84	No	No
WPAH073	A	15	2	7/17/2013	9:04:19	14.6	14.44	>4	2	>4	>4 to 2	202.80	14.04	13.14	15.33	2.19	Biogenic	50.46	3.49	No	No

STATION	Rep	Stop Collar Settings (in.)	# of weights per chassis	DATE	TIME	Water Depth (m)	Calibration Constant	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	GrnSize RANGE	Penetration Area (sq.cm)	Average Penetration (cm)	Minimum Penetration (cm)	Maximum Penetration (cm)	Boundary Roughness (cm)	Origin of Boundary Roughness	RPD Area (sq.cm)	Mean RPD (cm)	Methane	Low DO?
WPAH074	A	15	0	7/16/2013	13:26:06	29.0	14.44	>4	2	>4	>4 to 2	190.07	13.16	12.68	13.57	0.89	Physical	37.22	2.58	No	No
WPAH074	B	15	0	7/16/2013	13:27:30	29.2	14.44	>4	2	>4	>4 to 2	201.81	13.97	13.57	14.61	1.04	Biogenic	46.43	3.22	No	No
WPAH075	A	14	0	7/15/2013	8:51:47	21.0	14.44	>4	2	>4	>4 to 2	170.25	11.79	10.51	12.92	2.41	Biogenic	45.62	3.16	No	No
WPAH076	A	14	0	7/15/2013	10:23:21	20.4	14.44	>4	2	>4	>4 to 2	178.20	12.34	11.67	13.67	2.00	Biogenic	57.38	3.97	No	No
WPAH076	B	14	0	7/15/2013	10:24:21	20.4	14.44	>4	2	>4	>4 to 2	195.03	13.51	13.33	13.74	0.41	Biogenic	44.21	3.06	No	No
WPAH077	A	15	2	7/16/2013	9:05:12	21.2	14.44	>4	2	>4	>4 to 2	93.39	6.47	6.08	7.11	1.04	Biogenic	35.24	2.44	No	No
WPAH078	B	15	0	7/16/2013	13:01:22	16.8	14.44	>4	1	>4	>4 to 1	161.89	11.21	10.03	12.61	2.58	Biogenic	26.75	1.85	No	No
WPAH079	D	15	0	7/16/2013	13:20:03	34.2	14.44	>4	2	>4	>4 to 2	166.80	11.55	10.82	12.25	1.42	Biogenic	36.29	2.51	No	No
WPAH079	E	15	2	7/17/2013	13:58:20	33.6	14.44	>4	2	>4	>4 to 2	233.05	16.14	15.82	16.42	0.60	Biogenic	42.20	2.92	No	No
WPAH080	A	15	0	7/16/2013	10:18:35	26.0	14.44	>4	2	>4	>4 to 2	226.70	15.70	15.26	16.13	0.87	Physical	54.47	3.77	No	No
WPAH080	B	15	0	7/16/2013	10:20:06	28.0	14.44	>4	2	>4	>4 to 2	200.75	13.90	13.62	14.13	0.51	Biogenic	48.25	3.34	No	No
WPAH081	A	15	0	7/16/2013	10:00:41	25.0	14.44	>4	2	>4	>4 to 2	213.01	14.75	14.32	14.90	0.58	Biogenic	62.65	4.34	No	No
WPAH082	A	15	2	7/16/2013	9:42:26	23.6	14.44	>4	2	>4	>4 to 2	232.56	16.10	15.62	16.54	0.92	Biogenic	45.11	3.12	No	No
WPAH083	A	15.5	0	7/16/2013	11:43:27	26.6	14.44	>4	2	>4	>4 to 2	146.50	10.14	9.04	11.19	2.15	Biogenic	37.49	2.60	No	No
WPAH084	A	15	0	7/16/2013	10:36:31	41.0	14.44	>4	2	>4	>4 to 2	102.95	7.13	5.71	8.68	2.97	Physical	40.09	2.78	No	No
WPAH084	B	15	0	7/16/2013	10:37:38	41.6	14.44	>4	2	>4	>4 to 2	190.65	13.20	12.99	13.31	0.31	Biogenic	47.13	3.26	No	No
WPAH085	B	15	0	7/16/2013	10:29:12	31.2	14.44	>4	2	>4	>4 to 2	230.43	15.96	15.69	16.08	0.39	Biogenic	43.19	2.99	No	No
WPAH086	B	15	0	7/16/2013	10:10:57	29.2	14.44	>4	2	>4	>4 to 2	233.54	16.17	14.75	16.97	2.22	Biogenic	64.47	4.46	No	No
WPAH087	C	15.5	0	7/16/2013	11:17:24	24.6	14.44	>4	2	>4	>4 to 2	255.03	17.66	17.07	18.56	1.49	Biogenic	42.82	2.97	No	No
WPAH088	A	15.5	0	7/16/2013	11:05:51	45.6	14.44	>4	2	>4	>4 to 2	191.51	13.26	12.85	13.81	0.96	Biogenic	24.57	1.70	No	No
WPAH089	A	15	1	7/15/2013	16:57:50	49.6	14.44	>4	2	>4	>4 to 2	158.19	10.95	8.97	11.72	2.75	Physical	39.07	2.71	No	No
WPAH090	A	15	1	7/15/2013	17:07:21	41.8	14.44	>4	2	>4	>4 to 2	253.38	17.55	17.09	18.15	1.06	Biogenic	47.46	3.29	No	No
WPAH091	A	15	1	7/15/2013	17:24:21	39.0	14.44	>4	2	>4	>4 to 2	257.80	17.85	17.53	18.06	0.53	Biogenic	58.48	4.05	No	No
WPAH092	A	15	1	7/15/2013	16:37:12	28.4	14.44	>4	2	>4	>4 to 2	203.45	14.09	13.02	14.71	1.69	Physical	39.46	2.73	No	No
WPAH093	A	15	2	7/15/2013	16:08:51	39.6	14.44	>4	2	>4	>4 to 2	254.53	17.63	17.36	18.13	0.77	Biogenic	40.15	2.78	No	No
WPAH093	B	15	2	7/15/2013	16:10:10	38.4	14.44	>4	2	>4	>4 to 2	233.39	16.16	14.90	17.96	3.06	Physical	58.57	4.06	No	No
WPAH094	A	15	1	7/18/2013	9:23:43	53.8	14.44	>4	2	>4	>4 to 2	198.62	13.75	13.19	14.03	0.84	Biogenic	77.42	5.36	No	No
WPAH095	B	15	1	7/15/2013	13:46:16	49.6	14.44	>4	2	>4	>4 to 2	212.25	14.70	14.37	15.09	0.72	Biogenic	47.91	3.32	No	No

STATION	Rep	Stop Collar Settings (in.)	# of weights per chassis	DATE	TIME	Water Depth (m)	Calibration Constant	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	GrnSize RANGE	Penetration Area (sq.cm)	Average Penetration (cm)	Minimum Penetration (cm)	Maximum Penetration (cm)	Boundary Roughness (cm)	Origin of Boundary Roughness	RPD Area (sq.cm)	Mean RPD (cm)	Methane	Low DO?
WPAH096	A	15	1	7/15/2013	13:35:10	58.4	14.44	>4	2	>4	>4 to 2	261.32	18.10	17.94	18.20	0.27	Biogenic	41.34	2.86	No	No
WPAH097	A	13.5	0	7/16/2013	16:34:22	7.8	14.44	>4	2	>4	>4 to 2	208.15	14.41	12.58	15.82	3.23	Physical	43.55	3.02	No	No
WPAH098	A	16	3	7/16/2013	11:59:32	3.4	14.44	4-3	0	>4	>4 to 0	259.59	17.98	15.91	20.73	4.82	Physical	IND	IND	No	No
WPAH099	A	15	2	7/15/2013	15:37:54	9.4	14.44	>4	1	>4	>4 to 1	241.21	16.70	15.94	17.41	1.47	Physical	IND	IND	No	No
WPAH100	A	15	2	7/15/2013	15:24:40	8.2	14.44	4-3	1	>4	>4 to 1	128.36	8.89	7.74	10.49	2.75	Physical	0.00	0.00	No	No
WPAH101	A	15	1	7/18/2013	10:48:49	45.6	14.44	>4	2	>4	>4 to 2	170.19	11.78	11.55	12.03	0.48	Biogenic	48.01	3.32	No	No
WPAH102	A	15	1	7/18/2013	11:00:04	51.6	14.44	>4	2	>4	>4 to 2	294.50	20.39	19.94	20.76	0.82	Biogenic	52.95	3.67	No	No
WPAH103	A	15	1	7/18/2013	9:55:31	37.4	14.44	>4	2	>4	>4 to 2	261.71	18.12	17.41	18.52	1.11	Biogenic	46.98	3.25	No	No
WPAH104	A	15	1	7/18/2013	11:11:46	37.0	14.44	>4	2	>4	>4 to 2	194.56	13.47	13.26	13.62	0.36	Biogenic	37.70	2.61	No	No
WPAH105	A	15	1	7/18/2013	11:21:23	59.2	14.44	>4	1	>4	>4 to 1	262.34	18.17	17.84	18.42	0.58	Biogenic	27.37	1.89	No	No
KSS-1	A	15	2	7/17/2013	10:04:50	9.2	14.44	>4	2	>4	>4 to 2	262.31	18.16	17.53	19.02	1.49	Biogenic	43.63	3.02	No	No
KSS-2	A	15	2	7/17/2013	10:15:35	8.0	14.44	>4	2	>4	>4 to 2	161.06	11.15	10.44	11.74	1.30	Biogenic	35.79	2.48	No	No
KSS-3	E	16	4	7/17/2013	10:49:26	9.6	14.44	>4	1	>4	>4 to 1	297.85	20.62	20.23	21.02	0.80	Biogenic	26.54	1.84	No	No

STATION	Rep	Wood Debris?	Beggiatoa?	COMMENT	# of Feeding Voids	Void Minimum Depth (cm)	Void Maximum Depth (cm)	Void Average Depth (cm)	Max Bioturb Depth (cm)	Successional Stage
WPAH003	D	High	Trace	Thin aRPD but profile disturbed by wood chip dragdown so unable to meaure, wood debris over fines at depth, and flocular material oxidized at SWI. Ulva fragments throughout profile, a few amphipods at SWI, burrows and five active FVs present.	5	4.32	12.87	8.59	17.41	Stage 2 on 3
WPAH004	A	High	No	Silt with small wood fibers throughout profile. Shell fragments, ulva and red macroalgae at SWI. Burrows, one active FV and subsurface organisms, including a large polychaete present.	1	6.68	7.28	6.98	17.31	Stage 3
WPAH004	D	High	No	Silt with small wood fibers throughout profile. SWI disrupted by large fragment of wood being pulled down by prism on left. Ulva & barnacle encrusted wood debrisat SWI. Burrows, five active FVs, and a void toward right of profile present.	5	2.63	8.73	5.68	16.90	Stage 1 on 3
WPAH005	A	Trace	No	Silt with some wood fibers and small debris. Ulva and detrital mantling at SWI.	0	0.00	0.00	0.00	17.75	Stage 2 -> 3
WPAH005	B	Trace	No	Silt with some shell fragments and wood fibers throughout profile. Some macroalgae at SWI. One sediment-filled FV and evidence of burrowing at depth.	1	12.49	12.90	12.69	17.80	Stage 2 -> 3
WPAH006	C	High	No	Silt with some shell fragments and wood fibers. Debris, including wood fragments, and a large divot at SWI from wood piece being dragged down, preventing accurate aRPD measurement. Burrows, amphipods, one acitve FV, and a large polychaete visible.	1	2.58	4.00	3.29	16.76	Stage 2 on 3
WPAH007	D	High	Yes	Silt with wood fibers throughout profile. Ulva, wood debris, one coonstripe shrimp (Pandalus danae), and some Beggiatoa at SWI. Burrows and two active FVs present.	2	7.06	9.50	8.28	12.15	Stage 1 on 3
WPAH008	A	Med	Trace	Silt with wood fibers underlying detrital layer. Macroalgae and organism tubes at SWI. Burrows, wood debris, and active burrowing throughout profile.	2	1.33	11.45	6.39	15.55	Stage 1 on 3
WPAH008	D	High	Yes	Silt with high density of wood fibers & debris. Benthic macroalgae, wood debris, organism tubes, and some Beggiatoa at SWI. Profile disrupted by wood debris being dragged down by prism.	Ind	Ind	Ind	Ind	Ind	Ind
WPAH009	A	Trace	No	Silt with some shell fragments, wood fibers, and fecal pellets. Benthic macroalgae, ulva, wood debrisat SWI. Burrowing to depth and one active FV present. Ulva was dragged down into the sediment column toward right of profile.	1	1.47	3.86	2.66	10.05	Stage 1 on 3
WPAH009	D	Med	No	Silt with wood fibers and fecal pellets over wood pulp. Benthic macroalgae and debris at SWI. Burrows and an active FV at depth.	1	17.70	19.67	18.68	21.05	Stage 1 on 3
WPAH010	C	Med	No	Silt with wood fibers and fecal pellets mixed with wood pulp. Burrowing to depth of profile, and a subsurface annelid present.	2	10.34	13.16	11.75	18.30	Stage 1 on 3
WPAH011	B	Low	No	Silt with wood fibers mixed with wood pulp. Two sediment-filled FVs and a subsurface annelid visible.	2	8.75	20.11	14.43	20.11	Stage 1 on 3
WPAH012	B	Low	No	Silt with wood fibers; aRPD is linear measurement from left side of image, right half of SWI is disrupted by a crab being pushed down & transected by camera prism blade. Burrows and one active FV present.	0	0.00	0.00	0.00	17.50	Stage 1 on 3
WPAH012	C	High	No	Silt with wood fibers; profile disrupted by wood fragments being dragged down by prism, aRPD is linear measurement from right edge of image; burrowing throughout profile, annelid visible at depth.	0	0.00	0.00	0.00	17.65	Stage 1 on 3
WPAH013	A	None	No	Silt with relatively low percentage of wood fibers throughout profile;burrows to depth, one active FV, and subsurface annelid visible.	1	16.01	17.36	16.68	17.91	Stage 1 on 3
WPAH014	A	Low	No	Silt with wood fibers, fecal pellets, and some shell fragments over wood pulp at depth.	4	6.00	18.64	12.32	19.26	Stage 1 on 3
WPAH015	A	Trace	No	Silt with wood fibers and some shell fragments. Burrows, one active FV, and numerous polychaetes present.	1	3.21	7.40	5.30	13.02	Stage 1 on 3
WPAH016	A	Trace	No	Silt with wood fibers and some shell fragments. Wood debris and organism tubes at SWI. Burrows and polychaetes visible throughout profile.	0	0.00	0.00	0.00	15.65	Stage 1 on 3
WPAH017	A	None	No	Silt with wood fibers and Ulva at SWI. Burrows, annelids, and FV visible; burrowing throughout depth of profile.	1	4.36	4.64	4.50	15.72	Stage 1 on 3
WPAH018	A	Low	No	Silt with wood fibers, fecal pellets, and some shell fragments. Wood debris, red macroalgae, and seaweed at SWI. Burrows, one active, sediment-filled FV, and a piece of seaweed that was dragged down visible below SWI.	1	3.16	4.39	3.77	10.95	Stage 1 on 3
WPAH019	C	High	Trace	Silty very fine sand with wood fibers, high density of fecal pellets, and some shell fragments. Thin veneer of oxidized sediment at surface along with individual filaments of Beggiatoa. Burrows, red macroalgae, and active FVs present below SWI.	3	3.09	14.44	8.76	14.85	Stage 1 on 3
WPAH020	B	Med	No	Silt with numerous wood fibers, some fecal pellets, and shell fragments. Debris, wood fragments, and organism tubes at SWI. Burrowing throughout depth of profile.	4	5.04	16.56	10.80	18.42	Stage 1 on 3

STATION	Rep	Wood Debris?	Beggiatoa?	COMMENT	# of Feeding Voids	Void Minimum Depth (cm)	Void Maximum Depth (cm)	Void Average Depth (cm)	Max Bioturb Depth (cm)	Successional Stage
WPAH022	B	Low	No	Silt with wood fibers and some shell fragments. Debris, including a piece of cable, at SWI. Burrows and a few polychaetes present.	0	0.00	0.00	0.00	9.56	Stage 2 -> 3
WPAH022	C	Med	No	Silt with wood fibers mixed with wood pulp at depth. Burrowing throughout depth of profile.	0	0.00	0.00	0.00	19.70	Stage 1 on 3
WPAH023	A	High	Yes	Thick layer of wood debris with Ulva over fragmented silt at depth. Diffusional aRPD and flocular material at SWI is oxidized. Some Beggiatioa and organism tubes at SWI. Burrows and subsurface organisms present below SWI. Profile is disturbed from wood fragments being dragged down.	0	0.00	0.00	0.00	Ind	Ind
WPAH024	F	None	Yes	Silt. Reduced sediment appears to be above oxidized sediment from Ulva being dragged down throughout sediment column. Beggiatoa at SWI. Burrows present.	Ind	Ind	Ind	Ind	Ind	Ind
WPAH025	A	None	Yes	Anoxic silt with some shell fragments. Decomposing benthic macroalgae, some tubes, and Beggiatoa at SWI. Burrows present below SWI.	0	0.00	0.00	0.00	3.83	Stage 1
WPAH026	A	None	No	Silt with trace of wood fibers and fecal pellets mixed with wood pulp at depth. Station classified as no wood present even though it was historically (buried by natural deposition). Small tubes at SWI, evidence of burrowing at depth.	0	0.00	0.00	0.00	18.44	Stage 2 -> 3
WPAH027	A	High	No	Wood debris over silty fine sand with high percentage of wood chips & fibers and shell fragments. Kelp and Ulva at SWI. Burrows, active FVs, and a large polychaete present below SWI.	3	4.29	8.58	6.44	13.60	Stage 1 on 3
WPAH027	C	High	No	Wood debris over poorly sorted silty fine to coarse sand with wood fibers and shell fragments. Kelp and Ulva at SWI. Burrows and active FV present.	1	9.28	10.54	9.91	10.54	Stage 1 on 3
WPAH028	A	High	No	Silt with wood fibers and shell fragments. Ulva, red benthic macroalgae, wood debris, and organism tubes at SWI. Burrows, three active FVs, and benthic macroalgae dragged below SWI by camera.	3	13.43	16.10	14.77	16.10	Stage 1 on 3
WPAH030	A	None	No	Silt with trace of wood fibers below SWI. Small tubes at SWI. Annelids visible at depth.	0	0.00	0.00	0.00	10.06	Stage 1 on 3
WPAH030	B	None	No	Silt with trace of wood fibers below SWI. Small tubes at SWI; burrows, FVs, and a large polychaete toward bottom of profile.	4	3.52	10.49	7.00	15.21	Stage 1 on 3
WPAH031	A	None	No	Silt with trace of wood fibers below SWI. Mudclasts and small tubes at SWI. Evidence of burrowing throughout entire range of profile	4	3.66	10.85	7.26	12.30	Stage 1 on 3
WPAH032	B	Med	No	Silt with some wood fibers and wood debris at SWI. Burrows and a subsurface organism present.	0	0.00	0.00	0.00	10.27	Stage 2 -> 3
WPAH033	A	Trace	Yes	Silt with some wood fibers throughout profile and benthic macro algae at SWI. Reduced mudclasts, organism tubes, beggiatoa, and wood debris at SWI. Burrows & subsurface organisms visible.	6	3.66	16.73	10.20	17.99	Stage 1 on 3
WPAH034	A	Trace	No	Silt with some wood fibers. Some benthic macroalgae and debris at SWI. Evidence of burrowing throughout profile.	7	4.39	9.74	7.06	9.74	Stage 1 on 3
WPAH035	A	None	No	Silty fine sand with trace of wood fibers below SWI. Spiochaetopterus polychaete tube at SWI. Burrows and one active FV.	1	3.06	3.30	3.18	4.27	Stage 1 on 3
WPAH035	D	None	No	Silty fine sand with trace of wood fibers below SWI. Burrow present, worm tube in background; penetrations too shallow to accurately determine successional stage.	0	0.00	0.00	0.00	4.92	Ind
WPAH036	A	None	No	Silt with some wood fibers below SWI. Small tubes at surface and large burrow opening at right edge that leads to major subsurface gallery seen in lower half of image.	2	7.33	11.52	9.43	15.12	Stage 1 on 3
WPAH037	A	Trace	No	Sandy silt with wood fibers and fragments at SWI. Minor debris and organism tubes at SWI. Burrowing throughout depth of profile.	2	7.81	10.97	9.39	17.70	Stage 1 on 3
WPAH038	A	None	No	Silty very fine sand with minor traces of wood fibers. Bioturbation depth exceeds prism penetration depth.	3	7.79	10.54	9.16	11.19	Stage 1 on 3
WPAH038	D	None	No	Silty very fine sand with benthic macroalgae at SWI. Subsurface polychaetes visible.	0	0.00	0.00	0.00	7.25	Stage 2 -> 3
WPAH039	A	None	No	Silt with some wood debris at depth (lower left quadrant). Bioturbation depth exceeds prism penetration depth.	4	3.30	15.89	9.60	15.98	Stage 1 on 3
WPAH042	A	None	No	Sandy silt with trace of subsurface wood fibers; small worms visible against faceplate and bioturbation depth exceeds prism penetration depth.	1	8.53	9.21	8.87	10.56	Stage 1 on 3
WPAH043	A	High	No	Silt with shell fragments at depth. Debris, including a large piece of wood, small tubes, and benthic macroalgae at SWI. Burrows and active FVs present.	5	1.21	15.26	8.23	16.35	Stage 1 on 3
WPAH045	A	None	No	Sandy silt with numerous small tubesand two shrimp at SWI. Subsurface polychaetes visible; bioturbation depth exceeds prism penetration depth.	0	0.00	0.00	0.00	6.47	Stage 2 -> 3

STATION	Rep	Wood Debris?	Beggiatoa?	COMMENT	# of Feeding Voids	Void Minimum Depth (cm)	Void Maximum Depth (cm)	Void Average Depth (cm)	Max Bioturb Depth (cm)	Successional Stage
WPAH046	A	Med	No	aRPD>P. Silty very fine to fine sand. Ulva, seaweed, wood debris, organism tubes, and SAV at SWI. Gastropods attached to seaweed toward center of profile above SWI.	0	0.00	0.00	0.00	4.77	Ind
WPAH046	B	Trace	No	aRPD>P. Silty very fine to fine sand with few wood fibers. Seaweed, wood debris, mudclasts, algae, and large polychaete tube at SWI. Bioturbation depth exceeds prism penetration depth.	0	0.00	0.00	0.00	3.50	Stage 1 on 3
WPAH047	A	None	No	aRPD>P. Silty fine sand with fecal casts from subsurface deposit feeders at SWI.	0	0.00	0.00	0.00	2.75	Stage 1 on 3
WPAH053	D	None	No	aRPD>P. Poorly sorted silty sand with pebbles; burrows present, but insufficient penetration to accurately determine successional stage.	0	0.00	0.00	0.00	Ind	Ind
WPAH054	A	None	No	Silt with trace of subsurface wood fibers. Burrows, two active FVs, and a subsurface polychaete visible.	2	3.83	16.10	9.97	16.94	Stage 1 on 3
WPAH055	A	None	No	Silt with subsurface wood fibers, wood fragments, and shell fragments. Burrowing throughout depth of profile.	0	0.00	0.00	0.00	16.94	Stage 2 -> 3
WPAH056	A	None	No	Silt with subsurface wood fibers mixed with some wood pulp at depth, but no wood at sediment surface. Small mudclasts and organism tubes at SWI. Burrows, FVs and subsurface organisms present.	3	13.40	19.14	16.27	19.22	Stage 1 on 3
WPAH057	B	Low	No	Silt with low percentage of wood fibers at SWI and mixed with high percentage of wood pulp at depth. Small tubes and benthic macroalgae at SWI. Subsurface burrows and FVs visible	3	6.90	21.12	14.01	21.12	Stage 1 on 3
WPAH058	C	None	No	Silt with subsurface wood fibers mixed with wood pulp at depth. Burrows and subsurface polychaetes present.	0	0.00	0.00	0.00	18.25	Stage 1 on 3
WPAH059	A	None	No	Silt with trace of subsurface wood fibers; small tubes at SWI. Large "burrow" at left is artifact caused by prism blade dragging down object (shell?) from SWI	2	5.71	7.21	6.46	7.21	Stage 1 on 3
WPAH060	A	Trace	No	Silt with wood fibers and wood fragments at depth. Burrow at left caused by camera artifact as in previous image.	0	0.00	0.00	0.00	15.62	Stage 1 on 3
WPAH061	B	None	No	Silt with subsurface wood fibers. Benthic macroalgae and burrows present.	0	0.00	0.00	0.00	3.93	Stage 1 on 2
WPAH061	E	Trace	No	Silt with wood fibers and shell fragments. Evidence of subsurface burrowing.	0	0.00	0.00	0.00	6.49	Stage 1 on 2
WPAH062	B	None	No	Silt with trace of subsurface wood fibers. Debris and small tubes at SWI. Burrowsand subsurface polychaetes visible.	0	0.00	0.00	0.00	11.09	Stage 2 -> 3
WPAH063	A	None	No	Silt with subsurface wood fibers and small tubes at SWI. Burrows and a subsurface polychaete present.	0	0.00	0.00	0.00	17.41	Stage 1 on 3
WPAH064	A	Trace	No	Silt with wood fibers, fecal pellets, and shell fragments. Burrowing throughout profile; bioturbation exceeds prism penetration depth.	5	1.30	12.20	6.75	12.63	Stage 1 on 3
WPAH065	A	None	No	Silt-clay with trace of subsurface wood fibers; small tubes at SWI. Burrows FVs and subsurface polychaete visible.	3	4.19	11.67	7.93	13.81	Stage 1 on 3
WPAH065	B	None	No	Silt with trace of subsurface wood fibers near SWI but wood pulp at depth. Debris, including a monofillament wire, and small worm tubes at SWI. Burrows, FVs and subsurface polychaete visible.	5	8.97	14.27	11.62	15.07	Stage 1 on 3
WPAH066	A	Med	No	Silt-clay with profile distorted by piece of wood that was dragged down by prism and looks like large oxidized vertical channel. Burrows and subsurface polychaetes visible.	0	0.00	0.00	0.00	10.27	Stage 1 on 3
WPAH067	A	None	No	Silt-clay with trace of subsurface wood fibers and shell fragments. Small tubes at SWI. Subsurface burrows and polychaetes visible.	2	8.25	12.10	10.17	13.24	Stage 1 on 3
WPAH068	A	High	No	Silt-clay with wood fibers, fecal pellets, and shell fragments. Wood fragments/debris on surface that had been dragged down on right side of image; bioturbation depth exceeds prism penetration depth.	2	12.80	16.64	14.72	18.13	Stage 1 on 3
WPAH069	A	Med	No	Silt-clay with wood fibers and shell fragments. Wood debris in left foreground and center background, shells, and macroalgae at SWI. Evidence of subsurface burrowing throughout profile.	0	0.00	0.00	0.00	9.92	Stage 1 on 3
WPAH070	A	Low	No	Silt-clay with wood fibers and shell fragments. Some wood debris at SWI. Active subsurface reworking with bioturbation extending beyond depth of prism penetration	2	4.99	9.38	7.18	11.77	Stage 1 on 3
WPAH071	A	Trace	No	Silty very fine sand with wood fibers and shell fragments. Minor wood debris and small tubes, as well as two Spiochaetopterus tubes at SWI. Burrowsand subsurface polychaetes present. Burrow at right of profile caused by prism dragging down shell from SWI.	0	0.00	0.00	0.00	7.18	Stage 1 on 3
WPAH073	A	None	No	Silt with trace of subsurface wood fibers and shell fragments. Small tubes at SWI. Burrows, FVs, and subsurface polychaetes visible.	2	6.53	9.69	8.11	14.04	Stage 1 on 3

STATION	Rep	Wood Debris?	Beggiatoa?	COMMENT	# of Feeding Voids	Void Minimum Depth (cm)	Void Maximum Depth (cm)	Void Average Depth (cm)	Max Bioturb Depth (cm)	Successional Stage
WPAH074	A	Med	No	Silt with wood fibers and shell fragments. 2 pieces of wood debris at surface dragged down and organism tubes at SWI. Burrows, wood fragments, FVs and numerous subsurface polychaetes visible.	7	0.92	12.92	6.92	13.57	Stage 1 on 3
WPAH074	B	None	No	Silt-clay with trace of subsurface wood fibers and shell fragments. Small tubes at SWI. Burrowing throughout depth of profile.	4	1.86	13.62	7.74	13.62	Stage 1 on 3
WPAH075	A	Low	No	Silt-clay with subsurface wood fibers and wood debris at SWI. Burrowing throughout depth of profile..	0	0.00	0.00	0.00	10.32	Stage 1 on 3
WPAH076	A	None	No	Silt-clay with trace of subsurface wood fibers and shell fragments mixed with some wood chips at depth. Small tubes at SWI. Bioturbation exceeds prism penetration depth.	3	3.18	11.74	7.46	13.67	Stage 1 on 3
WPAH076	B	None	No	Silt-clay over buried wood pulp at depth. Mudclasts, small tubes, and minor debris at SWI. Burrowing throughout profle; wood pulp "cottage cheese" appears to promote biological activity.	6	3.28	10.61	6.94	13.74	Stage 1 on 3
WPAH077	A	Trace	No	Silt with wood fibers at SWI and subsurface shell fragments. Minor debris and mounds visible at SWI. Burrowing throughout profile.	4	3.59	5.93	4.76	7.11	Stage 1 on 3
WPAH078	B	Trace	No	Silt-clay with wood fibers and shell fragments. Small tubes and benthic macroalgae at SWI. Burrows, active FVs, seaweed pieces, and subsurface polychaetes visible.	2	1.52	10.54	6.03	12.61	Stage 1 on 3
WPAH079	D	None	No	Silt-clay with small tubes and a shrimp at SWI. Burrows and FVs at depth.	4	4.12	8.80	6.46	8.80	Stage 1 on 3
WPAH079	E	Trace	No	Silt-clay with one piece of wood debris at SWI on right edge of image. Burrows, FVs and a subsurface polychaete visible.	4	6.82	15.82	11.32	15.82	Stage 1 on 3
WPAH080	A	Trace	No	Silt-clay with what appears to be wood debris dragged down by camera on right edge of image; organic enrichment at depth and active burrowing throughout profile.	3	5.11	15.53	10.32	16.13	Stage 1 on 3
WPAH080	B	None	No	Silt-clay with organic enrichment at depth and a shrimp at SWI. Burrows and small polychaetes visible at depth.	2	6.92	8.44	7.68	13.74	Stage 1 on 3
WPAH081	A	None	No	Silt-clay with trace quantities of buried wood pulp at depth. Small tubes & shell fragment at SWI. Active burrowing throughout profile.	6	2.48	11.74	7.11	14.75	Stage 1 on 3
WPAH082	A	None	No	Silt-clay with buried wood fragments at depth, active bioturbation throughout depth of profile.	6	3.35	10.29	6.82	16.10	Stage 1 on 3
WPAH083	A	Med	No	Silt-clay with wood debris on surface partially tipped by prism insertion in sediment; organic enrichment at depth, reduced fecal pellets at right edge of image, burrowing throughout profile.	3	4.60	8.51	6.56	10.14	Stage 1 on 3
WPAH084	A	None	No	Silt-clay with organic enrichment at depth; small tubes and a shrimp at SWI. Burrows and a subsurface polychaete visible.	0	0.00	0.00	0.00	7.38	Stage 1 on 3
WPAH084	B	None	No	Silt-clay with organic enrichment at depth; small tubes and a shrimp at SWI. Burrows and subsurface polychaetes visible.	2	1.62	9.04	5.33	11.63	Stage 1 on 3
WPAH085	B	None	No	Silt-clay with organic enrichment at depth; small tubes at SWI. Burrows and subsurface polychaetes visible.	4	3.13	14.42	8.78	14.42	Stage 1 on 3
WPAH086	B	Trace	No	Silt-clay with some wood fibers and one wood fragment at SWI. Burrowing througout depth of profile.	2	8.17	14.20	11.19	14.83	Stage 1 on 3
WPAH087	C	Trace	No	Silt-clay with some wood fibers and one wood fragment at SWI. Burrowing througout depth of profile with polychaetes visible against faceplate.	3	4.56	7.84	6.20	16.18	Stage 1 on 3
WPAH088	A	None	No	Silt with shell fragments and slight trace of subsurface wood fibers. Fish at SWI. Burrowing throughout profile and large polychaete visible at depth.	9	6.10	13.19	9.64	13.26	Stage 1 on 3
WPAH089	A	Trace	No	Silt-clay with numerous fecal pellets near SWI and some shell fragments. Debris (wood) dragged down toward right of profile at SWI. Bioturbation exceeds prism penetration depth.	6	6.87	11.14	9.00	11.72	Stage 1 on 3
WPAH090	A	None	No	Silt-clay with minor sand fraction, subsurface organic enrichment and sediment fracture at depth.	1	8.80	9.84	9.32	9.84	Stage 2 -> 3
WPAH091	A	None	No	Silt-clay with subsurface organic enrichment, multiple feeding voids.	7	5.67	13.96	9.81	17.26	Stage 1 on 3
WPAH092	A	High	No	Silt-clay with wood fibers, shell fragments and wood debris at SWI and buried.Active burrowing throughout profile.	5	2.63	14.47	8.55	14.71	Stage 1 on 3
WPAH093	A	None	No	Silt with trace of subsurface wood fibers with active burrowing throughout profile.	5	7.43	16.95	12.19	17.12	Stage 1 on 3
WPAH093	B	Low	No	Silt-clay with surface detrital layer over wood debris (exposed by prism cut), organism tubes, and crab at SWI.	1	12.37	13.36	12.86	15.49	Stage 1 on 3
WPAH094	A	None	No	Silt-clay with large mud clast artifact from camera sled at SWI; actively bioturbated upper layer with small tubes at SWI; burrowing throughout depth of profile.	1	10.25	10.78	10.51	13.75	Stage 1 on 3
WPAH095	B	None	No	Silt-clay with subsurface organic enrichment, active burrowing throughout profile, shrimp @ SWI.	4	6.34	11.26	8.80	14.26	Stage 1 on 3

STATION	Rep	Wood Debris?	Beggiatoa?	COMMENT	# of Feeding Voids	Void Minimum Depth (cm)	Void Maximum Depth (cm)	Void Average Depth (cm)	Max Bioturb Depth (cm)	Successional Stage
WPAH096	A	None	No	Silt-clay with high organic enrichment at depth, evidence of subsurface burrowing throughout; polychaete visible against faceplate.	8	4.12	16.25	10.19	16.25	Stage 1 on 3
WPAH097	A	Trace	No	Silt-clay with wood fibers, shell fragments, and Ulva dispersed throughout profile from prism dragdown; subsurface burrows present.	0	0.00	0.00	0.00	12.52	Stage 1 on 3
WPAH098	A	Med	No	Silt with wood fragments and some fine sand at depth. Ulva and benthic macro algae at SWI. Surface hidden by algae being dragged down by cutting balde, impossible to measure aRPD accurately in this particular image; flocular material is oxidized. Burrowing throughout profile.	0	0.00	0.00	0.00	19.82	Ind
WPAH099	A	High	No	Silt with high proportion of wood fragments and some fine sand at depth. Ulva and benthic macro algae at SWI. Thin aRPD that is disrupted by wood dragdown, impossible to measure accurately in this particular image. Burrowing throughout profile.	0	0.00	0.00	0.00	16.30	Stage 1 on 3
WPAH100	A	IND	Yes	Silt with Ulva and kelp dragged down throughout profile. Beggiatoa and some oxidized flocular material at SWI. Burrows present, but impossible to accurately determine successional status due to disruption of profile from surface kelp artifacts.	0	0.00	0.00	0.00	10.49	Ind
WPAH101	A	None	No	Silt with traces of subsurface wood fibers; mudclasts and shell fragments at SWI. Burrows, one active FV, and subsurface worms visible.	1	5.88	6.58	6.23	11.61	Stage 1 on 3
WPAH102	A	None	No	Silt-clay with active burrowing and subsurface worms visible against faceplate.	9	8.34	13.84	11.09	13.84	Stage 1 on 3
WPAH103	A	None	No	Silt-clay with small tubes at SWI. Slight organic enrichment at depth, evidence of subsurface burrowing .	0	0.00	0.00	0.00	17.72	Stage 1 on 3
WPAH104	A	None	No	Silt-clay with high density of small tubes at SWI. Active FVs, burrowing throughout profile.	5	2.82	9.74	6.28	12.81	Stage 1 on 3
WPAH105	A	None	No	Silt-clay with subsurface organic enrichment and laminations from past depositional events. Distinctly shallower bioturbation as compared with other locations.	3	2.77	3.62	3.20	10.75	Stage 2 -> 3
KSS-1	A	Low	No	Sandy silt with wood fibers and wood fragments. Burrows and large active FV present.	1	7.69	18.88	13.28	19.02	Stage 1 on 3
KSS-2	A	Trace	No	Sandy silt with wood fibers and fecal pellets.Benthic macroalgae and mudclasts at SWI. Burrows and one active FV present.	1	9.28	10.87	10.08	10.87	Stage 1 on 3
KSS-3	E	None	No	Sandy silt with trace of subsurface wood fibers.Ulva dragged down by prism throughout sediment profile. Burrows and FVs present.	1	9.35	11.56	10.46	16.10	Stage 1 on 3

APPENDIX B

Plan View Image Analysis Results

STATION	Rep	DATE	TIME	Laser Cal (cm)	IMAGE WIDTH (cm)	IMAGE HEIGHT (cm)	Field of View imaged calc. (m2)	Sediment Type	Bedforms	Burrows	Tubes	Tracks	Lebensspuren	Epifauna	Mudclasts	Debris	Beggiatoa
WPAH003	D	7/17/2013	16:46:55	26.00	60.65	40.16	0.24	Wood and silt	No	No	No	No	None	No	No	High	Trace
WPAH004	A	7/16/2013	14:59:00	24.94	63.23	41.87	0.26	Wood and silt	No	No	Few	No	Low	Yes	No	High	No
WPAH004	D	7/16/2013	15:04:09	33.49	47.09	31.18	0.15	Wood and silt	No	No	Few	Yes	Low	Yes	No	High	No
WPAH005	A	7/16/2013	15:24:25	30.65	51.44	34.07	0.18	Silt	No	Yes	Yes	Yes	Low	Yes	No	Low	No
WPAH005	B	7/16/2013	15:26:10	29.74	53.02	35.11	0.19	Silt	No	Yes	Yes	Yes	Low	Yes	No	Trace	No
WPAH006	C	7/16/2013	15:11:07	24.48	64.41	42.65	0.27	Wood and silt	No	No	No	No	Low	No	No	High	No
WPAH007	D	7/16/2013	17:20:45	27.57	57.20	37.88	0.22	Wood and silt	No	No	Yes	No	Low	Yes	No	High	Trace
WPAH008	A	7/18/2013	13:21:43	28.02	56.27	37.26	0.21	Silt	No	No	Yes	Yes	Med	Yes	No	Med	No
WPAH008	D	7/18/2013	13:25:58	26.46	59.61	39.47	0.24	Wood and silt	No	No	Yes	Yes	Med	Yes	No	High	No
WPAH009	B	7/17/2013	15:28:37	34.30	45.98	30.45	0.14	Silt	No	No	Few	Yes	Low	Yes	No	Low	No
WPAH009	C	7/17/2013	15:29:55	38.60	40.86	27.06	0.11	Silt	No	No	Few	Yes	Med	Yes	No	Trace	No
WPAH010	C	7/17/2013	15:10:42	34.25	46.05	30.49	0.14	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH011	B	7/16/2013	15:49:33	33.08	47.67	31.57	0.15	Silt	No	Yes	Few	Yes	Med	No	No	None	No
WPAH012	E	7/17/2013	13:32:00	30.45	51.78	34.29	0.18	Silt	No	Yes	Yes	Yes	Med	Yes	No	Low-Med	No
WPAH012	F	7/17/2013	13:33:19	25.19	62.60	41.45	0.26	Silt	No	Yes	Few	Yes	Med	Yes	No	Med	No

STATION	Rep	DATE	TIME	Laser Cal (cm)	IMAGE WIDTH (cm)	IMAGE HEIGHT (cm)	Field of View imaged calc. (m2)	Sediment Type	Bedforms	Burrows	Tubes	Tracks	Lebensspuren	Epifauna	Mudclasts	Debris	Beggiatoa
WPAH013	A	7/16/2013	14:07:19	29.64	53.20	35.23	0.19	Silt	No	Yes	Few	Yes	Med	Yes	No	Trace	No
WPAH014	A	7/15/2013	10:15:08	32.22	48.94	32.41	0.16	Silt	No	Yes	Few	Yes	Med	Yes	No	Low	No
WPAH015	B	7/15/2013	10:32:13	27.11	58.16	38.51	0.22	Silt	No	Yes	Yes	Yes	Low	Yes	No	Trace-Low	No
WPAH016	A	7/15/2013	10:52:27	26.71	59.04	39.10	0.23	Silt	No	Yes	Few	Yes	Med	Yes	No	Trace	No
WPAH017	A	7/15/2013	11:13:10	28.48	55.37	36.67	0.20	Silt	No	Yes	Few	Yes	Med	Yes	No	Trace	No
WPAH018	A	7/15/2013	11:34:55	25.65	61.49	40.72	0.25	Silt	No	Yes	Yes	Yes	Low	Yes	No	Med	No
WPAH019	C	7/16/2013	11:28:18	33.69	46.81	31.00	0.15	Silty Sand	No	Yes	Yes	Yes	Low	No	No	Low	Trace
WPAH020	C	7/15/2013	16:27:27	38.75	40.70	26.95	0.11	Ind	Ind	Ind	Ind	Ind	None	No	No	Ind	No
WPAH022	B	7/16/2013	15:34:26	26.96	58.49	38.73	0.23	Silt	No	Yes	Yes	Yes	Med	Yes	No	Low	No
WPAH022	C	7/16/2013	15:35:45	25.54	61.73	40.88	0.25	Silt	No	Yes	Yes	Yes	Med	No	No	Trace	No
WPAH023	A	7/18/2013	12:47:38	38.34	41.13	27.23	0.11	Wood	No	No	No	No	None	Yes	No	High	Trace
WPAH024	F	7/18/2013	8:37:03	25.75	61.25	40.56	0.25	IND	No	No	No	No	None	Yes	No	High	Yes
WPAH025	A	7/17/2013	17:19:10	28.83	54.69	36.22	0.20	Silt	No	Yes	Yes	Yes	Low	Yes	No	None	Yes
WPAH026	A	7/18/2013	8:48:12	37.89	41.62	27.56	0.11	Silt	No	Yes	Yes	Yes	Low	Yes	No	None	No
WPAH027	C	7/16/2013	11:55:20	24.79	63.62	42.13	0.27	Wood and silty sand	Yes	Yes	Yes	No	None	Yes	No	High	No
WPAH027	D	7/16/2013	11:56:46	26.35	59.83	39.62	0.24	Wood and silty sand	No	No	Yes	No	Low	No	No	High	No
WPAH028	A	7/16/2013	11:35:02	39.61	39.81	26.37	0.10	Wood and silt	No	No	Yes	No	None	Yes	No	High	Yes

STATION	Rep	DATE	TIME	Laser Cal (cm)	IMAGE WIDTH (cm)	IMAGE HEIGHT (cm)	Field of View imaged calc. (m2)	Sediment Type	Bedforms	Burrows	Tubes	Tracks	Lebensspuren	Epifauna	Mudclasts	Debris	Beggiatoa
WPAH030	A	7/16/2013	8:55:25	26.91	58.60	38.80	0.23	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH030	B	7/16/2013	8:56:59	25.49	61.85	40.96	0.25	Silt	No	Yes	Yes	Yes	Med	No	No	None	No
WPAH031	A	7/15/2013	11:51:18	24.23	65.08	43.10	0.28	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH032	B	7/15/2013	11:28:13	27.42	57.52	38.09	0.22	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH033	A	7/16/2013	8:21:11	38.80	40.64	26.91	0.11	Silt	No	Yes	Yes	Yes	Low	Yes	No	Trace	Yes
WPAH034	A	7/16/2013	8:30:52	28.93	54.50	36.09	0.20	Silt	No	Yes	Yes	Yes	Low	Yes	No	Trace	No
WPAH035	A	7/16/2013	8:41:55	25.34	62.22	41.21	0.26	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace-Low	No
WPAH035	C	7/16/2013	8:44:59	27.72	56.89	37.67	0.21	Silt with rocks	No	No	Yes	Yes	Med	Yes	No	None	No
WPAH036	A	7/17/2013	9:26:02	23.77	66.33	43.92	0.29	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH037	A	7/17/2013	9:34:23	27.82	56.68	37.53	0.21	Silt	No	Yes	Yes	Yes	High	No	No	Med	No
WPAH038	A	7/17/2013	8:50:37	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	None	No
WPAH038	D	7/17/2013	8:54:22	28.58	55.17	36.54	0.20	Sandy Silt	No	Yes	Yes	Yes	Med	No	No	Trace	No
WPAH039	A	7/15/2013	16:46:12	42.64	36.98	24.49	0.09	Silt	No	Yes	Yes	Yes	Med	Yes	No	Med	No
WPAH042	A	7/15/2013	14:16:23	26.61	59.26	39.25	0.23	Silt	No	Yes	Yes	Yes	Med	Yes	No	Low	No
WPAH043	A	7/15/2013	16:00:05	27.72	56.89	37.67	0.21	Wood and silt	No	Yes	Yes	Yes	Med	Yes	No	High	No
WPAH045	A	7/15/2013	14:07:02	25.09	62.85	41.62	0.26	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No

STATION	Rep	DATE	TIME	Laser Cal (cm)	IMAGE WIDTH (cm)	IMAGE HEIGHT (cm)	Field of View imaged calc. (m2)	Sediment Type	Bedforms	Burrows	Tubes	Tracks	Lebensspuren	Epifauna	Mudclasts	Debris	Beggiatoa
WPAH046	A	7/15/2013	13:22:27	20.89	75.48	49.99	0.38	Silty Sand	No	Yes	Yes	No	Med	No	No	Med	No
WPAH046	B	7/15/2013	13:23:28	18.82	83.80	55.49	0.47	Silty Sand	No	Yes	Yes	Yes	Med	No	No	Low	No
WPAH047	A	7/15/2013	13:11:04	27.26	57.84	38.30	0.22	Sand	Yes	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH053	D	7/17/2013	16:35:34	28.58	55.17	36.54	0.20	Gravel	No	No	Yes	Yes	Low	Yes	No	Low	No
WPAH054	A	7/16/2013	15:40:06	32.02	49.25	32.61	0.16	Silt	No	Yes	Yes	Yes	Med	No	No	Trace	No
WPAH055	A	7/16/2013	17:24:32	27.42	57.52	38.09	0.22	Silt	No	Yes	Yes	Yes	Med	Yes	No	Low	No
WPAH056	A	7/16/2013	17:32:08	27.31	57.73	38.23	0.22	Silt	No	Yes	Yes	Yes	Med	No	No	None	No
WPAH057	D	7/17/2013	15:21:06	30.70	51.36	34.01	0.17	Silt	No	Yes	Yes	Yes	Med	Yes	No	Low	Trace
WPAH058	A	7/16/2013	15:55:53	36.22	43.54	28.83	0.13	Silt	No	Yes	Yes	Yes	Med	No	No	None	No
WPAH059	A	7/16/2013	17:02:52	30.25	52.13	34.52	0.18	Silt	No	Yes	Yes	Yes	Med	No	No	Trace	No
WPAH060	A	7/15/2013	10:44:41	29.74	53.02	35.11	0.19	Sandy Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH061	B	7/16/2013	16:47:18	32.37	48.71	32.26	0.16	Silt	No	No	Yes	Yes	Med	Yes	No	Trace	No
WPAH061	E	7/18/2013	9:03:13	31.46	50.12	33.19	0.17	Silt	No	Yes	Yes	Yes	Low	Yes	Yes	Trace	Yes
WPAH062	B	7/16/2013	16:56:08	31.36	50.28	33.30	0.17	Silt	No	Yes	Yes	Yes	Med	Yes	Yes	Trace	No
WPAH063	E	7/17/2013	14:11:59	25.95	60.77	40.24	0.24	Silt	No	Yes	Yes	Yes	Med	Yes	No	Low	No
WPAH064	C	7/16/2013	14:18:12	27.47	57.41	38.02	0.22	Silt	No	Yes	Yes	Yes	Med-High	Yes	No	Low	No

STATION	Rep	DATE	TIME	Laser Cal (cm)	IMAGE WIDTH (cm)	IMAGE HEIGHT (cm)	Field of View imaged calc. (m2)	Sediment Type	Bedforms	Burrows	Tubes	Tracks	Lebensspuren	Epifauna	Mudclasts	Debris	Beggiatoa
WPAH065	A	7/15/2013	10:38:14	27.82	56.68	37.53	0.21	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH065	D	7/15/2013	10:41:08	32.12	49.09	32.51	0.16	Silt	No	Yes	Ind	Yes	Med	No	No	Trace	No
WPAH066	A	7/15/2013	11:21:19	28.53	55.27	36.60	0.20	Silt	No	Yes	Yes	Yes	Med	No	No	Med	No
WPAH067	A	7/15/2013	11:43:59	27.47	57.41	38.02	0.22	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH068	B	7/16/2013	8:02:51	25.65	61.49	40.72	0.25	Silt	No	No	Yes	Yes	Med	Yes	No	Med	No
WPAH069	A	7/16/2013	8:10:02	25.95	60.77	40.24	0.24	Silt	No	Yes	Yes	Yes	Med	Yes	No	High	No
WPAH070	A	7/15/2013	15:03:43	30.20	52.22	34.58	0.18	Silt	No	Yes	Yes	Yes	Med	Yes	No	Low	No
WPAH071	A	7/15/2013	14:22:34	25.75	61.25	40.56	0.25	Silt	No	Yes	Yes	Yes	Med-High	Yes	No	Trace	No
WPAH073	C	7/17/2013	9:07:27	27.31	57.73	38.23	0.22	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH074	C	7/16/2013	13:29:48	27.62	57.09	37.81	0.22	Sandy Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH074	E	7/16/2013	13:39:06	25.14	62.72	41.54	0.26	Sandy Silt	No	Yes	Yes	Yes	Med	Yes	Yes	None	No
WPAH075	E	7/15/2013	9:59:37	33.28	47.38	31.37	0.15	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH076	A	7/15/2013	10:23:46	IND	IND	IND	IND	Silt	No	IND	IND	Yes	IND	Yes	IND	IND	IND
WPAH076	B	7/15/2013	10:24:45	IND	IND	IND	IND	Silt	No	IND	IND	Yes	IND	Yes	IND	IND	IND
WPAH077	B	7/16/2013	9:07:06	27.06	58.27	38.59	0.22	Silt	No	Yes	Yes	Yes	Med	No	No	None	No
WPAH078	A	7/16/2013	12:59:46	28.28	55.77	36.93	0.21	Silt	No	Yes	Yes	Yes	Med-High	No	Yes	Low	Yes
WPAH079	D	7/16/2013	13:21:03	26.40	59.72	39.55	0.24	Sandy Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No

STATION	Rep	DATE	TIME	Laser Cal (cm)	IMAGE WIDTH (cm)	IMAGE HEIGHT (cm)	Field of View imaged calc. (m2)	Sediment Type	Bedforms	Burrows	Tubes	Tracks	Lebensspuren	Epifauna	Mudclasts	Debris	Beggiatoa
WPAH079	E	7/17/2013	13:58:43	31.72	49.72	32.92	0.16	Sandy Silt	No	No	Yes	Yes	Med	Yes	No	None	No
WPAH080	A	7/16/2013	10:18:59	27.92	56.47	37.40	0.21	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH080	B	7/16/2013	10:20:30	26.15	60.30	39.93	0.24	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH081	A	7/16/2013	10:01:06	26.20	60.18	39.85	0.24	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH082	A	7/16/2013	9:42:51	28.38	55.57	36.80	0.20	Silt	No	Yes	Yes	Yes	Med	Yes	Yes	Trace	No
WPAH083	A	7/16/2013	11:43:19	28.33	55.67	36.86	0.21	Silt	No	Yes	Yes	Yes	Med	Yes	No	Med	Yes
WPAH084	A	7/16/2013	10:36:54	22.66	69.58	46.08	0.32	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH084	B	7/16/2013	10:38:02	26.66	59.15	39.17	0.23	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH085	B	7/16/2013	10:31:08	29.64	53.20	35.23	0.19	Silt	No	Yes	Yes	Yes	Low-Med	Yes	No	Trace	No
WPAH086	A	7/16/2013	10:10:14	26.46	59.60	39.47	0.24	Silt	No	Yes	Yes	Yes	Low-Med	Yes	No	None	No
WPAH087	C	7/16/2013	11:18:26	31.16	50.61	33.51	0.17	Silt	No	Yes	Yes	Yes	Med	No	No	Low	No
WPAH088	A	7/16/2013	11:06:52	25.59	61.61	40.80	0.25	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH089	A	7/15/2013	16:58:15	27.47	57.41	38.02	0.22	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH090	A	7/15/2013	17:07:46	33.18	47.52	31.47	0.15	Silt	No	Yes	Yes	Yes	Low-Med	Yes	No	None	No
WPAH091	A	7/15/2013	17:24:46	32.42	48.63	32.21	0.16	Silt	No	Yes	Yes	Yes	Low	Yes	No	Trace	No
WPAH092	A	7/15/2013	16:37:37	19.37	81.39	53.90	0.44	Silt	No	Yes	Yes	Yes	Low	Yes	No	High	No

STATION	Rep	DATE	TIME	Laser Cal (cm)	IMAGE WIDTH (cm)	IMAGE HEIGHT (cm)	Field of View imaged calc. (m2)	Sediment Type	Bedforms	Burrows	Tubes	Tracks	Lebensspuren	Epifauna	Mudclasts	Debris	Beggiatoa
WPAH093	A	7/15/2013	16:09:16	23.62	66.75	44.21	0.30	Silt	No	Yes	Yes	Yes	Low	Yes	No	None	No
WPAH093	B	7/15/2013	16:10:35	21.90	72.00	47.68	0.34	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH094	A	7/18/2013	9:24:05	25.24	62.47	41.37	0.26	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH095	B	7/15/2013	13:48:05	27.57	57.20	37.88	0.22	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH096	A	7/15/2013	13:35:34	25.95	60.77	40.24	0.24	Silt	No	No	Yes	Yes	Med-High	Yes	No	None	No
WPAH097	B	7/16/2013	16:36:12	36.52	43.17	28.59	0.12	IND	No	Ind	Ind	Ind	None	Yes	No	Ind	No
WPAH098	A	7/16/2013	12:00:35	38.24	41.23	27.31	0.11	Silt	No	Ind	Ind	No	None	No	No	Ind	No
WPAH099	A	7/15/2013	15:38:20	20.79	75.85	50.23	0.38	Silt	No	No	No	No	Low	No	Yes	High	No
WPAH100	C	7/15/2013	15:28:47	36.62	43.06	28.51	0.12	Silt	Ind	IND	Ind	No	None	No	No	Ind	No
WPAH101	A	7/18/2013	10:49:10	26.40	59.72	39.55	0.24	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH102	A	7/18/2013	11:00:25	24.48	64.41	42.65	0.27	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH103	A	7/18/2013	9:55:54	31.31	50.36	33.35	0.17	Silt	No	Yes	Yes	Yes	Med-High	No	No	None	No
WPAH104	A	7/18/2013	11:12:07	39.30	40.12	26.57	0.11	Silt	No	Yes	Yes	Yes	Med	No	Yes	None	No
WPAH105	A	7/18/2013	11:21:44	28.53	55.27	36.60	0.20	Silt	No	No	Yes	Yes	Low	Yes	No	Trace	No
KSS-1	A	7/17/2013	10:05:13	25.04	62.98	41.70	0.26	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
KSS-2	A	7/17/2013	10:15:58	25.44	61.98	41.04	0.25	Silt	No	No	Yes	Yes	Low	Yes	No	Trace	No
KSS-3	B	7/17/2013	10:26:22	27.42	57.52	38.09	0.22	Silt	No	No	Yes	Yes	Low	Yes	No	None	No

STATION	Rep	Comment
WPAH003	D	Surface covered in woody debris, detritus, ulva, and a few fragments of kelp in upper portion of frame. Small patch of beggiatoa in wood debris in upper left of frame. Near 100 pervent cover of wood chips and debris that appear to intact and are mantled with algae and detritus.
WPAH004	A	Detrital-mantled wood debris across entire frame. Ulva, Small elongate fish in upper center of frame. The majority of wood fragments are covered but a few have old barnacle residue on them. A few small tubes in right side of frame.
WPAH004	D	Silt. Detritus mantled wood debris across frame and shell fragments throughout profile. Ulva, at least four small crabs Small crab footprints visible. A few tubes in lower left of frame. Woody debris is small, weathered/od and approaching fibrous.
WPAH005	A	Silt. Scattered ulva fragments. Small fish toward bottom of profile (long, slender lance-like). Crab tracks and a few gastropod tracks in detritus mantling.
WPAH005	B	Detritus mantled silt with fine features well preserved. Burrows at upper right and multiple small tubes. Crab tracks and small crab in upper left of frame. Appears depositional.
WPAH006	C	Wood debris (some with barnacles) partially mantled with minor deritus, ulva, and seaweed covering most of SWI. Ulva, kelp fragments and dentritic red algae are in various states of decay. Appears to be organic depositional with high organic input.
WPAH007	D	Silt/detritus mantledWood debris (some with barnacles) and ulva covering most of SWI. Three organisms (shrimps in motion) toward top-right of profile. Minor shell fragments interspersed amongst wood debris. Small patch of beggiatoa on wood and detritus in lower left center edge of frame.
WPAH008	A	Silt with mantled wood debris (some with barnacles), benthic macroalgae, and seaweed on SWI. An anemone (does not appear to be metridium), at least four shrimp (coonstripe and crangon sp..), two small crabs, and two elongate fish (gunnels?) present. Some trails in the form of furrows visible. Appears depositional.
WPAH008	D	Silt. Wood debris (some with barnacles), scattered algal fragments at SWI. At least five crabs (red rock crab in upper right - Cancer productus) and two fishes (goby and gunnel?) and a shrimp (Coonstripe?) present. Some crab tracks round depressions (possibly fish foraging pits?) visible.Thick detrital mentling suggests that this is at least seasonally depositional.
WPAH009	B	Silt. Shell fragments and benthic macroalgae throughout profile. Distinct crab tracks across frame. Benthic macroalgae is binding surface sediment. Image slightly blurry.
WPAH009	C	Silt. Extensive benthic macroalgae on SWI that is binding SWI. Fish (sole/flounder) at top of profile. Trails running through macroalgae, including crab tracks. Sediment is curling where algal mat has been punctured. Interesting photo.
WPAH010	C	Silt. Fish toward right of profile. Few tubes, crab tracks, and other trails in the form of thin furrows present. Several small burrows scattered across frame. Appears at least seasonally depositional.
WPAH011	B	Silt and detritus. Thin furrowed tracks running diagonally through profile, and few burrows/pits visible along with some small tubes fringing the burrows. Very fine grained surface that looks to be at least seasonally depositional. Small fragment of red aldae affixed to a tube in lower portion of the frame.
WPAH012	E	Silt. Wood debris and shell fragments throughout frame. Four shrimp (coonstripe and crangon) toward left of profile and small localized clouds of silt present (caused by organisms). Epifaunal tracks in lower left and upper right.
WPAH012	F	Silt. Some wood debris and shell fragments throughout frame. Ten shrimp (coonstripe, spot and crangon)) and a snall fish present. Numerous tracks visible, including shrimp and crab tracks. The outline of wood fragments can be seen through detrital mantling.

STATION	Rep	Comment
WPAH013	A	Silt. Few shell fragments and wood debris throughout profile. At least four small crabs present. Gastropods and their tracks are present across frame. Rich detrital mantling and at least seasonally depositional. Very small tubes and several large burrows.
WPAH014	A	Silt. Few shell and wood fragments. Five Coonstripe shrimp and a small crab present. Shrimp and crab tracks visible. Image slightly cloudy and not possible to differentiate tracks from burrows. Small tube between shrimp in center.
WPAH015	B	Silt. Few wood fragments. Three Coonstripe shrimp present. Image slightly cloudy; tracks barely visible. A few burrows and slender tubes visible. Crab upper left and gastropods across frame. Appears to be at least seasonally depositional.
WPAH016	A	Silt. Four shrimp (Coonstripe?) and small crabs present. Shrimp tracks, crab tracks, mounds, and burrows visible. Spiochaetopterid tube recumbent at SWI. Image slightly cloudy. Thick detrital mantling and at least seasonally depositional.
WPAH017	A	Silt as thick detrital mantling. Six shrimp (Coonstripe and crangon sp.) and some red benthic macroalgae present. Shrimp, crab, and gastropod tracks, and a few burrows visible as well as a few very small tubes.
WPAH018	A	Silt. Extensive benthic macroalgae on SWI that is binding the SWI. Two fish, an organism tube, and a small crab present. Trails and tracks running through macroalgae and in places, macroalgae curls where surface has been pierced. Wood debris appears to be primarily sticks/twig fragments.
WPAH019	C	Silty sand with shell fragments. Ulva and mior washed wood debris present. Crab tracks.
WPAH020	C	Extensive ulva with detritus covering SWI. Ulva does not appear to be in advanced decay.
WPAH022	B	Silt. Large mound running diagonally through profile. Minor wood debris, shell fragments and rope present (from crab trap). Red macroalgae, a bryozoan, one fish and one small crab visible. Crab tracks, and an organism tube present. Burrow mid-left.
WPAH022	C	Silt with thick detrital mantling. Few wood fragments. Spiochaetopterus polychaete tubes, seaweed, benthic red filamentous macroalgae, crab tracks, and some shrimp tracks present.
WPAH023	A	SWI completely covered by Ulva and wood debris. Some beggiatoa fringing wood fragment in mid-left and one small crab toward top-left of profile. All PV images for station 23 are covered in debris or cloudy.
WPAH024	F	SWI completely covered by Ulva and wood debris. Ulva is thickly mantled with detritus and some of the ulva is decaying with some beggiatoa at decomposing areas of ulva. Beggiatioa and three small crabs present. All PV images for station 24 are covered in debris and ulva.
WPAH025	A	Silt. Extensive benthic macroalgae throughout profile that appears to have once been a continuous binding cover that is now decomposing and breaking apart. Beggiatoa fringing some of the decaying algae and two fish present (goby/gunnel). Organism tubes, possible crab tracks, and trails in the form of thin furrows present.
WPAH026	A	Silt with detrital mantling. Small fish (possible goby) toward bottom-left of profile. Crab and shrimp tracks visible Several small tubes and a few burrows visible.
WPAH027	C	Wood fragments, algae and silty sand. Wood debris, shell fragments, ulva, and seaweed covers most of SWI. One fish toward top-right of profile and one Hermit Crab toward top-left of profile. Wood debris is small and rounded suggesting reworking at the SWI.
WPAH027	D	Woody debris and silty sand visible at SWI.. Wood debris, shell fragments, ulva, and seaweed covers most of SWI thought there is a small patch of exposed sediment with a tube at upper left center. Wood fragments are chips, fragments and splinted with varying degrees of roundness.
WPAH028	A	Silt. Ulva, wood debris, shell fragments, and benthic macroalgae covers most of SWI. Beggiatoa associated with decaying ulva in upper right and at least 11 snails present. Wood debris and ulva are detritus mantles.

STATION	Rep	Comment
WPAH030	A	Silt with detrital surface. Some shell fragments at right. One shrimp and one fish present. Burrows an several small tubes, shrimp, gastropod and crab tracks present. Appears at least seasonally depositional.
WPAH030	B	Silt, appears soft with detrital mantling. Some shell fragments. Crab tracks and possible gastropod tracks. Cloudy. Burrows visible and fine tubes associated with burrows (secondary).
WPAH031	A	Silt. Some wood debris throughout profile. At least seventeen shrimp and the base of a sea pen (toward right of profile) present. Small tubes. Shrimp tracks and burrows visible. Image slightly cloudy.
WPAH032	B	Silt. Some wood debris throughout profile. Ulva and three fish (gunnels and goby) present. Crab tracks, and burrows/pits visible. Small localized clouds of silt present. Incipient benthic macroalgae at SWI that appear to in the process of binding sediment.
WPAH033	A	Silt. Some wood fragments and seaweed toward top of profile. A fish, carb tracks, crab tracks, and beggiatoa present. Beggiatoa appears to associated with decaying benthic macroalgae that was binding surface sediments.
WPAH034	A	Silt. Scarce mantled wood fragments, a seapen , ulva, and benthic macroalgae present. Two fish (gunnels), seven shrimp, and crab tracks present. A few small burrows and tubes.
WPAH035	A	Silt and minor wood debris. Two organism tubes (possible Spiochaetopterus sabellid polychaete tubes), a fish, four shrimp (two coonstripes), and two small crabs present. Shrimp and crab tracks visible. Several small tubes. Detrital mantling and slightly cloudy.
WPAH035	C	Silt with rounded stones. At least fifteen small crabs, some barnacles on rocks, organism tubes, and a shrimp (coonstripe?) present. Bivalve siphon in left center. Unusual pic of grain size types.
WPAH036	A	Silt with some mantled wood debris and shell fragments. Two fish, two shrimp and a small crab present. Shrimp tracks, crab tracks, organism tubes, and burrows present. A few broken tubes at SWI and multiple intact smaller tubes fringing burrows. Murky.
WPAH037	A	Silt with some heavily mantled wood debris throughout profile. Shrimp tracks, crab tracks, organism tubes, and burrows present. Wood fragments appear older and large based on outlines beneath detritus/sediment.
WPAH038	A	Kelp fronds with detritus.
WPAH038	D	Silt. Some wood debris and shell fragments at SWI. Ulva, seaweed, shrimp tracks, crab tracks, organism tubes, and burrows present. Both red filamantous algae and brown benthic macroalgae.
WPAH039	A	Silt and detritus mantled wood debris (one with barnacles) and shell fragment. Two shrimp, shrimp tracks, and crab tracks present. Cloud of silt toward top-right of profile. Appears to be large tabular bark/wood fragment at lower portion of frame. Mechanically fragmented wood chunk (small) at SWI and free of detritus.
WPAH042	A	Silt. Some wood debris and shell fragments. A shrimp, shrimp and crab tracks, burrows, organism tubes, present. Benthic macroalgae visible. Abundant seston in water column. Wood fragments are well mantled with detritus/sediment. Possible sabellid.
WPAH043	A	Silt. Sediment and detritus mantled wood debris over half the frame and few shell fragments. Two shrimp (spot prawns), shrimp tracks, numerous organism tubes, and crab tracks present. Ulva visible.
WPAH045	A	Silt. Some shell fragments. One crab, twenty-two shrimp, numerous organism tubes, crab tracks, burrows, and other depressions (possible fish foraging pits?) present. Shrimp are oriented in same direction, presumably due to currents.

STATION	Rep	Comment
WPAH046	A	Silty fine sand. Minor twiggy wood debris and shell fragments throughout profile. Ulva and benthic macroalgae visible. Numerous organism tubes (including active polychaete tubes) and burrows. At least two bivalve siphons visible. Snails on algae. Surface appears washed with very little detrital mantling.
WPAH046	B	Silty fien sand. Some wood debris at SWI and shell fragments. Ulva and benthic macroalgae visible. Numerous organism tubes (including active polychaete tubes), burrows, and some crab tracks present. Cerianthid and sabellid visible as well as algal encrusted spiochaetopterus tubes.
WPAH047	A	Fine sand with some silt. Bedding visible. Seaweed, nine shrimp, organism tubes, burrows, crab tracks and trails in the form of furrows present. Surface is washed. Very minor scattered small elongate wood fragments at SWI. Fecal strings.
WPAH053	D	Rounded to subrounded gravel with a thin discontinuous detrital mantling. Ulva and red dendritic algae. At least two small crabs. Very small tube.
WPAH054	A	Silt. Some shell fragments throughout at SWI. Crab tracks, some burrows and fine scaled tubes present. Murky. Abundant detritus at SWI.
WPAH055	A	Silt with detrital veneer at SWI. Minor wood and shell fragments. Three shrimp (coonstripe and crangon?), two small crabs, crab tracks, and a mound toward right of profile present. Wood fragments are at left and their outline is visible under detritus.
WPAH056	A	Silt with robust detrital mantling and very minor shell fragments at SWI. Crab tracks, an organism tube, and small burrows present. Appears at least seasonally depositional.
WPAH057	D	Silt and detritus along with very small wood fragments and minor shell at SWI.. Small elongate fish, a shrimp, and a small crab visible. Numerous organism tubes, shrimp tracks and crab tracks present. Incipient beggiatoa at left.
WPAH058	A	Silt with detritus at SWI. Crab tracks, and furrows (possibly snail trails?) present. Small localized cloud of silt visible (possibly caused by an organism). Small burrows at upper right and very small tubes across frame. Appears depositional.
WPAH059	A	Silt, detrital veneer, and very minor small wood debris and shell fragments at SWI. Crab tracks present in upper right as well as a gastropod and its trail in center right. A piece of ulva present. Appears at least seasonally depositional.
WPAH060	A	Sandy silt with some detrital mantling. A few tabular wood fragments at SWI. A sand dab and some small organisms (toward top-right of profile) present. Shrimp tracks, crab tracks, burrows, and organism tubes present. Appears to seasonally depositional.
WPAH061	B	Silt. Some shell fragments and seaweed visible. A whitish blurred epifaunal organism under algae, a relatively deep furrow (possibly a snail trail) and crab tracks present. Thick detrital mantle at SWI.
WPAH061	E	Silt. Very minor small wood debris and shell fragments. Two shrimp (coonstripe?), benthic macroalgae, fish and Ulva visible. A mudclast, shrimp tracks, crab tracks, and a small cloud of silt (possibly caused by an organism) present. Beggiatoal present and is localized where reduuced sediment is exposed from either burrows or faunal disturbance. Murky but nice pic.
WPAH062	B	Silt. Some shell fragments and seaweed visible. A shrimp, shrimp tracks, crab tracks, few small mudclasts, and some organism tubes, including a possible Spiochaetopterus polychaete tube, present. Surface appears washed with some fluting around tubes.
WPAH063	E	Silt. Some shell fragments and wood debris visible. Two shrimp and a small gastropod present. Shrimp tracks, organism tubes (including an active polychaete tube), depressions (possible fish foraging pits) and burrows present. Depositional.
WPAH064	C	Silt. Some shell fragments and wood debris visible with a distinct fragment at top of frame. A small gastropod present. Shrimp tracks, crab tracks, gastropod tracks, organism tubes (including a Spiochaetopterus polychaete tube), burrows, and a depression present.

STATION	Rep	Comment
WPAH065	A	Silt. Very murky with some shell fragments visible. A small crab, crab tracks, snail trails, and possible burrows present. Image slightly cloudy and obscures visibility of small tubes.
WPAH065	D	Silt. Some shell fragments visible. Crab tracks and burrows present. Image slightly cloudy which precludes identification of small tubes. Minor small wood debris based on outlines at left.
WPAH066	A	Silt. Some wood debris and benthic macroalgae visible. Crab tracks, organism tubes, and shrimp tracks present. Wood debris is covered by thick veneer of sediment/detritus and some appear to have been dislocated so that outline is visible by crabs scuttling over the fragments.
WPAH067	A	Silt. Very minor small wood fibers, shell fragments, and benthic macroalgae visible. Small gastropods, crab tracks, gastropod tracks, organism tubes, shrimp tracks, and burrows present. Thick detrital veneer and appears depositional.
WPAH068	B	Silt. Wood debris apparent across frame with a mix of fragments and twigs, shell fragments, and benthic macroalgae. Five fishes and two shrimp visible. Crab tracks, organism tubes, and shrimp tracks present. Thick detrital veener and appears at least seasonally depositional.
WPAH069	A	Silt. Wood debris (some with barnacles), shell fragments across the majority of frame and most all is mantled with sediment/detritus, and benthic macroalgae throughout profile. Four small crabs visible. Crab tracks, organism tubes, possible burrows, and shrimp tracks present. Appears depositional.
WPAH070	A	Silt. Some wood debris that is visible by outline through detrital veneer, shell fragments, and ulva visible. Two shrimp, two small crabs, crab tracks, organism tubes, shrimp tracks, and burrows present. Bivalve siphon.
WPAH071	A	Silt with detrital veneer and some small wood fragments. Some shell fragments and benthic macroalgae visible. A shrimp, two small crabs, bivalve siphon, a small flounder, and a few small gastropods present. Crab tracks, organism tubes (includingSpiochaetopterus polychaete tubes), shrimp tracks, gastropod tracks, and burrows present. Spiochatopterus tubes have attached red algae.
WPAH073	C	Silt. A small gastropod, a fish, crab tracks, gastropod tracks, organism tubes, shrimp tracks, and burrows. Small localized silt clouds visible; possibly caused by organisms. Murky and appears depositional.
WPAH074	C	Sandy Silt. Some shell fragments throughout profile. Seven shrimp (one coonstripe), crab tracks, organism tubes, shrimp tracks, possible fish foraging pits, and abundant burrows present. Small localized silt clouds visible; possibly caused by organisms.
WPAH074	E	Sandy Silt. Some shell fragments and several small gastropods. Fifteen shrimp, crab tracks, organism tubes, shrimp tracks, abundant burrows, and trails in the form of thin furrows present. Very nice pic.
WPAH075	E	Silt with minor shell fragments. One shrimp, at least one crab, crab tracks, shrimp tracks, and trails in the form of thin furrows present. Small localized silt cloud visible; murky. Small tubes faintly visible. Thick detritus/sediment veneer.
WPAH076	A	Silt. Some debris visible. Crab tracks and a shrimp present. Image is cloudy.
WPAH076	B	Silt. Some debris visible. A shrimp and some tracks present. Image is cloudy.
WPAH077	B	Silt. Crab tracks, shrimp tracks, Gastropod tracks, abundant large burrows and some small tubes. Murky and appears to be covered with fine sediment/detritus indicating that it is at least seasonally depositional.
WPAH078	A	Silt. Some shell fragments, wood debris at right (large fragment), ulva at SWI. Crab tracks, shrimp tracks, possible snail tracks, organism tubes, and trails in the form of thin (v-shaped) furrows present. Distinct patches of wispy beggiatoa at right.
WPAH079	D	Sandy silt. Ten shrimp, crab tracks, shrimp tracks, possible gastropod tracks, small mounds, and burrows present. Surface is low-relief.

STATION	Rep	Comment
WPAH079	E	Sandy Silt. Some shell fragments. Three shrimp, crab tracks, shrimp tracks, possible gastropod tracks, and abundant small organism tubes present.
WPAH080	A	Silt. Some shell fragments throughout profile. At least nineteen shrimp, crab tracks, shrimp tracks, and burrows present. Detrital veneer at SWI and appears to be seasonally depositional. Murky.
WPAH080	B	Silt. Some shell fragments throughout profile. At least twenty (one possibly deceased) shrimp, one fish, shrimp tracks, organism tubes, possible fish foraging pits, trails in the form of thin furrows, and burrows present. Small localized silt clouds visible; caused by shrimp and generally murky.
WPAH081	A	Silt. Minor shell fragment and wood fragment in upper left. One fish, at least one gastropod, shrimp tracks, crab tracks, gastropod tracks, burrow and tube upper center, and trails in the form of thin furrows present. Murky and detrital veneer suggesting that station is at least seasonally depositional.
WPAH082	A	Silt. Some shell fragments and small tabular ronded wood fragments, ulva, at SWI. Two shrimp, one crab, shrimp tracks, crab tracks, burrows, and trails in the form of thin furrows present. Thin detrital veneer.
WPAH083	A	Silt with robust detrital veneer. Some shell fragments, wood debris with large fragment at center left and twig/branch at far left, ulva and beggiatoa visible. Five shrimp (one coonstripe), crab tracks, shrimp tracks, organism tubes, burrows, and trails in the form of thin furrows present. Beggiatoa associated with edge of translated wood fragment in center left.
WPAH084	A	Silt. Minor small wood debris, ulva and kelp visible. Eleven shrimp (three lurking spot prawns), crab tracks, shrimp tracks, and trails in the form of thin furrows present. Very nice pic.
WPAH084	B	Silt. Twenty-four shrimp, crab track, shrimp tracks, gastropod with trail, and trails in the form of thin furrows present. Several burrows and small tubes visible along with a very thing detrital veneer.. Shrimp are oriented mostly in same direction presumably due to current.
WPAH085	B	Silt. Small tabular wood fragment visible. Eight shrimp (2 coonstripe?), one fish, crab track, shrimp tracks, and gastropod with trail present. Intersting dynamics between shrimp species. Detritus and murky.
WPAH086	A	Silt. shell fragments visible. Nine shrimp (1 spot prawn), crab track, shrimp tracks, and trails in the form of thin furrows present. A few burrows and small tubes. Thin detrital veneer.
WPAH087	C	Silt with well developed silt/detrital veneer. Some wood debris easily visible on left side of frame, ulva, and shell fragments visible. Shrimp tracks, organism tubes, burrows, and trails in the form of thin furrows present. Small gastropods.
WPAH088	A	Silt. Small tabular wood fragment visible. Eighteen shrimp, one fish, shrimp tracks, possible crab tracks, possible snail trail, burrows, and trails in the form of thin furrows present.
WPAH089	A	Silt. Very minor wood debris, seaweed, and red benthic macroalgae visible. Ten shrimp, shrimp tracks, crab tracks, organism tube, burrows, and trails in the form of thin furrows present. At least three shrimp species present. Tube at center with encrusted algae (sabellid?)
WPAH090	A	Silt. Some shell fragments visible. Ten shrimp, shrimp tracks, crab tracks, possible gastropod and accompanying trail present. Other trails in the form of thin furrows present. Thin detrital veneer.
WPAH091	A	Silt. Some shell fragments visible and a few small tabular wood fragments. Twenty-four shrimp, shrimp tracks, and a trail in the form of a thin furrow present. Many small localized silt clouds visible caused by shrimp.
WPAH092	A	Silt with large tabular wood debris and abundant smaller wood fragments/fibers, shell fragments, and barnacles. At least eight shrimp (4 spot prawns), a possible fish, organism tubes, shrimp tracks, and trails in the form of a thin furrows present. Wood is mantled with sediment/detritus. Carapace of a red rock crab.

STATION	Rep	Comment
WPAH093	A	Silt. Some shell fragments visible. Twenty-two shrimp (1 larger pandalid partially in frame), shrimp tracks, possible crab track, and a trail in the form of a thin furrow present. Small localized silt clouds visible caused by shrimp. Burrows and small tubes visible.
WPAH093	B	Silt. Some wood debris visible. Twenty-six shrimp, shrimp tracks, possible crab track, burrows, and trails in the form of thin furrows present. A veritable shrimp boil with coonstripe, spot and fairy? Shrimp all present.
WPAH094	A	Silt. Some shell fragments visible. Four shrimp, shrimp tracks, crab tracks, burrows, and organism tubes present. Long parallel lines running through left of profile appear to be drag marks.
WPAH095	B	Silt. Some wood debris and benthic macroalgae visible. At least fourty-eight shrimp, shrimp tracks, possible crab tracks, burrows, and organism tubes present. One shrimp marching to the beat of a different drummer.
WPAH096	A	Silt. Some shell fragments, benthic macroalgae, and leafy seaweed visible. Seven shrimp, shrimp tracks and numerous furrows running from left to right (or right to left) through profile whuch apear to be due to undulatory sweeping of kelp fronds.
WPAH097	B	SWI covered in ulva and detritus. Two shrimp, a small crab.
WPAH098	A	SWI covered in ulva, seaweed, and detritus.
WPAH099	A	Silt. Benthic macroalgae, ulva, and seaweed covering SWI. Wood debris covering surface outside of algae. Wood debris appears to be small physically reworked particles. Some of the ulva is in a state of decay.
WPAH100	C	SWI covered in ulva, seaweed, and detritus.
WPAH101	A	Silt. Sixteen shrimp, shrimp tracks, crab tracks, and burrows present. Smal tubes. Low relief at SWI.
WPAH102	A	Silt. Some shell fragments visible. Thirteen shrimp, shrimp tracks, crab tracks, burrows, and trails in the form of thin furrows present.
WPAH103	A	Silt. Shrimp tracks, crab tracks, organism tubes, burrows, possible snail trail, and other trails in the form of thin furrows present.
WPAH104	A	Silt. Shrimp tracks, crab tracks, dense organism tubes, burrows, and trails in the form of thin furrows present.
WPAH105	A	Grey and tan silt. Some shell and wood fragments visible. Five shrimp and long parrallel furrows present. Surface physically or mechanically disturbed.
KSS-1	A	Silt. Some wood debris visible. Benthic macroalgae throughout profile. Two shrimp, possible amphipod, and Goby present. Crab tracks, organism tubes, large burrow openings or possible fish foraging pits and trails in the form of thin furrows present.
KSS-2	A	Silt. Some shell fragments visible. Benthic macroalgae throughout profile. One small crab present. Crab tracks and trails in the form of thin furrows present.
KSS-3	B	Silt. Some shell fragments visible. Ulva toward right of profile. One small crab present. Crab tracks and trails in the form of thin furrows present.

APPENDIX J

SPI AND PLAN VIEW DATA

Table J1. SPI Data

Station	Rep	Stop Collar Settings (in.)	No. of Weights per Chassis	Date	Time	Water Depth (m)	Calibration Constant	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	Grain Size Range	Penetration Area (sq.cm)	Average Penetration (cm)	Minimum Penetration (cm)	Maximum Penetration (cm)	Boundary Roughness (cm)	Origin of Boundary Roughness	RPD Area (sq.cm)	Mean RPD (cm)	Methane	Low DO?
WPAH003	D	16	5	7/17/2013	16:46:31	4.6	14.44	4-3	1	>4	>4 to 1	238.10	16.49	15.12	17.41	2.29	Physical	IND	IND	No	No
WPAH004	A	15	2	7/16/2013	15:00:10	8.8	14.44	>4	2	>4	>4 to 2	257.12	17.80	16.85	19.19	2.34	Physical	42.04	2.91	No	No
WPAH004	D	15	2	7/16/2013	15:03:46	8.2	14.44	>4	2	>4	>4 to 2	215.67	14.93	10.80	16.95	6.15	Physical	IND	IND	No	No
WPAH005	A	15	0	7/16/2013	15:24:03	13.0	14.44	>4	2	>4	>4 to 2	268.98	18.63	17.62	19.38	1.76	Biogenic	82.22	5.69	No	No
WPAH005	B	15	0	7/16/2013	15:25:48	13.0	14.44	>4	2	>4	>4 to 2	257.09	17.80	17.24	18.64	1.40	Biogenic	48.45	3.35	No	No
WPAH006	C	15	2	7/16/2013	15:10:44	7.6	14.44	>4	1	>4	>4 to 1	233.88	16.20	15.60	16.76	1.16	Physical	IND	IND	No	No
WPAH007	D	14	0	7/16/2013	17:20:23	12.0	14.44	>4	2	>4	>4 to 2	157.93	10.94	8.99	12.15	3.16	Physical	22.41	1.55	No	No
WPAH008	A	16	5	7/18/2013	13:22:38	6.8	14.44	>4	2	>4	>4 to 2	209.33	14.50	13.02	15.55	2.53	Biogenic	27.49	1.90	No	No
WPAH008	D	16	5	7/18/2013	13:25:34	8.2	14.44	>4	2	>4	>4 to 2	147.59	10.22	9.74	10.92	1.18	Physical	diffusional	0.20	No	No
WPAH009	A	14	0	7/17/2013	15:25:29	8.6	14.44	>4	2	>4	>4 to 2	112.33	7.78	6.73	10.05	3.33	Physical	17.01	1.18	No	No
WPAH009	D	14	0	7/17/2013	15:29:32	9.6	14.44	>4	2	>4	>4 to 2	289.29	20.03	19.58	21.05	1.47	Biogenic	29.61	2.05	No	No
WPAH010	C	14	0	7/17/2013	15:10:20	16.0	14.44	>4	2	>4	>4 to 2	255.33	17.68	16.78	18.30	1.52	Physical	6.39	0.44	No	No
WPAH011	B	15	0	7/16/2013	15:49:11	16.4	14.44	>4	2	>4	>4 to 2	291.22	20.17	19.94	20.47	0.53	Biogenic	47.87	3.31	No	No
WPAH012	B	15	2	7/16/2013	13:48:16	27.4	14.44	>4	2	>4	>4 to 2	216.28	14.98	12.66	18.39	5.74	Physical	Ind	3.43	No	No
WPAH012	C	15	2	7/16/2013	13:49:31	27.4	14.44	>4	2	>4	>4 to 2	216.92	15.02	14.08	17.65	3.57	Physical	IND	3.37	No	No
WPAH013	A	15	0	7/16/2013	14:06:16	17.8	14.44	>4	2	>4	>4 to 2	248.81	17.23	16.68	17.91	1.23	Biogenic	41.48	2.87	No	No
WPAH014	A	14	0	7/15/2013	10:14:43	21.2	14.44	>4	2	>4	>4 to 2	278.13	19.26	18.71	20.11	1.40	Physical	38.32	2.65	No	No
WPAH015	A	14	0	7/15/2013	10:30:48	19.6	14.44	>4	2	>4	>4 to 2	187.97	13.02	12.27	14.06	1.78	Biogenic	40.70	2.82	No	No
WPAH016	A	14	0	7/15/2013	10:52:03	16.0	14.44	>4	2	>4	>4 to 2	226.02	15.65	14.97	16.13	1.16	Biogenic	29.44	2.04	No	No
WPAH017	A	14	0	7/15/2013	11:12:46	15.4	14.44	>4	2	>4	>4 to 2	218.83	15.15	14.75	15.72	0.96	Biogenic	31.89	2.21	No	No
WPAH018	A	14	0	7/15/2013	11:34:31	12.2	14.44	>4	2	>4	>4 to 2	157.32	10.89	9.50	11.28	1.78	Biogenic	33.93	2.35	No	No
WPAH019	C	15.5	0	7/16/2013	11:27:20	14.0	14.44	4-3	0	>4	>4 to 0	186.00	12.88	10.61	14.85	4.24	Physical	diffusional	0.10	No	Yes

Table J1. SPI Data

Station	Rep	Stop Collar Settings (in.)	No. of Weights per Chassis	Date	Time	Water Depth (m)	Calibration Constant	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	Grain Size Range	Penetration Area (sq.cm)	Average Penetration (cm)	Minimum Penetration (cm)	Maximum Penetration (cm)	Boundary Roughness (cm)	Origin of Boundary Roughness	RPD Area (sq.cm)	Mean RPD (cm)	Methane	Low DO?
WPAH020	B	15	1	7/15/2013	16:25:38	14.6	14.44	>4	2	>4	>4 to 2	264.41	18.31	17.67	19.43	1.76	Physical	15.54	1.08	No	No
WPAH022	B	15	0	7/16/2013	15:34:05	12.6	14.44	>4	2	>4	>4 to 2	138.00	9.56	8.22	10.73	2.51	Biogenic	36.06	2.50	No	No
WPAH022	C	15	0	7/16/2013	15:35:24	12.8	14.44	>4	2	>4	>4 to 2	279.79	19.37	18.76	19.70	0.94	Biogenic	47.70	3.30	No	No
WPAH023	A	16	5	7/18/2013	12:47:16	7.4	14.44	>4	0	>4	>4 to 0	196.19	13.59	12.37	14.61	2.24	Physical	IND	IND	No	No
WPAH024	F	16	0	7/18/2013	8:36:41	5.6	14.44	>4	2	>4	>4 to 2	176.82	12.24	11.79	12.71	0.92	Physical	diffusional	0.10	No	Yes
WPAH025	A	16	3	7/17/2013	17:18:47	6.8	14.44	>4	2	>4	>4 to 2	135.41	9.38	9.06	9.72	0.65	Physical	0.00	0.00	No	Yes
WPAH026	A	14	0	7/18/2013	8:47:50	13.6	14.44	>4	2	>4	>4 to 2	278.43	19.28	17.84	20.35	2.51	Physical	28.80	1.99	No	No
WPAH027	A	16	3	7/16/2013	11:51:47	4.8	14.44	3-2	0	>4	>4 to 0	188.00	13.02	12.32	13.57	1.25	Physical	17.02	1.18	No	No
WPAH027	C	16	3	7/16/2013	11:54:18	4.6	14.44	2-1	-1	>4	>4 to -1	151.23	10.47	9.64	10.78	1.13	Physical	8.13	0.56	No	No
WPAH028	A	15.5	0	7/16/2013	11:33:59	11.4	14.44	>4	1	>4	>4 to 1	224.19	15.52	14.56	16.23	1.66	Physical	diffusional	0.10	No	No
WPAH030	A	15	2	7/16/2013	8:54:59	23.6	14.44	>4	2	>4	>4 to 2	161.70	11.20	10.15	12.15	2.00	Biogenic	34.71	2.40	No	No
WPAH030	B	15	2	7/16/2013	8:56:33	23.6	14.44	>4	2	>4	>4 to 2	212.74	14.73	14.47	15.21	0.75	Biogenic	33.26	2.30	No	No
WPAH031	A	14	0	7/15/2013	11:50:54	17.6	14.44	>4	2	>4	>4 to 2	176.59	12.23	11.67	12.30	0.63	Biogenic	41.32	2.86	No	No
WPAH032	B	14	0	7/15/2013	11:27:48	14.0	14.44	>4	2	>4	>4 to 2	195.25	13.52	12.71	14.44	1.74	Physical	63.31	4.38	No	No
WPAH033	A	16	3	7/16/2013	8:20:45	10.6	14.44	>4	2	>4	>4 to 2	247.79	17.16	16.66	17.99	1.33	Biogenic	40.74	2.82	No	No
WPAH034	A	16	3	7/16/2013	8:30:25	14.8	14.44	>4	2	>4	>4 to 2	151.88	10.52	10.08	10.82	0.75	Biogenic	34.39	2.38	No	No
WPAH035	A	16	3	7/16/2013	8:41:29	15.8	14.44	4-3	0	>4	>4 to 0	57.55	3.99	3.64	4.27	0.63	Biogenic	23.47	1.62	No	No
WPAH035	D	16	3	7/16/2013	8:46:02	16.0	14.44	4-3	1	>4	>4 to 1	66.13	4.58	4.07	4.92	0.84	Biogenic	22.83	1.58	No	No
WPAH036	A	15	2	7/17/2013	9:25:39	11.8	14.44	>4	1	>4	>4 to 1	214.73	14.87	14.13	15.12	0.99	Biogenic	99.25	6.87	No	No
WPAH037	A	15	2	7/17/2013	9:34:00	10.2	14.44	>4	1	>4	>4 to 1	230.66	15.97	14.75	17.70	2.94	Biogenic	64.44	4.46	No	No
WPAH038	A	16	5	7/17/2013	8:50:13	7.0	14.44	4-3	1	>4	>4 to 1	149.60	10.36	9.21	11.19	1.98	Biogenic	17.90	1.24	No	No
WPAH038	D	16	5	7/17/2013	8:53:58	5.8	14.44	4-3	1	>4	>4 to 1	123.93	8.58	8.32	8.87	0.55	Biogenic	19.64	1.36	No	No
WPAH039	A	15	1	7/15/2013	16:45:46	31.2	14.44	>4	1	>4	>4 to 1	227.71	15.77	15.36	15.98	0.63	Biogenic	49.12	3.40	No	No
WPAH042	A	15	1	7/15/2013	14:15:57	15.8	14.44	>4	1	>4	>4 to 1	147.23	10.20	9.76	10.56	0.80	Biogenic	34.04	2.36	No	No

Table J1. SPI Data

Station	Rep	Stop Collar Settings (in.)	No. of Weights per Chassis	Date	Time	Water Depth (m)	Calibration Constant	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	Grain Size Range	Penetration Area (sq.cm)	Average Penetration (cm)	Minimum Penetration (cm)	Maximum Penetration (cm)	Boundary Roughness (cm)	Origin of Boundary Roughness	RPD Area (sq.cm)	Mean RPD (cm)	Methane	Low DO?
WPAH043	A	15	2	7/15/2013	15:59:39	26.4	14.44	>4	2	>4	>4 to 2	236.13	16.35	15.28	17.67	2.39	Physical	43.01	2.98	No	No
WPAH045	A	15	1	7/15/2013	14:06:37	25.4	14.44	>4	2	>4	>4 to 2	93.47	6.47	6.12	6.75	0.63	Biogenic	34.02	2.36	No	No
WPAH046	A	16.5	5	7/15/2013	13:22:01	16.8	14.44	4-3	1	>4	>4 to 1	61.47	4.26	3.38	4.77	1.40	Physical	61.47	4.26	No	No
WPAH046	B	16.5	5	7/15/2013	13:23:03	16.2	14.44	4-3	1	>4	>4 to 1	42.51	2.94	2.43	3.50	1.06	Physical	42.51	2.94	No	No
WPAH047	A	16.5	5	7/15/2013	13:10:38	46.0	14.44	3-2	1	>4	>4 to 1	29.69	2.06	1.11	2.75	1.64	Physical	IND	IND	No	No
WPAH053	D	15	2	7/17/2013	16:35:10	6.4	14.44	-3	-4	>4	>4 to -4	28.59	1.98	1.06	2.51	1.45	Physical	IND	IND	No	No
WPAH054	A	15	0	7/16/2013	15:39:44	13.2	14.44	>4	2	>4	>4 to 2	244.69	16.94	16.59	17.29	0.70	Biogenic	42.58	2.95	No	No
WPAH055	A	14	0	7/16/2013	17:24:10	14.4	14.44	>4	2	>4	>4 to 2	244.64	16.94	16.25	18.23	1.98	Biogenic	25.96	1.80	No	No
WPAH056	A	14	0	7/16/2013	17:31:46	12.8	14.44	>4	2	>4	>4 to 2	277.62	19.22	18.59	19.48	0.89	Biogenic	61.66	4.27	No	No
WPAH057	B	14	0	7/17/2013	15:18:11	14.0	14.44	>4	2	>4	>4 to 2	304.62	21.09	20.66	21.22	0.55	Biogenic	28.91	2.00	No	No
WPAH058	C	15	0	7/16/2013	15:57:59	17.0	14.44	>4	2	>4	>4 to 2	293.65	20.33	20.20	20.61	0.41	Biogenic	54.26	3.76	No	No
WPAH059	A	13.5	0	7/16/2013	17:02:30	17.2	14.44	>4	2	>4	>4 to 2	254.95	17.65	17.14	17.82	0.68	Physical	40.42	2.80	No	No
WPAH060	A	14	0	7/15/2013	10:44:15	15.0	14.44	>4	2	>4	>4 to 2	222.75	15.42	15.04	15.82	0.77	Biogenic	47.27	3.27	No	No
WPAH061	B	13.5	0	7/16/2013	16:46:56	14.8	14.44	>4	2	>4	>4 to 2	135.10	9.36	8.70	10.46	1.76	Biogenic	49.59	3.43	No	No
WPAH061	E	15	1	7/18/2013	9:02:50	13.0	14.44	>4	2	>4	>4 to 2	103.18	7.15	6.39	7.55	1.16	Biogenic	44.87	3.11	No	No
WPAH062	B	13.5	0	7/16/2013	16:55:46	18.6	14.44	>4	2	>4	>4 to 2	226.27	15.67	15.21	16.23	1.01	Biogenic	37.63	2.61	No	No
WPAH063	A	15	2	7/16/2013	13:55:34	19.6	14.44	>4	2	>4	>4 to 2	273.95	18.97	18.11	20.30	2.19	Biogenic	41.04	2.84	No	No
WPAH064	A	15	0	7/16/2013	14:14:16	18.0	14.44	>4	2	>4	>4 to 2	179.15	12.41	12.37	12.63	0.27	Biogenic	39.39	2.73	No	No
WPAH065	A	14	0	7/15/2013	10:37:49	18.2	14.44	>4	2	>4	>4 to 2	208.18	14.42	14.10	14.56	0.46	Biogenic	32.01	2.22	No	No
WPAH065	B	14	0	7/15/2013	10:38:46	18.2	14.44	>4	2	>4	>4 to 2	208.81	14.46	14.20	15.07	0.87	Biogenic	32.84	2.27	No	No
WPAH066	A	14	0	7/15/2013	11:20:55	14.2	14.44	>4	2	>4	>4 to 2	204.51	14.16	13.28	15.16	1.88	Physical	32.45	2.25	No	No
WPAH067	A	14	0	7/15/2013	11:43:35	15.6	14.44	>4	2	>4	>4 to 2	185.10	12.82	12.34	13.24	0.89	Biogenic	48.87	3.38	No	No
WPAH068	A	15	2	7/16/2013	8:00:54	13.0	14.44	>4	2	>4	>4 to 2	261.87	18.13	17.12	19.72	2.60	Physical	48.39	3.35	No	No
WPAH069	A	15	2	7/16/2013	8:09:36	14.0	14.44	>4	2	>4	>4 to 2	147.82	10.24	7.76	11.31	3.54	Physical	47.76	3.31	No	No
WPAH070	A	15	2	7/15/2013	15:03:17	20.4	14.44	>4	2	>4	>4 to 2	147.13	10.19	9.47	11.77	2.29	Biogenic	32.70	2.26	No	No

Table J1. SPI Data

Station	Rep	Stop Collar Settings (in.)	No. of Weights per Chassis	Date	Time	Water Depth (m)	Calibration Constant	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	Grain Size Range	Penetration Area (sq.cm)	Average Penetration (cm)	Minimum Penetration (cm)	Maximum Penetration (cm)	Boundary Roughness (cm)	Origin of Boundary Roughness	RPD Area (sq.cm)	Mean RPD (cm)	Methane	Low DO?
WPAH071	A	15	2	7/15/2013	14:55:09	15.8	14.44	4-3	1	>4	>4 to 1	103.35	7.16	6.85	7.18	0.34	Physical	26.54	1.84	No	No
WPAH073	A	15	2	7/17/2013	9:04:19	14.6	14.44	>4	2	>4	>4 to 2	202.80	14.04	13.14	15.33	2.19	Biogenic	50.46	3.49	No	No
WPAH074	A	15	0	7/16/2013	13:26:06	29.0	14.44	>4	2	>4	>4 to 2	190.07	13.16	12.68	13.57	0.89	Physical	37.22	2.58	No	No
WPAH074	B	15	0	7/16/2013	13:27:30	29.2	14.44	>4	2	>4	>4 to 2	201.81	13.97	13.57	14.61	1.04	Biogenic	46.43	3.22	No	No
WPAH075	A	14	0	7/15/2013	8:51:47	21.0	14.44	>4	2	>4	>4 to 2	170.25	11.79	10.51	12.92	2.41	Biogenic	45.62	3.16	No	No
WPAH076	A	14	0	7/15/2013	10:23:21	20.4	14.44	>4	2	>4	>4 to 2	178.20	12.34	11.67	13.67	2.00	Biogenic	57.38	3.97	No	No
WPAH076	B	14	0	7/15/2013	10:24:21	20.4	14.44	>4	2	>4	>4 to 2	195.03	13.51	13.33	13.74	0.41	Biogenic	44.21	3.06	No	No
WPAH077	A	15	2	7/16/2013	9:05:12	21.2	14.44	>4	2	>4	>4 to 2	93.39	6.47	6.08	7.11	1.04	Biogenic	35.24	2.44	No	No
WPAH078	B	15	0	7/16/2013	13:01:22	16.8	14.44	>4	1	>4	>4 to 1	161.89	11.21	10.03	12.61	2.58	Biogenic	26.75	1.85	No	No
WPAH079	D	15	0	7/16/2013	13:20:03	34.2	14.44	>4	2	>4	>4 to 2	166.80	11.55	10.82	12.25	1.42	Biogenic	36.29	2.51	No	No
WPAH079	E	15	2	7/17/2013	13:58:20	33.6	14.44	>4	2	>4	>4 to 2	233.05	16.14	15.82	16.42	0.60	Biogenic	42.20	2.92	No	No
WPAH080	A	15	0	7/16/2013	10:18:35	26.0	14.44	>4	2	>4	>4 to 2	226.70	15.70	15.26	16.13	0.87	Physical	54.47	3.77	No	No
WPAH080	B	15	0	7/16/2013	10:20:06	28.0	14.44	>4	2	>4	>4 to 2	200.75	13.90	13.62	14.13	0.51	Biogenic	48.25	3.34	No	No
WPAH081	A	15	0	7/16/2013	10:00:41	25.0	14.44	>4	2	>4	>4 to 2	213.01	14.75	14.32	14.90	0.58	Biogenic	62.65	4.34	No	No
WPAH082	A	15	2	7/16/2013	9:42:26	23.6	14.44	>4	2	>4	>4 to 2	232.56	16.10	15.62	16.54	0.92	Biogenic	45.11	3.12	No	No
WPAH083	A	15.5	0	7/16/2013	11:43:27	26.6	14.44	>4	2	>4	>4 to 2	146.50	10.14	9.04	11.19	2.15	Biogenic	37.49	2.60	No	No
WPAH084	A	15	0	7/16/2013	10:36:31	41.0	14.44	>4	2	>4	>4 to 2	102.95	7.13	5.71	8.68	2.97	Physical	40.09	2.78	No	No
WPAH084	B	15	0	7/16/2013	10:37:38	41.6	14.44	>4	2	>4	>4 to 2	190.65	13.20	12.99	13.31	0.31	Biogenic	47.13	3.26	No	No
WPAH085	B	15	0	7/16/2013	10:29:12	31.2	14.44	>4	2	>4	>4 to 2	230.43	15.96	15.69	16.08	0.39	Biogenic	43.19	2.99	No	No
WPAH086	B	15	0	7/16/2013	10:10:57	29.2	14.44	>4	2	>4	>4 to 2	233.54	16.17	14.75	16.97	2.22	Biogenic	64.47	4.46	No	No
WPAH087	C	15.5	0	7/16/2013	11:17:24	24.6	14.44	>4	2	>4	>4 to 2	255.03	17.66	17.07	18.56	1.49	Biogenic	42.82	2.97	No	No
WPAH088	A	15.5	0	7/16/2013	11:05:51	45.6	14.44	>4	2	>4	>4 to 2	191.51	13.26	12.85	13.81	0.96	Biogenic	24.57	1.70	No	No
WPAH089	A	15	1	7/15/2013	16:57:50	49.6	14.44	>4	2	>4	>4 to 2	158.19	10.95	8.97	11.72	2.75	Physical	39.07	2.71	No	No
WPAH090	A	15	1	7/15/2013	17:07:21	41.8	14.44	>4	2	>4	>4 to 2	253.38	17.55	17.09	18.15	1.06	Biogenic	47.46	3.29	No	No
WPAH091	A	15	1	7/15/2013	17:24:21	39.0	14.44	>4	2	>4	>4 to 2	257.80	17.85	17.53	18.06	0.53	Biogenic	58.48	4.05	No	No
WPAH092	A	15	1	7/15/2013	16:37:12	28.4	14.44	>4	2	>4	>4 to 2	203.45	14.09	13.02	14.71	1.69	Physical	39.46	2.73	No	No
WPAH093	A	15	2	7/15/2013	16:08:51	39.6	14.44	>4	2	>4	>4 to 2	254.53	17.63	17.36	18.13	0.77	Biogenic	40.15	2.78	No	No

Table J1. SPI Data

Station	Rep	Stop Collar Settings (in.)	No. of Weights per Chassis	Date	Time	Water Depth (m)	Calibration Constant	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	Grain Size Range	Penetration Area (sq.cm)	Average Penetration (cm)	Minimum Penetration (cm)	Maximum Penetration (cm)	Boundary Roughness (cm)	Origin of Boundary Roughness	RPD Area (sq.cm)	Mean RPD (cm)	Methane	Low DO?
WPAH093	B	15	2	7/15/2013	16:10:10	38.4	14.44	>4	2	>4	>4 to 2	233.39	16.16	14.90	17.96	3.06	Physical	58.57	4.06	No	No
WPAH094	A	15	1	7/18/2013	9:23:43	53.8	14.44	>4	2	>4	>4 to 2	198.62	13.75	13.19	14.03	0.84	Biogenic	77.42	5.36	No	No
WPAH095	B	15	1	7/15/2013	13:46:16	49.6	14.44	>4	2	>4	>4 to 2	212.25	14.70	14.37	15.09	0.72	Biogenic	47.91	3.32	No	No
WPAH096	A	15	1	7/15/2013	13:35:10	58.4	14.44	>4	2	>4	>4 to 2	261.32	18.10	17.94	18.20	0.27	Biogenic	41.34	2.86	No	No
WPAH097	A	13.5	0	7/16/2013	16:34:22	7.8	14.44	>4	2	>4	>4 to 2	208.15	14.41	12.58	15.82	3.23	Physical	43.55	3.02	No	No
WPAH098	A	16	3	7/16/2013	11:59:32	3.4	14.44	4-3	0	>4	>4 to 0	259.59	17.98	15.91	20.73	4.82	Physical	IND	IND	No	No
WPAH099	A	15	2	7/15/2013	15:37:54	9.4	14.44	>4	1	>4	>4 to 1	241.21	16.70	15.94	17.41	1.47	Physical	IND	IND	No	No
WPAH100	A	15	2	7/15/2013	15:24:40	8.2	14.44	4-3	1	>4	>4 to 1	128.36	8.89	7.74	10.49	2.75	Physical	0.00	0.00	No	No
WPAH101	A	15	1	7/18/2013	10:48:49	45.6	14.44	>4	2	>4	>4 to 2	170.19	11.78	11.55	12.03	0.48	Biogenic	48.01	3.32	No	No
WPAH102	A	15	1	7/18/2013	11:00:04	51.6	14.44	>4	2	>4	>4 to 2	294.50	20.39	19.94	20.76	0.82	Biogenic	52.95	3.67	No	No
WPAH103	A	15	1	7/18/2013	9:55:31	37.4	14.44	>4	2	>4	>4 to 2	261.71	18.12	17.41	18.52	1.11	Biogenic	46.98	3.25	No	No
WPAH104	A	15	1	7/18/2013	11:11:46	37.0	14.44	>4	2	>4	>4 to 2	194.56	13.47	13.26	13.62	0.36	Biogenic	37.70	2.61	No	No
WPAH105	A	15	1	7/18/2013	11:21:23	59.2	14.44	>4	1	>4	>4 to 1	262.34	18.17	17.84	18.42	0.58	Biogenic	27.37	1.89	No	No
KSS-1	A	15	2	7/17/2013	10:04:50	9.2	14.44	>4	2	>4	>4 to 2	262.31	18.16	17.53	19.02	1.49	Biogenic	43.63	3.02	No	No
KSS-2	A	15	2	7/17/2013	10:15:35	8.0	14.44	>4	2	>4	>4 to 2	161.06	11.15	10.44	11.74	1.30	Biogenic	35.79	2.48	No	No
KSS-3	E	16	4	7/17/2013	10:49:26	9.6	14.44	>4	1	>4	>4 to 1	297.85	20.62	20.23	21.02	0.80	Biogenic	26.54	1.84	No	No

Table J1. SPI Data

Station	Rep	Wood Debris?	Beggiatoa?	Comment	No. of Feeding Voids	Void Minimum Depth (cm)	Void Maximum Depth (cm)	Void Average Depth (cm)	Max Bioturb Depth (cm)	Successional Stage
WPAH003	D	High	Trace	Thin aRPD but profile disturbed by wood chip dragdown so unable to measure, wood debris over fines at depth, and flocular material oxidized at SWI. Ulva fragments throughout profile, a few amphipods at SWI, burrows and five active FVs present.	5	4.32	12.87	8.59	17.41	Stage 2 on 3
WPAH004	A	High	No	Silt with small wood fibers throughout profile. Shell fragments, ulva and red macroalgae at SWI. Burrows, one active FV and subsurface organisms, including a large polychaete present.	1	6.68	7.28	6.98	17.31	Stage 3
WPAH004	D	High	No	Silt with small wood fibers throughout profile. SWI disrupted by large fragment of wood being pulled down by prism on left. Ulva & barnacle encrusted wood debris at SWI. Burrows, five active FVs, and a void toward right of profile present.	5	2.63	8.73	5.68	16.90	Stage 1 on 3
WPAH005	A	Trace	No	Silt with some wood fibers and small debris. Ulva and detrital mantling at SWI.	0	0.00	0.00	0.00	17.75	Stage 2 -> 3
WPAH005	B	Trace	No	Silt with some shell fragments and wood fibers throughout profile. Some macroalgae at SWI. One sediment-filled FV and evidence of burrowing at depth.	1	12.49	12.90	12.69	17.80	Stage 2 -> 3
WPAH006	C	High	No	Silt with some shell fragments and wood fibers. Debris, including wood fragments, and a large divot at SWI from wood piece being dragged down, preventing accurate aRPD measurement. Burrows, amphipods, one active FV, and a large polychaete visible.	1	2.58	4.00	3.29	16.76	Stage 2 on 3
WPAH007	D	High	Yes	Silt with wood fibers throughout profile. Ulva, wood debris, one coonstripe shrimp (Pandalus danae), and some Beggiatoa at SWI. Burrows and two active FVs present.	2	7.06	9.50	8.28	12.15	Stage 1 on 3
WPAH008	A	Med	Trace	Silt with wood fibers underlying detrital layer. Macroalgae and organism tubes at SWI. Burrows, wood debris, and active burrowing throughout profile.	2	1.33	11.45	6.39	15.55	Stage 1 on 3
WPAH008	D	High	Yes	Silt with high density of wood fibers & debris. Benthic macroalgae, wood debris, organism tubes, and some Beggiatoa at SWI. Profile disrupted by wood debris being dragged down by prism.	Ind	Ind	Ind	Ind	Ind	Ind
WPAH009	A	Trace	No	Silt with some shell fragments, wood fibers, and fecal pellets. Benthic macroalgae, ulva, wood debris at SWI. Burrowing to depth and one active FV present. Ulva was dragged down into the sediment column toward right of profile.	1	1.47	3.86	2.66	10.05	Stage 1 on 3
WPAH009	D	Med	No	Silt with wood fibers and fecal pellets over wood pulp. Benthic macroalgae and debris at SWI. Burrows and an active FV at depth.	1	17.70	19.67	18.68	21.05	Stage 1 on 3
WPAH010	C	Med	No	Silt with wood fibers and fecal pellets mixed with wood pulp. Burrowing to depth of profile, and a subsurface annelid present.	2	10.34	13.16	11.75	18.30	Stage 1 on 3
WPAH011	B	Low	No	Silt with wood fibers mixed with wood pulp. Two sediment-filled FVs and a subsurface annelid visible.	2	8.75	20.11	14.43	20.11	Stage 1 on 3
WPAH012	B	Low	No	Silt with wood fibers; aRPD is linear measurement from left side of image, right half of SWI is disrupted by a crab being pushed down & transected by camera prism blade. Burrows and one active FV present.	0	0.00	0.00	0.00	17.50	Stage 1 on 3
WPAH012	C	High	No	Silt with wood fibers; profile disrupted by wood fragments being dragged down by prism, aRPD is linear measurement from right edge of image; burrowing throughout profile, annelid visible at depth.	0	0.00	0.00	0.00	17.65	Stage 1 on 3
WPAH013	A	None	No	Silt with relatively low percentage of wood fibers throughout profile; burrows to depth, one active FV, and subsurface annelid visible.	1	16.01	17.36	16.68	17.91	Stage 1 on 3
WPAH014	A	Low	No	Silt with wood fibers, fecal pellets, and some shell fragments over wood pulp at depth.	4	6.00	18.64	12.32	19.26	Stage 1 on 3
WPAH015	A	Trace	No	Silt with wood fibers and some shell fragments. Burrows, one active FV, and numerous polychaetes present.	1	3.21	7.40	5.30	13.02	Stage 1 on 3
WPAH016	A	Trace	No	Silt with wood fibers and some shell fragments. Wood debris and organism tubes at SWI. Burrows and polychaetes visible throughout profile.	0	0.00	0.00	0.00	15.65	Stage 1 on 3
WPAH017	A	None	No	Silt with wood fibers and Ulva at SWI. Burrows, annelids, and FV visible; burrowing throughout depth of profile.	1	4.36	4.64	4.50	15.72	Stage 1 on 3
WPAH018	A	Low	No	Silt with wood fibers, fecal pellets, and some shell fragments. Wood debris, red macroalgae, and seaweed at SWI. Burrows, one active, sediment-filled FV, and a piece of seaweed that was dragged down visible below SWI.	1	3.16	4.39	3.77	10.95	Stage 1 on 3
WPAH019	C	High	Trace	Silty very fine sand with wood fibers, high density of fecal pellets, and some shell fragments. Thin veneer of oxidized sediment at surface along with individual filaments of Beggiatoa. Burrows, red macroalgae, and active FVs present below SWI.	3	3.09	14.44	8.76	14.85	Stage 1 on 3

Table J1. SPI Data

Station	Rep	Wood Debris?	Beggiatoa?	Comment	No. of Feeding Voids	Void Minimum Depth (cm)	Void Maximum Depth (cm)	Void Average Depth (cm)	Max Bioturb Depth (cm)	Successional Stage
WPAH020	B	Med	No	Silt with numerous wood fibers, some fecal pellets, and shell fragments. Debris, wood fragments, and organism tubes at SWI. Burrowing throughout depth of profile.	4	5.04	16.56	10.80	18.42	Stage 1 on 3
WPAH022	B	Low	No	Silt with wood fibers and some shell fragments. Debris, including a piece of cable, at SWI. Burrows and a few polychaetes present.	0	0.00	0.00	0.00	9.56	Stage 2 -> 3
WPAH022	C	Med	No	Silt with wood fibers mixed with wood pulp at depth. Burrowing throughout depth of profile.	0	0.00	0.00	0.00	19.70	Stage 1 on 3
WPAH023	A	High	Yes	Thick layer of wood debris with Ulva over fragmented silt at depth. Diffusional aRPD and flocular material at SWI is oxidized. Some Beggiatioa and organism tubes at SWI. Burrows and subsurface organisms present below SWI. Profile is disturbed from wood fragments being dragged down.	0	0.00	0.00	0.00	Ind	Ind
WPAH024	F	None	Yes	Silt. Reduced sediment appears to be above oxidized sediment from Ulva being dragged down throughout sediment column. Beggiatoa at SWI. Burrows present.	Ind	Ind	Ind	Ind	Ind	Ind
WPAH025	A	None	Yes	Anoxic silt with some shell fragments. Decomposing benthic macroalgae, some tubes, and Beggiatoa at SWI. Burrows present below SWI.	0	0.00	0.00	0.00	3.83	Stage 1
WPAH026	A	None	No	Silt with trace of wood fibers and fecal pellets mixed with wood pulp at depth. Station classified as no wood present even though it was historically (buried by natural deposition). Small tubes at SWI, evidence of burrowing at depth.	0	0.00	0.00	0.00	18.44	Stage 2 -> 3
WPAH027	A	High	No	Wood debris over silty fine sand with high percentage of wood chips & fibers and shell fragments. Kelp and Ulva at SWI. Burrows, active FVs, and a large polychaete present below SWI.	3	4.29	8.58	6.44	13.60	Stage 1 on 3
WPAH027	C	High	No	Wood debris over poorly sorted silty fine to coarse sand with wood fibers and shell fragments. Kelp and Ulva at SWI. Burrows and active FV present.	1	9.28	10.54	9.91	10.54	Stage 1 on 3
WPAH028	A	High	No	Silt with wood fibers and shell fragments. Ulva, red benthic macroalgae, wood debris, and organism tubes at SWI. Burrows, three active FVs, and benthic macroalgae dragged below SWI by camera.	3	13.43	16.10	14.77	16.10	Stage 1 on 3
WPAH030	A	None	No	Silt with trace of wood fibers below SWI. Small tubes at SWI. Annelids visible at depth.	0	0.00	0.00	0.00	10.06	Stage 1 on 3
WPAH030	B	None	No	Silt with trace of wood fibers below SWI. Small tubes at SWI; burrows, FVs, and a large polychaete toward bottom of profile.	4	3.52	10.49	7.00	15.21	Stage 1 on 3
WPAH031	A	None	No	Silt with trace of wood fibers below SWI. Mudclasts and small tubes at SWI. Evidence of burrowing throughout entire range of profile	4	3.66	10.85	7.26	12.30	Stage 1 on 3
WPAH032	B	Med	No	Silt with some wood fibers and wood debris at SWI. Burrows and a subsurface organism present.	0	0.00	0.00	0.00	10.27	Stage 2 -> 3
WPAH033	A	Trace	Yes	Silt with some wood fibers throughout profile and benthic macro algae at SWI. Reduced mudclasts, organism tubes, beggiatoa, and wood debris at SWI. Burrows & subsurface organisms visible.	6	3.66	16.73	10.20	17.99	Stage 1 on 3
WPAH034	A	Trace	No	Silt with some wood fibers. Some benthic macroalgae and debris at SWI. Evidence of burrowing throughout profile.	7	4.39	9.74	7.06	9.74	Stage 1 on 3
WPAH035	A	None	No	Silty fine sand with trace of wood fibers below SWI. Spiochaetopterus polychaete tube at SWI. Burrows and one active FV.	1	3.06	3.30	3.18	4.27	Stage 1 on 3
WPAH035	D	None	No	Silty fine sand with trace of wood fibers below SWI. Burrow present, worm tube in background; penetrations too shallow to accurately determine successional stage.	0	0.00	0.00	0.00	4.92	Ind
WPAH036	A	None	No	Silt with some wood fibers below SWI. Small tubes at surface and large burrow opening at right edge that leads to major subsurface gallery seen in lower half of image.	2	7.33	11.52	9.43	15.12	Stage 1 on 3
WPAH037	A	Trace	No	Sandy silt with wood fibers and fragments at SWI. Minor debris and organism tubes at SWI. Burrowing throughout depth of profile.	2	7.81	10.97	9.39	17.70	Stage 1 on 3
WPAH038	A	None	No	Silty very fine sand with minor traces of wood fibers. Bioturbation depth exceeds prism penetration depth.	3	7.79	10.54	9.16	11.19	Stage 1 on 3
WPAH038	D	None	No	Silty very fine sand with benthic macroalgae at SWI. Subsurface polychaetes visible.	0	0.00	0.00	0.00	7.25	Stage 2 -> 3
WPAH039	A	None	No	Silt with some wood debris at depth (lower left quadrant). Bioturbation depth exceeds prism penetration depth.	4	3.30	15.89	9.60	15.98	Stage 1 on 3
WPAH042	A	None	No	Sandy silt with trace of subsurface wood fibers; small worms visible against faceplate and bioturbation depth exceeds prism penetration depth.	1	8.53	9.21	8.87	10.56	Stage 1 on 3

Table J1. SPI Data

Station	Rep	Wood Debris?	Beggiatoa?	Comment	No. of Feeding Voids	Void Minimum Depth (cm)	Void Maximum Depth (cm)	Void Average Depth (cm)	Max Bioturb Depth (cm)	Successional Stage
WPAH043	A	High	No	Silt with shell fragments at depth. Debris, including a large piece of wood, small tubes, and benthic macroalgae at SWI. Burrows and active FVs present.	5	1.21	15.26	8.23	16.35	Stage 1 on 3
WPAH045	A	None	No	Sandy silt with numerous small tubes and two shrimp at SWI. Subsurface polychaetes visible; bioturbation depth exceeds prism penetration depth.	0	0.00	0.00	0.00	6.47	Stage 2 -> 3
WPAH046	A	Med	No	aRPD>P. Silty very fine to fine sand. Ulva, seaweed, wood debris, organism tubes, and SAV at SWI. Gastropods attached to seaweed toward center of profile above SWI.	0	0.00	0.00	0.00	4.77	Ind
WPAH046	B	Trace	No	aRPD>P. Silty very fine to fine sand with few wood fibers. Seaweed, wood debris, mudclasts, algae, and large polychaete tube at SWI. Bioturbation depth exceeds prism penetration depth.	0	0.00	0.00	0.00	3.50	Stage 1 on 3
WPAH047	A	None	No	aRPD>P. Silty fine sand with fecal casts from subsurface deposit feeders at SWI.	0	0.00	0.00	0.00	2.75	Stage 1 on 3
WPAH053	D	None	No	aRPD>P. Poorly sorted silty sand with pebbles; burrows present, but insufficient penetration to accurately determine successional stage.	0	0.00	0.00	0.00	Ind	Ind
WPAH054	A	None	No	Silt with trace of subsurface wood fibers. Burrows, two active FVs, and a subsurface polychaete visible.	2	3.83	16.10	9.97	16.94	Stage 1 on 3
WPAH055	A	None	No	Silt with subsurface wood fibers, wood fragments, and shell fragments. Burrowing throughout depth of profile.	0	0.00	0.00	0.00	16.94	Stage 2 -> 3
WPAH056	A	None	No	Silt with subsurface wood fibers mixed with some wood pulp at depth, but no wood at sediment surface. Small mudclasts and organism tubes at SWI. Burrows, FVs and subsurface organisms present.	3	13.40	19.14	16.27	19.22	Stage 1 on 3
WPAH057	B	Low	No	Silt with low percentage of wood fibers at SWI and mixed with high percentage of wood pulp at depth. Small tubes and benthic macroalgae at SWI. Subsurface burrows and FVs visible	3	6.90	21.12	14.01	21.12	Stage 1 on 3
WPAH058	C	None	No	Silt with subsurface wood fibers mixed with wood pulp at depth. Burrows and subsurface polychaetes present.	0	0.00	0.00	0.00	18.25	Stage 1 on 3
WPAH059	A	None	No	Silt with trace of subsurface wood fibers; small tubes at SWI. Large "burrow" at left is artifact caused by prism blade dragging down object (shell?) from SWI	2	5.71	7.21	6.46	7.21	Stage 1 on 3
WPAH060	A	Trace	No	Silt with wood fibers and wood fragments at depth. Burrow at left caused by camera artifact as in previous image.	0	0.00	0.00	0.00	15.62	Stage 1 on 3
WPAH061	B	None	No	Silt with subsurface wood fibers. Benthic macroalgae and burrows present.	0	0.00	0.00	0.00	3.93	Stage 1 on 2
WPAH061	E	Trace	No	Silt with wood fibers and shell fragments. Evidence of subsurface burrowing.	0	0.00	0.00	0.00	6.49	Stage 1 on 2
WPAH062	B	None	No	Silt with trace of subsurface wood fibers. Debris and small tubes at SWI. Burrows and subsurface polychaetes visible.	0	0.00	0.00	0.00	11.09	Stage 2 -> 3
WPAH063	A	None	No	Silt with subsurface wood fibers and small tubes at SWI. Burrows and a subsurface polychaete present.	0	0.00	0.00	0.00	17.41	Stage 1 on 3
WPAH064	A	Trace	No	Silt with wood fibers, fecal pellets, and shell fragments. Burrowing throughout profile; bioturbation exceeds prism penetration depth.	5	1.30	12.20	6.75	12.63	Stage 1 on 3
WPAH065	A	None	No	Silt-clay with trace of subsurface wood fibers; small tubes at SWI. Burrows FVs and subsurface polychaete visible.	3	4.19	11.67	7.93	13.81	Stage 1 on 3
WPAH065	B	None	No	Silt with trace of subsurface wood fibers near SWI but wood pulp at depth. Debris, including a monofilament wire, and small worm tubes at SWI. Burrows, FVs and subsurface polychaete visible.	5	8.97	14.27	11.62	15.07	Stage 1 on 3
WPAH066	A	Med	No	Silt-clay with profile distorted by piece of wood that was dragged down by prism and looks like large oxidized vertical channel. Burrows and subsurface polychaetes visible.	0	0.00	0.00	0.00	10.27	Stage 1 on 3
WPAH067	A	None	No	Silt-clay with trace of subsurface wood fibers and shell fragments. Small tubes at SWI. Subsurface burrows and polychaetes visible.	2	8.25	12.10	10.17	13.24	Stage 1 on 3
WPAH068	A	High	No	Silt-clay with wood fibers, fecal pellets, and shell fragments. Wood fragments/debris on surface that had been dragged down on right side of image; bioturbation depth exceeds prism penetration depth.	2	12.80	16.64	14.72	18.13	Stage 1 on 3
WPAH069	A	Med	No	Silt-clay with wood fibers and shell fragments. Wood debris in left foreground and center background, shells, and macroalgae at SWI. Evidence of subsurface burrowing throughout profile.	0	0.00	0.00	0.00	9.92	Stage 1 on 3
WPAH070	A	Low	No	Silt-clay with wood fibers and shell fragments. Some wood debris at SWI. Active subsurface reworking with bioturbation extending beyond depth of prism penetration	2	4.99	9.38	7.18	11.77	Stage 1 on 3

Table J1. SPI Data

Station	Rep	Wood Debris?	Beggiatoa?	Comment	No. of Feeding Voids	Void Minimum Depth (cm)	Void Maximum Depth (cm)	Void Average Depth (cm)	Max Bioturb Depth (cm)	Successional Stage
WPAH071	A	Trace	No	Silty very fine sand with wood fibers and shell fragments. Minor wood debris and small tubes, as well as two Spiochaetopterus tubes at SWI. Burrows and subsurface polychaetes present. Burrow at right of profile caused by prism dragging down shell from SWI.	0	0.00	0.00	0.00	7.18	Stage 1 on 3
WPAH073	A	None	No	Silt with trace of subsurface wood fibers and shell fragments. Small tubes at SWI. Burrows, FVs, and subsurface polychaetes visible.	2	6.53	9.69	8.11	14.04	Stage 1 on 3
WPAH074	A	Med	No	Silt with wood fibers and shell fragments. 2 pieces of wood debris at surface dragged down and organism tubes at SWI. Burrows, wood fragments, FVs and numerous subsurface polychaetes visible.	7	0.92	12.92	6.92	13.57	Stage 1 on 3
WPAH074	B	None	No	Silt-clay with trace of subsurface wood fibers and shell fragments. Small tubes at SWI. Burrowing throughout depth of profile.	4	1.86	13.62	7.74	13.62	Stage 1 on 3
WPAH075	A	Low	No	Silt-clay with subsurface wood fibers and wood debris at SWI. Burrowing throughout depth of profile..	0	0.00	0.00	0.00	10.32	Stage 1 on 3
WPAH076	A	None	No	Silt-clay with trace of subsurface wood fibers and shell fragments mixed with some wood chips at depth. Small tubes at SWI. Bioturbation exceeds prism penetration depth.	3	3.18	11.74	7.46	13.67	Stage 1 on 3
WPAH076	B	None	No	Silt-clay over buried wood pulp at depth. Mudclasts, small tubes, and minor debris at SWI. Burrowing throughout profile; wood pulp "cottage cheese" appears to promote biological activity.	6	3.28	10.61	6.94	13.74	Stage 1 on 3
WPAH077	A	Trace	No	Silt with wood fibers at SWI and subsurface shell fragments. Minor debris and mounds visible at SWI. Burrowing throughout profile.	4	3.59	5.93	4.76	7.11	Stage 1 on 3
WPAH078	B	Trace	No	Silt-clay with wood fibers and shell fragments. Small tubes and benthic macroalgae at SWI. Burrows, active FVs, seaweed pieces, and subsurface polychaetes visible.	2	1.52	10.54	6.03	12.61	Stage 1 on 3
WPAH079	D	None	No	Silt-clay with small tubes and a shrimp at SWI. Burrows and FVs at depth.	4	4.12	8.80	6.46	8.80	Stage 1 on 3
WPAH079	E	Trace	No	Silt-clay with one piece of wood debris at SWI on right edge of image. Burrows, FVs and a subsurface polychaete visible.	4	6.82	15.82	11.32	15.82	Stage 1 on 3
WPAH080	A	Trace	No	Silt-clay with what appears to be wood debris dragged down by camera on right edge of image; organic enrichment at depth and active burrowing throughout profile.	3	5.11	15.53	10.32	16.13	Stage 1 on 3
WPAH080	B	None	No	Silt-clay with organic enrichment at depth and a shrimp at SWI. Burrows and small polychaetes visible at depth.	2	6.92	8.44	7.68	13.74	Stage 1 on 3
WPAH081	A	None	No	Silt-clay with trace quantities of buried wood pulp at depth. Small tubes & shell fragment at SWI. Active burrowing throughout profile.	6	2.48	11.74	7.11	14.75	Stage 1 on 3
WPAH082	A	None	No	Silt-clay with buried wood fragments at depth, active bioturbation throughout depth of profile.	6	3.35	10.29	6.82	16.10	Stage 1 on 3
WPAH083	A	Med	No	Silt-clay with wood debris on surface partially tipped by prism insertion in sediment; organic enrichment at depth, reduced fecal pellets at right edge of image, burrowing throughout profile.	3	4.60	8.51	6.56	10.14	Stage 1 on 3
WPAH084	A	None	No	Silt-clay with organic enrichment at depth; small tubes and a shrimp at SWI. Burrows and a subsurface polychaete visible.	0	0.00	0.00	0.00	7.38	Stage 1 on 3
WPAH084	B	None	No	Silt-clay with organic enrichment at depth; small tubes and a shrimp at SWI. Burrows and subsurface polychaetes visible.	2	1.62	9.04	5.33	11.63	Stage 1 on 3
WPAH085	B	None	No	Silt-clay with organic enrichment at depth; small tubes at SWI. Burrows and subsurface polychaetes visible.	4	3.13	14.42	8.78	14.42	Stage 1 on 3
WPAH086	B	Trace	No	Silt-clay with some wood fibers and one wood fragment at SWI. Burrowing throughout depth of profile.	2	8.17	14.20	11.19	14.83	Stage 1 on 3
WPAH087	C	Trace	No	Silt-clay with some wood fibers and one wood fragment at SWI. Burrowing throughout depth of profile with polychaetes visible against faceplate.	3	4.56	7.84	6.20	16.18	Stage 1 on 3
WPAH088	A	None	No	Silt with shell fragments and slight trace of subsurface wood fibers. Fish at SWI. Burrowing throughout profile and large polychaete visible at depth.	9	6.10	13.19	9.64	13.26	Stage 1 on 3
WPAH089	A	Trace	No	Silt-clay with numerous fecal pellets near SWI and some shell fragments. Debris (wood) dragged down toward right of profile at SWI. Bioturbation exceeds prism penetration depth.	6	6.87	11.14	9.00	11.72	Stage 1 on 3
WPAH090	A	None	No	Silt-clay with minor sand fraction, subsurface organic enrichment and sediment fracture at depth.	1	8.80	9.84	9.32	9.84	Stage 2 -> 3
WPAH091	A	None	No	Silt-clay with subsurface organic enrichment, multiple feeding voids.	7	5.67	13.96	9.81	17.26	Stage 1 on 3
WPAH092	A	High	No	Silt-clay with wood fibers, shell fragments and wood debris at SWI and buried. Active burrowing throughout profile.	5	2.63	14.47	8.55	14.71	Stage 1 on 3
WPAH093	A	None	No	Silt with trace of subsurface wood fibers with active burrowing throughout profile.	5	7.43	16.95	12.19	17.12	Stage 1 on 3

Table J1. SPI Data

Station	Rep	Wood Debris?	Beggiatoa?	Comment	No. of Feeding Voids	Void Minimum Depth (cm)	Void Maximum Depth (cm)	Void Average Depth (cm)	Max Bioturb Depth (cm)	Successional Stage
WPAH093	B	Low	No	Silt-clay with surface detrital layer over wood debris (exposed by prism cut), organism tubes, and crab at SWI.	1	12.37	13.36	12.86	15.49	Stage 1 on 3
WPAH094	A	None	No	Silt-clay with large mud clast artifact from camera sled at SWI; actively bioturbated upper layer with small tubes at SWI; burrowing throughout depth of profile.	1	10.25	10.78	10.51	13.75	Stage 1 on 3
WPAH095	B	None	No	Silt-clay with subsurface organic enrichment, active burrowing throughout profile, shrimp @ SWI.	4	6.34	11.26	8.80	14.26	Stage 1 on 3
WPAH096	A	None	No	Silt-clay with high organic enrichment at depth, evidence of subsurface burrowing throughout; polychaete visible against faceplate.	8	4.12	16.25	10.19	16.25	Stage 1 on 3
WPAH097	A	Trace	No	Silt-clay with wood fibers, shell fragments, and Ulva dispersed throughout profile from prism dragdown; subsurface burrows present.	0	0.00	0.00	0.00	12.52	Stage 1 on 3
WPAH098	A	Med	No	Silt with wood fragments and some fine sand at depth. Ulva and benthic macro algae at SWI. Surface hidden by algae being dragged down by cutting blade, impossible to measure aRPD accurately in this particular image; flocular material is oxidized. Burrowing throughout profile.	0	0.00	0.00	0.00	19.82	Ind
WPAH099	A	High	No	Silt with high proportion of wood fragments and some fine sand at depth. Ulva and benthic macro algae at SWI. Thin aRPD that is disrupted by wood dragdown, impossible to measure accurately in this particular image. Burrowing throughout profile.	0	0.00	0.00	0.00	16.30	Stage 1 on 3
WPAH100	A	IND	Yes	Silt with Ulva and kelp dragged down throughout profile. Beggiatoa and some oxidized flocular material at SWI. Burrows present, but impossible to accurately determine successional status due to disruption of profile from surface kelp artifacts.	0	0.00	0.00	0.00	10.49	Ind
WPAH101	A	None	No	Silt with traces of subsurface wood fibers; mudclasts and shell fragments at SWI. Burrows, one active FV, and subsurface worms visible.	1	5.88	6.58	6.23	11.61	Stage 1 on 3
WPAH102	A	None	No	Silt-clay with active burrowing and subsurface worms visible against faceplate.	9	8.34	13.84	11.09	13.84	Stage 1 on 3
WPAH103	A	None	No	Silt-clay with small tubes at SWI. Slight organic enrichment at depth, evidence of subsurface burrowing .	0	0.00	0.00	0.00	17.72	Stage 1 on 3
WPAH104	A	None	No	Silt-clay with high density of small tubes at SWI. Active FVs, burrowing throughout profile.	5	2.82	9.74	6.28	12.81	Stage 1 on 3
WPAH105	A	None	No	Silt-clay with subsurface organic enrichment and laminations from past depositional events. Distinctly shallower bioturbation as compared with other locations.	3	2.77	3.62	3.20	10.75	Stage 2 -> 3
KSS-1	A	Low	No	Sandy silt with wood fibers and wood fragments. Burrows and large active FV present.	1	7.69	18.88	13.28	19.02	Stage 1 on 3
KSS-2	A	Trace	No	Sandy silt with wood fibers and fecal pellets. Benthic macroalgae and mudclasts at SWI. Burrows and one active FV present.	1	9.28	10.87	10.08	10.87	Stage 1 on 3
KSS-3	E	None	No	Sandy silt with trace of subsurface wood fibers. Ulva dragged down by prism throughout sediment profile. Burrows and FVs present.	1	9.35	11.56	10.46	16.10	Stage 1 on 3

Table J2. Plan View Data

Station	Rep	Date	Time	Laser Cal (cm)	Image Width (cm)	Image Height (cm)	Field of View Imaged Calc. (m^2)	Sediment Type	Bedforms	Burrows	Tubes	Tracks	Lebensspuren	Epifauna	Mudclasts	Wood Debris	Beggiatoa
WPAH003	D	7/17/2013	16:46:55	26.00	60.65	40.16	0.24	Wood and silt	No	No	No	No	None	No	No	High	Trace
WPAH004	A	7/16/2013	14:59:00	24.94	63.23	41.87	0.26	Wood and silt	No	No	Few	No	Low	Yes	No	High	No
WPAH004	D	7/16/2013	15:04:09	33.49	47.09	31.18	0.15	Wood and silt	No	No	Few	Yes	Low	Yes	No	High	No
WPAH005	A	7/16/2013	15:24:25	30.65	51.44	34.07	0.18	Silt	No	Yes	Yes	Yes	Low	Yes	No	Low	No
WPAH005	B	7/16/2013	15:26:10	29.74	53.02	35.11	0.19	Silt	No	Yes	Yes	Yes	Low	Yes	No	Trace	No
WPAH006	C	7/16/2013	15:11:07	24.48	64.41	42.65	0.27	Wood and silt	No	No	No	No	Low	No	No	High	No
WPAH007	D	7/16/2013	17:20:45	27.57	57.20	37.88	0.22	Wood and silt	No	No	Yes	No	Low	Yes	No	High	Trace
WPAH008	A	7/18/2013	13:21:43	28.02	56.27	37.26	0.21	Silt	No	No	Yes	Yes	Med	Yes	No	Med	No
WPAH008	D	7/18/2013	13:25:58	26.46	59.61	39.47	0.24	Wood and silt	No	No	Yes	Yes	Med	Yes	No	High	No
WPAH009	B	7/17/2013	15:28:37	34.30	45.98	30.45	0.14	Silt	No	No	Few	Yes	Low	Yes	No	Low	No
WPAH009	C	7/17/2013	15:29:55	38.60	40.86	27.06	0.11	Silt	No	No	Few	Yes	Med	Yes	No	Trace	No
WPAH010	C	7/17/2013	15:10:42	34.25	46.05	30.49	0.14	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH011	B	7/16/2013	15:49:33	33.08	47.67	31.57	0.15	Silt	No	Yes	Few	Yes	Med	No	No	None	No
WPAH012	E	7/17/2013	13:32:00	30.45	51.78	34.29	0.18	Silt	No	Yes	Yes	Yes	Med	Yes	No	Low-Med	No
WPAH012	F	7/17/2013	13:33:19	25.19	62.60	41.45	0.26	Silt	No	Yes	Few	Yes	Med	Yes	No	Med	No
WPAH013	A	7/16/2013	14:07:19	29.64	53.20	35.23	0.19	Silt	No	Yes	Few	Yes	Med	Yes	No	Trace	No

Table J2. Plan View Data

Station	Rep	Date	Time	Laser Cal (cm)	Image Width (cm)	Image Height (cm)	Field of View Imaged Calc. (m^2)	Sediment Type	Bedforms	Burrows	Tubes	Tracks	Lebensspuren	Epifauna	Mudclasts	Wood Debris	Beggiatoa
WPAH014	A	7/15/2013	10:15:08	32.22	48.94	32.41	0.16	Silt	No	Yes	Few	Yes	Med	Yes	No	Low	No
WPAH015	B	7/15/2013	10:32:13	27.11	58.16	38.51	0.22	Silt	No	Yes	Yes	Yes	Low	Yes	No	Trace-Low	No
WPAH016	A	7/15/2013	10:52:27	26.71	59.04	39.10	0.23	Silt	No	Yes	Few	Yes	Med	Yes	No	Trace	No
WPAH017	A	7/15/2013	11:13:10	28.48	55.37	36.67	0.20	Silt	No	Yes	Few	Yes	Med	Yes	No	Trace	No
WPAH018	A	7/15/2013	11:34:55	25.65	61.49	40.72	0.25	Silt	No	Yes	Yes	Yes	Low	Yes	No	Med	No
WPAH019	C	7/16/2013	11:28:18	33.69	46.81	31.00	0.15	Silty sand	No	Yes	Yes	Yes	Low	No	No	Low	Trace
WPAH020	C	7/15/2013	16:27:27	38.75	40.70	26.95	0.11	Ind	Ind	Ind	Ind	Ind	None	No	No	Ind	No
WPAH022	B	7/16/2013	15:34:26	26.96	58.49	38.73	0.23	Silt	No	Yes	Yes	Yes	Med	Yes	No	Low	No
WPAH022	C	7/16/2013	15:35:45	25.54	61.73	40.88	0.25	Silt	No	Yes	Yes	Yes	Med	No	No	Trace	No
WPAH023	A	7/18/2013	12:47:38	38.34	41.13	27.23	0.11	Wood	No	No	No	No	None	Yes	No	High	Trace
WPAH024	F	7/18/2013	8:37:03	25.75	61.25	40.56	0.25	IND	No	No	No	No	None	Yes	No	High	Yes
WPAH025	A	7/17/2013	17:19:10	28.83	54.69	36.22	0.20	Silt	No	Yes	Yes	Yes	Low	Yes	No	None	Yes
WPAH026	A	7/18/2013	8:48:12	37.89	41.62	27.56	0.11	Silt	No	Yes	Yes	Yes	Low	Yes	No	None	No
WPAH027	C	7/16/2013	11:55:20	24.79	63.62	42.13	0.27	Wood and silty sand	Yes	Yes	Yes	No	None	Yes	No	High	No
WPAH027	D	7/16/2013	11:56:46	26.35	59.83	39.62	0.24	Wood and silty sand	No	No	Yes	No	Low	No	No	High	No
WPAH028	A	7/16/2013	11:35:02	39.61	39.81	26.37	0.10	Wood and silt	No	No	Yes	No	None	Yes	No	High	Yes
WPAH030	A	7/16/2013	8:55:25	26.91	58.60	38.80	0.23	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH030	B	7/16/2013	8:56:59	25.49	61.85	40.96	0.25	Silt	No	Yes	Yes	Yes	Med	No	No	None	No
WPAH031	A	7/15/2013	11:51:18	24.23	65.08	43.10	0.28	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No

Table J2. Plan View Data

Station	Rep	Date	Time	Laser Cal (cm)	Image Width (cm)	Image Height (cm)	Field of View Imaged Calc. (m^2)	Sediment Type	Bedforms	Burrows	Tubes	Tracks	Lebensspuren	Epifauna	Mudclasts	Wood Debris	Beggiatoa
WPAH032	B	7/15/2013	11:28:13	27.42	57.52	38.09	0.22	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH033	A	7/16/2013	8:21:11	38.80	40.64	26.91	0.11	Silt	No	Yes	Yes	Yes	Low	Yes	No	Trace	Yes
WPAH034	A	7/16/2013	8:30:52	28.93	54.50	36.09	0.20	Silt	No	Yes	Yes	Yes	Low	Yes	No	Trace	No
WPAH035	A	7/16/2013	8:41:55	25.34	62.22	41.21	0.26	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace-Low	No
WPAH035	C	7/16/2013	8:44:59	27.72	56.89	37.67	0.21	Silt with rocks	No	No	Yes	Yes	Med	Yes	No	None	No
WPAH036	A	7/17/2013	9:26:02	23.77	66.33	43.92	0.29	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH037	A	7/17/2013	9:34:23	27.82	56.68	37.53	0.21	Silt	No	Yes	Yes	Yes	High	No	No	Med	No
WPAH038	A	7/17/2013	8:50:37	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	None	No
WPAH038	D	7/17/2013	8:54:22	28.58	55.17	36.54	0.20	Sandy silt	No	Yes	Yes	Yes	Med	No	No	Trace	No
WPAH039	A	7/15/2013	16:46:12	42.64	36.98	24.49	0.09	Silt	No	Yes	Yes	Yes	Med	Yes	No	Med	No
WPAH042	A	7/15/2013	14:16:23	26.61	59.26	39.25	0.23	Silt	No	Yes	Yes	Yes	Med	Yes	No	Low	No
WPAH043	A	7/15/2013	16:00:05	27.72	56.89	37.67	0.21	Wood and silt	No	Yes	Yes	Yes	Med	Yes	No	High	No
WPAH045	A	7/15/2013	14:07:02	25.09	62.85	41.62	0.26	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH046	A	7/15/2013	13:22:27	20.89	75.48	49.99	0.38	Silty sand	No	Yes	Yes	No	Med	No	No	Med	No
WPAH046	B	7/15/2013	13:23:28	18.82	83.80	55.49	0.47	Silty sand	No	Yes	Yes	Yes	Med	No	No	Low	No
WPAH047	A	7/15/2013	13:11:04	27.26	57.84	38.30	0.22	Sand	Yes	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH053	D	7/17/2013	16:35:34	28.58	55.17	36.54	0.20	Gravel	No	No	Yes	Yes	Low	Yes	No	Low	No
WPAH054	A	7/16/2013	15:40:06	32.02	49.25	32.61	0.16	Silt	No	Yes	Yes	Yes	Med	No	No	Trace	No

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Station	Rep	Date	Time	Laser Cal (cm)	Image Width (cm)	Image Height (cm)	Field of View Imaged Calc. (m^2)	Sediment Type	Bedforms	Burrows	Tubes	Tracks	Lebensspuren	Epifauna	Mudclasts	Wood Debris	Beggiatoa
WPAH055	A	7/16/2013	17:24:32	27.42	57.52	38.09	0.22	Silt	No	Yes	Yes	Yes	Med	Yes	No	Low	No
WPAH056	A	7/16/2013	17:32:08	27.31	57.73	38.23	0.22	Silt	No	Yes	Yes	Yes	Med	No	No	None	No
WPAH057	D	7/17/2013	15:21:06	30.70	51.36	34.01	0.17	Silt	No	Yes	Yes	Yes	Med	Yes	No	Low	Trace
WPAH058	A	7/16/2013	15:55:53	36.22	43.54	28.83	0.13	Silt	No	Yes	Yes	Yes	Med	No	No	None	No
WPAH059	A	7/16/2013	17:02:52	30.25	52.13	34.52	0.18	Silt	No	Yes	Yes	Yes	Med	No	No	Trace	No
WPAH060	A	7/15/2013	10:44:41	29.74	53.02	35.11	0.19	Sandy silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH061	B	7/16/2013	16:47:18	32.37	48.71	32.26	0.16	Silt	No	No	Yes	Yes	Med	Yes	No	Trace	No
WPAH061	E	7/18/2013	9:03:13	31.46	50.12	33.19	0.17	Silt	No	Yes	Yes	Yes	Low	Yes	Yes	Trace	Yes
WPAH062	B	7/16/2013	16:56:08	31.36	50.28	33.30	0.17	Silt	No	Yes	Yes	Yes	Med	Yes	Yes	Trace	No
WPAH063	E	7/17/2013	14:11:59	25.95	60.77	40.24	0.24	Silt	No	Yes	Yes	Yes	Med	Yes	No	Low	No
WPAH064	C	7/16/2013	14:18:12	27.47	57.41	38.02	0.22	Silt	No	Yes	Yes	Yes	Med-High	Yes	No	Low	No
WPAH065	A	7/15/2013	10:38:14	27.82	56.68	37.53	0.21	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH065	D	7/15/2013	10:41:08	32.12	49.09	32.51	0.16	Silt	No	Yes	Ind	Yes	Med	No	No	Trace	No
WPAH066	A	7/15/2013	11:21:19	28.53	55.27	36.60	0.20	Silt	No	Yes	Yes	Yes	Med	No	No	Med	No
WPAH067	A	7/15/2013	11:43:59	27.47	57.41	38.02	0.22	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH068	B	7/16/2013	8:02:51	25.65	61.49	40.72	0.25	Silt	No	No	Yes	Yes	Med	Yes	No	Med	No

Table J2. Plan View Data

Station	Rep	Date	Time	Laser Cal (cm)	Image Width (cm)	Image Height (cm)	Field of View Imaged Calc. (m^2)	Sediment Type	Bedforms	Burrows	Tubes	Tracks	Lebensspuren	Epifauna	Mudclasts	Wood Debris	Beggiatoa
WPAH069	A	7/16/2013	8:10:02	25.95	60.77	40.24	0.24	Silt	No	Yes	Yes	Yes	Med	Yes	No	High	No
WPAH070	A	7/15/2013	15:03:43	30.20	52.22	34.58	0.18	Silt	No	Yes	Yes	Yes	Med	Yes	No	Low	No
WPAH071	A	7/15/2013	14:22:34	25.75	61.25	40.56	0.25	Silt	No	Yes	Yes	Yes	Med-High	Yes	No	Trace	No
WPAH073	C	7/17/2013	9:07:27	27.31	57.73	38.23	0.22	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH074	C	7/16/2013	13:29:48	27.62	57.09	37.81	0.22	Sandy silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH074	E	7/16/2013	13:39:06	25.14	62.72	41.54	0.26	Sandy silt	No	Yes	Yes	Yes	Med	Yes	Yes	None	No
WPAH075	E	7/15/2013	9:59:37	33.28	47.38	31.37	0.15	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH076	A	7/15/2013	10:23:46	IND	IND	IND	IND	Silt	No	IND	IND	Yes	IND	Yes	IND	IND	IND
WPAH076	B	7/15/2013	10:24:45	IND	IND	IND	IND	Silt	No	IND	IND	Yes	IND	Yes	IND	IND	IND
WPAH077	B	7/16/2013	9:07:06	27.06	58.27	38.59	0.22	Silt	No	Yes	Yes	Yes	Med	No	No	None	No
WPAH078	A	7/16/2013	12:59:46	28.28	55.77	36.93	0.21	Silt	No	Yes	Yes	Yes	Med-High	No	Yes	Low	Yes
WPAH079	D	7/16/2013	13:21:03	26.40	59.72	39.55	0.24	Sandy silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH079	E	7/17/2013	13:58:43	31.72	49.72	32.92	0.16	Sandy silt	No	No	Yes	Yes	Med	Yes	No	None	No
WPAH080	A	7/16/2013	10:18:59	27.92	56.47	37.40	0.21	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH080	B	7/16/2013	10:20:30	26.15	60.30	39.93	0.24	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH081	A	7/16/2013	10:01:06	26.20	60.18	39.85	0.24	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH082	A	7/16/2013	9:42:51	28.38	55.57	36.80	0.20	Silt	No	Yes	Yes	Yes	Med	Yes	Yes	Trace	No
WPAH083	A	7/16/2013	11:43:19	28.33	55.67	36.86	0.21	Silt	No	Yes	Yes	Yes	Med	Yes	No	Med	Yes

Table J2. Plan View Data

Station	Rep	Date	Time	Laser Cal (cm)	Image Width (cm)	Image Height (cm)	Field of View Imaged Calc. (m^2)	Sediment Type	Bedforms	Burrows	Tubes	Tracks	Lebensspuren	Epifauna	Mudclasts	Wood Debris	Beggiatoa
WPAH084	A	7/16/2013	10:36:54	22.66	69.58	46.08	0.32	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH084	B	7/16/2013	10:38:02	26.66	59.15	39.17	0.23	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH085	B	7/16/2013	10:31:08	29.64	53.20	35.23	0.19	Silt	No	Yes	Yes	Yes	Low-Med	Yes	No	Trace	No
WPAH086	A	7/16/2013	10:10:14	26.46	59.60	39.47	0.24	Silt	No	Yes	Yes	Yes	Low-Med	Yes	No	None	No
WPAH087	C	7/16/2013	11:18:26	31.16	50.61	33.51	0.17	Silt	No	Yes	Yes	Yes	Med	No	No	Low	No
WPAH088	A	7/16/2013	11:06:52	25.59	61.61	40.80	0.25	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH089	A	7/15/2013	16:58:15	27.47	57.41	38.02	0.22	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH090	A	7/15/2013	17:07:46	33.18	47.52	31.47	0.15	Silt	No	Yes	Yes	Yes	Low-Med	Yes	No	None	No
WPAH091	A	7/15/2013	17:24:46	32.42	48.63	32.21	0.16	Silt	No	Yes	Yes	Yes	Low	Yes	No	Trace	No
WPAH092	A	7/15/2013	16:37:37	19.37	81.39	53.90	0.44	Silt	No	Yes	Yes	Yes	Low	Yes	No	High	No
WPAH093	A	7/15/2013	16:09:16	23.62	66.75	44.21	0.30	Silt	No	Yes	Yes	Yes	Low	Yes	No	None	No
WPAH093	B	7/15/2013	16:10:35	21.90	72.00	47.68	0.34	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH094	A	7/18/2013	9:24:05	25.24	62.47	41.37	0.26	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH095	B	7/15/2013	13:48:05	27.57	57.20	37.88	0.22	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
WPAH096	A	7/15/2013	13:35:34	25.95	60.77	40.24	0.24	Silt	No	No	Yes	Yes	Med-High	Yes	No	None	No
WPAH097	B	7/16/2013	16:36:12	36.52	43.17	28.59	0.12	IND	No	Ind	Ind	Ind	None	Yes	No	Ind	No
WPAH098	A	7/16/2013	12:00:35	38.24	41.23	27.31	0.11	Silt	No	Ind	Ind	No	None	No	No	Ind	No
WPAH099	A	7/15/2013	15:38:20	20.79	75.85	50.23	0.38	Silt	No	No	No	No	Low	No	Yes	High	No
WPAH100	C	7/15/2013	15:28:47	36.62	43.06	28.51	0.12	Silt	IND	IND	IND	No	None	No	No	Ind	No
WPAH101	A	7/18/2013	10:49:10	26.40	59.72	39.55	0.24	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No

Table J2. Plan View Data

Station	Rep	Date	Time	Laser Cal (cm)	Image Width (cm)	Image Height (cm)	Field of View Imaged Calc. (m^2)	Sediment Type	Bedforms	Burrows	Tubes	Tracks	Lebensspuren	Epifauna	Mudclasts	Wood Debris	Beggiatoa
WPAH102	A	7/18/2013	11:00:25	24.48	64.41	42.65	0.27	Silt	No	Yes	Yes	Yes	Med	Yes	No	None	No
WPAH103	A	7/18/2013	9:55:54	31.31	50.36	33.35	0.17	Silt	No	Yes	Yes	Yes	Med-High	No	No	None	No
WPAH104	A	7/18/2013	11:12:07	39.30	40.12	26.57	0.11	Silt	No	Yes	Yes	Yes	Med	No	Yes	None	No
WPAH105	A	7/18/2013	11:21:44	28.53	55.27	36.60	0.20	Silt	No	No	Yes	Yes	Low	Yes	No	Trace	No
KSS-1	A	7/17/2013	10:05:13	25.04	62.98	41.70	0.26	Silt	No	Yes	Yes	Yes	Med	Yes	No	Trace	No
KSS-2	A	7/17/2013	10:15:58	25.44	61.98	41.04	0.25	Silt	No	No	Yes	Yes	Low	Yes	No	Trace	No
KSS-3	B	7/17/2013	10:26:22	27.42	57.52	38.09	0.22	Silt	No	No	Yes	Yes	Low	Yes	No	None	No

Table J2. Plan View Data

Station	Rep	Comment
WPAH003	D	Surface covered in woody debris, detritus, ulva, and a few fragments of kelp in upper portion of frame. Small patch of beggiatoa in wood debris in upper left of frame. Near 100 percent cover of wood chips and debris that appear to intact and are mantled with algae and detritus.
WPAH004	A	Detrital-mantled wood debris across entire frame. Ulva, Small elongate fish in upper center of frame. The majority of wood fragments are covered but a few have old barnacle residue on them. A few small tubes in right side of frame.
WPAH004	D	Silt. Detritus mantled wood debris across frame and shell fragments throughout profile. Ulva, at least four small crabs Small crab footprints visible. A few tubes in lower left of frame. Woody debris is small, weathered/od and approaching fibrous.
WPAH005	A	Silt. Scattered ulva fragments. Small fish toward bottom of profile (long, slender lance-like). Crab tracks and a few gastropod tracks in detritus mantling.
WPAH005	B	Detritus mantled silt with fine features well preserved. Burrows at upper right and multiple small tubes. Crab tracks and small crab in upper left of frame. Appears depositional.
WPAH006	C	Wood debris (some with barnacles) partially mantled with minor detritus, ulva, and seaweed covering most of SWI. Ulva, kelp fragments and dendritic red algae are in various states of decay. Appears to be organic depositional with high organic input.
WPAH007	D	Silt/detritus mantled Wood debris (some with barnacles) and ulva covering most of SWI. Three organisms (shrimps in motion) toward top-right of profile. Minor shell fragments interspersed amongst wood debris. Small patch of beggiatoa on wood and detritus in lower left center edge of frame.
WPAH008	A	Silt with mantled wood debris (some with barnacles), benthic macroalgae, and seaweed on SWI. An anemone (does not appear to be metridium), at least four shrimp (coonstripe and crangon sp..), two small crabs, and two elongate fish (gunnels?) present. Some trails in the form of furrows visible. Appears depositional.
WPAH008	D	Silt. Wood debris (some with barnacles), scattered algal fragments at SWI. At least five crabs (red rock crab in upper right - Cancer productus) and two fishes (goby and gunnel?) and a shrimp (Coonstripe?) present. Some crab tracks round depressions (possibly fish foraging pits?) visible. Thick detrital mantling suggests that this is at least seasonally depositional.
WPAH009	B	Silt. Shell fragments and benthic macroalgae throughout profile. Distinct crab tracks across frame. Benthic macroalgae is binding surface sediment. Image slightly blurry.
WPAH009	C	Silt. Extensive benthic macroalgae on SWI that is binding SWI. Fish (sole/flounder) at top of profile. Trails running through macroalgae, including crab tracks. Sediment is curling where algal mat has been punctured. Interesting photo.
WPAH010	C	Silt. Fish toward right of profile. Few tubes, crab tracks, and other trails in the form of thin furrows present. Several small burrows scattered across frame. Appears at least seasonally depositional.
WPAH011	B	Silt and detritus. Thin furrowed tracks running diagonally through profile, and few burrows/pits visible along with some small tubes fringing the burrows. Very fine grained surface that looks to be at least seasonally depositional. Small fragment of red algae affixed to a tube in lower portion of the frame.
WPAH012	E	Silt. Wood debris and shell fragments throughout frame. Four shrimp (coonstripe and crangon) toward left of profile and small localized clouds of silt present (caused by organisms). Epifaunal tracks in lower left and upper right.
WPAH012	F	Silt. Some wood debris and shell fragments throughout frame. Ten shrimp (coonstripe, spot and crangon) and a small fish present. Numerous tracks visible, including shrimp and crab tracks. The outline of wood fragments can be seen through detrital mantling.
WPAH013	A	Silt. Few shell fragments and wood debris throughout profile. At least four small crabs present. Gastropods and their tracks are present across frame. Rich detrital mantling and at least seasonally depositional. Very small tubes and several large burrows.

Table J2. Plan View Data

Station	Rep	Comment
WPAH014	A	Silt. Few shell and wood fragments. Five Coonstripe shrimp and a small crab present. Shrimp and crab tracks visible. Image slightly cloudy and not possible to differentiate tracks from burrows. Small tube between shrimp in center.
WPAH015	B	Silt. Few wood fragments. Three Coonstripe shrimp present. Image slightly cloudy; tracks barely visible. A few burrows and slender tubes visible. Crab upper left and gastropods across frame. Appears to be at least seasonally depositional.
WPAH016	A	Silt. Four shrimp (Coonstripe?) and small crabs present. Shrimp tracks, crab tracks, mounds, and burrows visible. Spiochaetopterid tube recumbent at SWI. Image slightly cloudy. Thick detrital mantling and at least seasonally depositional.
WPAH017	A	Silt as thick detrital mantling. Six shrimp (Coonstripe and crangon sp.) and some red benthic macroalgae present. Shrimp, crab, and gastropod tracks, and a few burrows visible as well as a few very small tubes.
WPAH018	A	Silt. Extensive benthic macroalgae on SWI that is binding the SWI. Two fish, an organism tube, and a small crab present. Trails and tracks running through macroalgae and in places, macroalgae curls where surface has been pierced. Wood debris appears to be primarily sticks/twig fragments.
WPAH019	C	Silty sand with shell fragments. Ulva and minor washed wood debris present. Crab tracks.
WPAH020	C	Extensive ulva with detritus covering SWI. Ulva does not appear to be in advanced decay.
WPAH022	B	Silt. Large mound running diagonally through profile. Minor wood debris, shell fragments and rope present (from crab trap). Red macroalgae, a bryozoan, one fish and one small crab visible. Crab tracks, and an organism tube present. Burrow mid-left.
WPAH022	C	Silt with thick detrital mantling. Few wood fragments. Spiochaetopterus polychaete tubes, seaweed, benthic red filamentous macroalgae, crab tracks, and some shrimp tracks present.
WPAH023	A	SWI completely covered by Ulva and wood debris. Some beggiatoa fringing wood fragment in mid-left and one small crab toward top-left of profile. All PV images for station 23 are covered in debris or cloudy.
WPAH024	F	SWI completely covered by Ulva and wood debris. Ulva is thickly mantled with detritus and some of the ulva is decaying with some beggiatoa at decomposing areas of ulva. Beggiatioa and three small crabs present. All PV images for station 24 are covered in debris and ulva.
WPAH025	A	Silt. Extensive benthic macroalgae throughout profile that appears to have once been a continuous binding cover that is now decomposing and breaking apart. Beggiatoa fringing some of the decaying algae and two fish present (goby/gunnel). Organism tubes, possible crab tracks, and trails in the form of thin furrows present.
WPAH026	A	Silt with detrital mantling. Small fish (possible goby) toward bottom-left of profile. Crab and shrimp tracks visible Several small tubes and a few burrows visible.
WPAH027	C	Wood fragments, algae and silty sand. Wood debris, shell fragments, ulva, and seaweed covers most of SWI. One fish toward top-right of profile and one Hermit Crab toward top-left of profile. Wood debris is small and rounded suggesting reworking at the SWI.
WPAH027	D	Woody debris and silty sand visible at SWI.. Wood debris, shell fragments, ulva, and seaweed covers most of SWI thought there is a small patch of exposed sediment with a tube at upper left center. Wood fragments are chips, fragments and splinted with varying degrees of roundness.
WPAH028	A	Silt. Ulva, wood debris, shell fragments, and benthic macroalgae covers most of SWI. Beggiatoa associated with decaying ulva in upper right and at least 11 snails present. Wood debris and ulva are detritus mantles.
WPAH030	A	Silt with detrital surface. Some shell fragments at right. One shrimp and one fish present. Burrows an several small tubes, shrimp, gastropod and crab tracks present. Appears at least seasonally depositional.
WPAH030	B	Silt, appears soft with detrital mantling. Some shell fragments. Crab tracks and possible gastropod tracks. Cloudy. Burrows visible and fine tubes associated with burrows (secondary).
WPAH031	A	Silt. Some wood debris throughout profile. At least seventeen shrimp and the base of a sea pen (toward right of profile) present. Small tubes. Shrimp tracks and burrows visible. Image slightly cloudy.

Table J2. Plan View Data

Station	Rep	Comment
WPAH032	B	Silt. Some wood debris throughout profile. Ulva and three fish (gunnels and goby) present. Crab tracks, and burrows/pits visible. Small localized clouds of silt present. Incipient benthic macroalgae at SWI that appear to in the process of binding sediment.
WPAH033	A	Silt. Some wood fragments and seaweed toward top of profile. A fish, carb tracks, crab tracks, and beggiatoa present. Beggiatoa appears to associated with decaying benthic macroalgae that was binding surface sediments.
WPAH034	A	Silt. Scarce mantled wood fragments, a seapen , ulva, and benthic macroalgae present. Two fish (gunnels), seven shrimp, and crab tracks present. A few small burrows and tubes.
WPAH035	A	Silt and minor wood debris. Two organism tubes (possible Spiochaetopterus sabellid polychaete tubes), a fish, four shrimp (two coonstripes), and two small crabs present. Shrimp and crab tracks visible. Several small tubes. Detrital mantling and slightly cloudy.
WPAH035	C	Silt with rounded stones. At least fifteen small crabs, some barnacles on rocks, organism tubes, and a shrimp (coonstripe?) present. Bivalve siphon in left center. Unusual pic of grain size types.
WPAH036	A	Silt with some mantled wood debris and shell fragments. Two fish, two shrimp and a small crab present. Shrimp tracks, crab tracks, organism tubes, and burrows present. A few broken tubes at SWI and multiple intact smaller tubes fringing burrows. Murky.
WPAH037	A	Silt with some heavily mantled wood debris throughout profile. Shrimp tracks, crab tracks, organism tubes, and burrows present. Wood fragments appear older and large based on outlines beneath detritus/sediment.
WPAH038	A	Kelp fronds with detritus.
WPAH038	D	Silt. Some wood debris and shell fragments at SWI. Ulva, seaweed, shrimp tracks, crab tracks, organism tubes, and burrows present. Both red filamentous algae and brown benthic macroalgae.
WPAH039	A	Silt and detritus mantled wood debris (one with barnacles) and shell fragment. Two shrimp, shrimp tracks, and crab tracks present. Cloud of silt toward top-right of profile. Appears to be large tabular bark/wood fragment at lower portion of frame. Mechanically fragmented wood chunk (small) at SWI and free of detritus.
WPAH042	A	Silt. Some wood debris and shell fragments. A shrimp, shrimp and crab tracks, burrows, organism tubes, present. Benthic macroalgae visible. Abundant seston in water column. Wood fragments are well mantled with detritus/sediment. Possible sabellid.
WPAH043	A	Silt. Sediment and detritus mantled wood debris over half the frame and few shell fragments. Two shrimp (spot prawns), shrimp tracks, numerous organism tubes, and crab tracks present. Ulva visible.
WPAH045	A	Silt. Some shell fragments. One crab, twenty-two shrimp, numerous organism tubes, crab tracks, burrows, and other depressions (possible fish foraging pits?) present. Shrimp are oriented in same direction, presumably due to currents.
WPAH046	A	Silty fine sand. Minor twiggy wood debris and shell fragments throughout profile. Ulva and benthic macroalgae visible. Numerous organism tubes (including active polychaete tubes) and burrows. At least two bivalve siphons visible. Snails on algae. Surface appears washed with very little detrital mantling.
WPAH046	B	Silty fine sand. Some wood debris at SWI and shell fragments. Ulva and benthic macroalgae visible. Numerous organism tubes (including active polychaete tubes), burrows, and some crab tracks present. Cerianthid and sabellid visible as well as algal encrusted spiochaetopterus tubes.
WPAH047	A	Fine sand with some silt. Bedding visible. Seaweed, nine shrimp, organism tubes, burrows, crab tracks and trails in the form of furrows present. Surface is washed. Very minor scattered small elongate wood fragments at SWI. Fecal strings.
WPAH053	D	Rounded to subrounded gravel with a thin discontinuous detrital mantling. Ulva and red dendritic algae. At least two small crabs. Very small tube.
WPAH054	A	Silt. Some shell fragments throughout at SWI. Crab tracks, some burrows and fine scaled tubes present. Murky. Abundant detritus at SWI.

Table J2. Plan View Data

Station	Rep	Comment
WPAH055	A	Silt with detrital veneer at SWI. Minor wood and shell fragments. Three shrimp (coonstripe and crangon?), two small crabs, crab tracks, and a mound toward right of profile present. Wood fragments are at left and their outline is visible under detritus.
WPAH056	A	Silt with robust detrital mantling and very minor shell fragments at SWI. Crab tracks, an organism tube, and small burrows present. Appears at least seasonally depositional.
WPAH057	D	Silt and detritus along with very small wood fragments and minor shell at SWI.. Small elongate fish, a shrimp, and a small crab visible. Numerous organism tubes, shrimp tracks and crab tracks present. Incipient beggiatoa at left.
WPAH058	A	Silt with detritus at SWI. Crab tracks, and furrows (possibly snail trails?) present. Small localized cloud of silt visible (possibly caused by an organism). Small burrows at upper right and very small tubes across frame. Appears depositional.
WPAH059	A	Silt, detrital veneer, and very minor small wood debris and shell fragments at SWI. Crab tracks present in upper right as well as a gastropod and its trail in center right. A piece of ulva present. Appears at least seasonally depositional.
WPAH060	A	Sandy silt with some detrital mantling. A few tabular wood fragments at SWI. A sand dab and some small organisms (toward top-right of profile) present. Shrimp tracks, crab tracks, burrows, and organism tubes present. Appears to seasonally depositional.
WPAH061	B	Silt. Some shell fragments and seaweed visible. A whitish blurred epifaunal organism under algae, a relatively deep furrow (possibly a snail trail) and crab tracks present. Thick detrital mantle at SWI.
WPAH061	E	Silt. Very minor small wood debris and shell fragments. Two shrimp (coonstripe?), benthic macroalgae, fish and Ulva visible. A mudclast, shrimp tracks, crab tracks, and a small cloud of silt (possibly caused by an organism) present. Beggiatoal present and is localized where reduced sediment is exposed from either burrows or faunal disturbance. Murky but nice pic.
WPAH062	B	Silt. Some shell fragments and seaweed visible. A shrimp, shrimp tracks, crab tracks, few small mudclasts, and some organism tubes, including a possible Spiochaetopterus polychaete tube, present. Surface appears washed with some fluting around tubes.
WPAH063	E	Silt. Some shell fragments and wood debris visible. Two shrimp and a small gastropod present. Shrimp tracks, organism tubes (including an active polychaete tube), depressions (possible fish foraging pits) and burrows present. Depositional.
WPAH064	C	Silt. Some shell fragments and wood debris visible with a distinct fragment at top of frame. A small gastropod present. Shrimp tracks, crab tracks, gastropod tracks, organism tubes (including a Spiochaetopterus polychaete tube), burrows, and a depression present.
WPAH065	A	Silt. Very murky with some shell fragments visible. A small crab, crab tracks, snail trails, and possible burrows present. Image slightly cloudy and obscures visibility of small tubes.
WPAH065	D	Silt. Some shell fragments visible. Crab tracks and burrows present. Image slightly cloudy which precludes identification of small tubes. Minor small wood debris based on outlines at left.
WPAH066	A	Silt. Some wood debris and benthic macroalgae visible. Crab tracks, organism tubes, and shrimp tracks present. Wood debris is covered by thick veneer of sediment/detritus and some appear to have been dislocated so that outline is visible by crabs scuttling over the fragments.
WPAH067	A	Silt. Very minor small wood fibers, shell fragments, and benthic macroalgae visible. Small gastropods, crab tracks, gastropod tracks, organism tubes, shrimp tracks, and burrows present. Thick detrital veneer and appears depositional.
WPAH068	B	Silt. Wood debris apparent across frame with a mix of fragments and twigs, shell fragments, and benthic macroalgae. Five fishes and two shrimp visible. Crab tracks, organism tubes, and shrimp tracks present. Thick detrital veneer and appears at least seasonally depositional.

Table J2. Plan View Data

Station	Rep	Comment
WPAH069	A	Silt. Wood debris (some with barnacles), shell fragments across the majority of frame and most all is mantled with sediment/detritus, and benthic macroalgae throughout profile. Four small crabs visible. Crab tracks, organism tubes, possible burrows, and shrimp tracks present. Appears depositional.
WPAH070	A	Silt. Some wood debris that is visible by outline through detrital veneer, shell fragments, and ulva visible. Two shrimp, two small crabs, crab tracks, organism tubes, shrimp tracks, and burrows present. Bivalve siphon.
WPAH071	A	Silt with detrital veneer and some small wood fragments. Some shell fragments and benthic macroalgae visible. A shrimp, two small crabs, bivalve siphon, a small flounder, and a few small gastropods present. Crab tracks, organism tubes (including Spiochaetopterus polychaete tubes), shrimp tracks, gastropod tracks, and burrows present. Spiochatopterus tubes have attached red algae.
WPAH073	C	Silt. A small gastropod, a fish, crab tracks, gastropod tracks, organism tubes, shrimp tracks, and burrows. Small localized silt clouds visible; possibly caused by organisms. Murky and appears depositional.
WPAH074	C	Sandy Silt. Some shell fragments throughout profile. Seven shrimp (one coonstripe), crab tracks, organism tubes, shrimp tracks, possible fish foraging pits, and abundant burrows present. Small localized silt clouds visible; possibly caused by organisms.
WPAH074	E	Sandy Silt. Some shell fragments and several small gastropods. Fifteen shrimp, crab tracks, organism tubes, shrimp tracks, abundant burrows, and trails in the form of thin furrows present. Very nice pic.
WPAH075	E	Silt with minor shell fragments. One shrimp, at least one crab, crab tracks, shrimp tracks, and trails in the form of thin furrows present. Small localized silt cloud visible; murky. Small tubes faintly visible. Thick detritus/sediment veneer.
WPAH076	A	Silt. Some debris visible. Crab tracks and a shrimp present. Image is cloudy.
WPAH076	B	Silt. Some debris visible. A shrimp and some tracks present. Image is cloudy.
WPAH077	B	Silt. Crab tracks, shrimp tracks, Gastropod tracks, abundant large burrows and some small tubes. Murky and appears to be covered with fine sediment/detritus indicating that it is at least seasonally depositional.
WPAH078	A	Silt. Some shell fragments, wood debris at right (large fragment), ulva at SWI. Crab tracks, shrimp tracks, possible snail tracks, organism tubes, and trails in the form of thin (v-shaped) furrows present. Distinct patches of wispy beggiatoa at right.
WPAH079	D	Sandy silt. Ten shrimp, crab tracks, shrimp tracks, possible gastropod tracks, small mounds, and burrows present. Surface is low-relief.
WPAH079	E	Sandy Silt. Some shell fragments. Three shrimp, crab tracks, shrimp tracks, possible gastropod tracks, and abundant small organism tubes present.
WPAH080	A	Silt. Some shell fragments throughout profile. At least nineteen shrimp, crab tracks, shrimp tracks, and burrows present. Detrital veneer at SWI and appears to be seasonally depositional. Murky.
WPAH080	B	Silt. Some shell fragments throughout profile. At least twenty (one possibly deceased) shrimp, one fish, shrimp tracks, organism tubes, possible fish foraging pits, trails in the form of thin furrows, and burrows present. Small localized silt clouds visible; caused by shrimp and generally murky.
WPAH081	A	Silt. Minor shell fragment and wood fragment in upper left. One fish, at least one gastropod, shrimp tracks, crab tracks, gastropod tracks, burrow and tube upper center, and trails in the form of thin furrows present. Murky and detrital veneer suggesting that station is at least seasonally depositional.
WPAH082	A	Silt. Some shell fragments and small tabular rounded wood fragments, ulva, at SWI. Two shrimp, one crab, shrimp tracks, crab tracks, burrows, and trails in the form of thin furrows present. Thin detrital veneer.
WPAH083	A	Silt with robust detrital veneer. Some shell fragments, wood debris with large fragment at center left and twig/branch at far left, ulva and beggiatoa visible. Five shrimp (one coonstripe), crab tracks, shrimp tracks, organism tubes, burrows, and trails in the form of thin furrows present. Beggiatoa associated with edge of translated wood fragment in center left.

Table J2. Plan View Data

Station	Rep	Comment
WPAH084	A	Silt. Minor small wood debris, ulva and kelp visible. Eleven shrimp (three lurking spot prawns), crab tracks, shrimp tracks, and trails in the form of thin furrows present. Very nice pic.
WPAH084	B	Silt. Twenty-four shrimp, crab track, shrimp tracks, gastropod with trail, and trails in the form of thin furrows present. Several burrows and small tubes visible along with a very thing detrital veneer.. Shrimp are oriented mostly in same direction presumably due to current.
WPAH085	B	Silt. Small tabular wood fragment visible. Eight shrimp (2 coonstripe?), one fish, crab track, shrimp tracks, and gastropod with trail present. Interesting dynamics between shrimp species. Detritus and murky.
WPAH086	A	Silt. shell fragments visible. Nine shrimp (1 spot prawn), crab track, shrimp tracks, and trails in the form of thin furrows present. A few burrows and small tubes. Thin detrital veneer.
WPAH087	C	Silt with well developed silt/detrital veneer. Some wood debris easily visible on left side of frame, ulva, and shell fragments visible. Shrimp tracks, organism tubes, burrows, and trails in the form of thin furrows present. Small gastropods.
WPAH088	A	Silt. Small tabular wood fragment visible. Eighteen shrimp, one fish, shrimp tracks, possible crab tracks, possible snail trail, burrows, and trails in the form of thin furrows present.
WPAH089	A	Silt. Very minor wood debris, seaweed, and red benthic macroalgae visible. Ten shrimp, shrimp tracks, crab tracks, organism tube, burrows, and trails in the form of thin furrows present. At least three shrimp species present. Tube at center with encrusted algae (sabellid?)
WPAH090	A	Silt. Some shell fragments visible. Ten shrimp, shrimp tracks, crab tracks, possible gastropod and accompanying trail present. Other trails in the form of thin furrows present. Thin detrital veneer.
WPAH091	A	Silt. Some shell fragments visible and a few small tabular wood fragments. Twenty-four shrimp, shrimp tracks, and a trail in the form of a thin furrow present. Many small localized silt clouds visible caused by shrimp.
WPAH092	A	Silt with large tabular wood debris and abundant smaller wood fragments/fibers, shell fragments, and barnacles. At least eight shrimp (4 spot prawns), a possible fish, organism tubes, shrimp tracks, and trails in the form of a thin furrows present. Wood is mantled with sediment/detritus. Carapace of a red rock crab.
WPAH093	A	Silt. Some shell fragments visible. Twenty-two shrimp (1 larger pandalid partially in frame), shrimp tracks, possible crab track, and a trail in the form of a thin furrow present. Small localized silt clouds visible caused by shrimp. Burrows and small tubes visible.
WPAH093	B	Silt. Some wood debris visible. Twenty-six shrimp, shrimp tracks, possible crab track, burrows, and trails in the form of thin furrows present. A veritable shrimp boil with coonstripe, spot and fairy? Shrimp all present.
WPAH094	A	Silt. Some shell fragments visible. Four shrimp, shrimp tracks, crab tracks, burrows, and organism tubes present. Long parallel lines running through left of profile appear to be drag marks.
WPAH095	B	Silt. Some wood debris and benthic macroalgae visible. At least forty-eight shrimp, shrimp tracks, possible crab tracks, burrows, and organism tubes present. One shrimp marching to the beat of a different drummer.
WPAH096	A	Silt. Some shell fragments, benthic macroalgae, and leafy seaweed visible. Seven shrimp, shrimp tracks and numerous furrows running from left to right (or right to left) through profile which appear to be due to undulatory sweeping of kelp fronds.
WPAH097	B	SWI covered in ulva and detritus. Two shrimp, a small crab.
WPAH098	A	SWI covered in ulva, seaweed, and detritus.
WPAH099	A	Silt. Benthic macroalgae, ulva, and seaweed covering SWI. Wood debris covering surface outside of algae. Wood debris appears to be small physically reworked particles. Some of the ulva is in a state of decay.
WPAH100	C	SWI covered in ulva, seaweed, and detritus.
WPAH101	A	Silt. Sixteen shrimp, shrimp tracks, crab tracks, and burrows present. Small tubes. Low relief at SWI.

Table J2. Plan View Data

Station	Rep	Comment
WPAH102	A	Silt. Some shell fragments visible. Thirteen shrimp, shrimp tracks, crab tracks, burrows, and trails in the form of thin furrows present.
WPAH103	A	Silt. Shrimp tracks, crab tracks, organism tubes, burrows, possible snail trail, and other trails in the form of thin furrows present.
WPAH104	A	Silt. Shrimp tracks, crab tracks, dense organism tubes, burrows, and trails in the form of thin furrows present.
WPAH105	A	Grey and tan silt. Some shell and wood fragments visible. Five shrimp and long parallel furrows present. Surface physically or mechanically disturbed.
KSS-1	A	Silt. Some wood debris visible. Benthic macroalgae throughout profile. Two shrimp, possible amphipod, and Goby present. Crab tracks, organism tubes, large burrow openings or possible fish foraging pits and trails in the form of thin furrows present.
KSS-2	A	Silt. Some shell fragments visible. Benthic macroalgae throughout profile. One small crab present. Crab tracks and trails in the form of thin furrows present.
KSS-3	B	Silt. Some shell fragments visible. Ulva toward right of profile. One small crab present. Crab tracks and trails in the form of thin furrows present.