



EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT

Port of Seattle Duwamish East Waterway Recontamination Monitoring

Prepared for:

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, Washington 98119

Prepared by:

EcoChem, Inc.
710 Second Avenue, Suite 660
Seattle, Washington 98104

EcoChem Project: C22004-2

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Approved for Release:


Christine Ransom
Project Manager
EcoChem, Inc.

PROJECT NARRATIVE

Basis for the Data Validation

This report summarizes the results of the validation performed on sediments and associated laboratory quality control samples. A **SAMPLE INDEX** is provided, followed by the validation report.

The samples were analyzed by Analytical Resources, Inc. (ARI), Tukwila, Washington. The analytical methods and EcoChem project chemists are listed in the table below.

ANALYSIS METHODS AND ECOCHEM CHEMISTS

Analysis	Method	Primary Review	Secondary Review
Semivolatile Organic Compounds	SW8270D	Mark Brindle	John Mitchell
Semivolatile Organic Compounds	SW8270-SIM		
Organochlorine Pesticide Compounds	SW8081	Craig Hutchings	
Polychlorinated Biphenyls as Aroclors	SW8082		
Total Metals	SW6010B & E200.8	Patricia Lambrecht	Chris Ransom
Total Mercury	SW7470A & SW7471A		
Total Organic Carbon	Plumb 1981		
Total Solids	EPA 160.3		
Grain Size	PSEP		

The data were reviewed using guidance and quality control criteria documented in the analytical methods; the project quality assurance project plan (QAPP) *Port of Seattle, East Waterway Phase I Removal Action: Recontamination Action Plan (October 4, 2005)*; and *National Functional Guidelines for Inorganic (USEPA 1994 & 2002) and Organic Data Review (USEPA 1999)*.

Data validation qualifier codes, reason codes, and validation criteria are included as **APPENDIX A**. A qualified data summary table is included as **APPENDIX B**. Communication records are included as **APPENDIX C**. Data validation worksheets will be kept on file at EcoChem.

Windward
East Waterway Recontamination Monitoring
Sample Index

Sample ID	Laboratory ID	SVOC	SVOC SIM	Pesticides	PCB's	Metals	Mercury	TOC	Grain Size
EW-RM07-45	07-2277-KN89A	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-101	07-2278-KN89B	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-29	07-2279-KN89C	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-30	07-2280-KN89D	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-4	07-2281-KN89E	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-32	07-2282-KN89F	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-10	07-2283-KN89G	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-33	07-2284-KN89H	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-46	07-2285-KN89I	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-36	07-2286-KN89J	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-34	07-2287-KN89K	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-37	07-2288-KN89L	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-102	07-2289-KN89M	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-39	07-2290-KN89N	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-40	07-2291-KN89O	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-47	07-2292-KN89P	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-41	07-2293-KN89Q	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-42	07-2294-KN89R	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-43	07-2295-KN89S	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-27	07-2296-KN89T	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-44	07-2297-KN89U	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-15	07-2298-KN89V	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-35	07-2299-KN89W	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-38	07-2300-KN89X	✓	✓	✓	✓	✓	✓	✓	✓
EW-RM07-45-RB	07-2301-KN89Y	✓	✓	✓	✓	✓	✓		
EW-RM07-39-RB	07-2302-KN89Z	✓	✓	✓	✓	✓	✓		

DATA VALIDATION REPORT
Port of Seattle
Duwamish East Waterway Recontamination Monitoring
Semivolatiles by SW846 Method 8270
SDG: KN89

This report documents the review of analytical data from the analysis of sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc. (ARI), Tukwila, Washington. Full validation (Level IV) was performed on all samples. Refer to the **Sample Index** for a list of samples reviewed.

I. DATA PACKAGE COMPLETENESS

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

II. EDD TO HARDCOPY VERIFICATION

A verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. Ten percent of the results were verified.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
GC/MS Tuning	2 Laboratory Control Samples (LCS)
Initial Calibration (ICAL)	1 Field Duplicates
2 Continuing Calibration (CCAL)	Internal Standards
Laboratory Blanks	Compound Identification
1 Field Blanks	Reporting Limits (MDL and MRL)
Surrogate Compounds	1 Calculation Verification (full validation only)

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

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

Continuing Calibration

All values for the relative response factor (RRF) were greater than the 0.05 minimum control limit. The values for percent difference (%D) were within the $\pm 25\%$ control limits, with the exceptions noted below. Results and reporting limits from samples associated with outliers indicative of a low bias were estimated (J/UJ-5B) and positive results in samples associated with outliers indicative of a high bias were estimated (J-5B).

CCAL Date	Instrument ID	Analyte	Bias
2/21/07	NT4	benzoic acid	Low
		2,4-dinitrophenol	Low
2/22/07	NT4	hexachlorocyclopentadiene	Low

Field Blanks

To assess the impact of each blank contaminant on the reported sample results, an action level is established at five times the concentration detected in the blank (ten times for common laboratory contaminants). If a contaminant is detected in an associated field sample and the concentration is less than the action level, the result is qualified as not detected (U). If the result is also less than the reporting limit, then the result is elevated to the reporting limit. No action is taken if the sample result is greater than the action level, or for non-detected results. Laboratory method blanks are used to evaluate all associated field blanks. Any remaining positive results in the field blank are used to evaluate the associated samples.

Samples EW-RM07-39-RB and EW-RM07-45-RB were submitted as field blanks. A positive result for bis(2-ethylhexyl)phthalate was reported in EW-RM-45-RB. Results in all associated sediment samples exceeded the action level; therefore no qualifiers were required.

Laboratory Control Sample (LCS)

Two sediment laboratory control samples (LCS) and one water LCS were analyzed. For the water LCS-021307, the percent recovery (%R) value for aniline was less than the lower control limit of 30%, at 14%. The aniline reporting limits were qualified as estimated (UJ-10) in the associated samples. For sediment LCS-021707, the %R values for benzo(a)anthracene (62%) and di-n-octyl phthalate (44%) were less than the lower control limits of 63% and 66% respectively. The positive results and reporting limits for these analytes in the associated samples were qualified as estimated (J/UJ-10) to indicate a potential low bias.

Field Duplicates

Two sets of field duplicates were submitted. All relative percent difference (RPD) values were within control limits for Samples EW-RM07-45 and EW-RM07-101 and Samples EW-RM07-37 and EW-RM07-102. Field precision was acceptable.

Calculation Verification

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

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample, and matrix spike/matrix spike duplicate (MS/MSD) %R values, with the exceptions noted above. Precision was also acceptable as demonstrated by the RPD values for the MS/MSD and field duplicate analyses.

Data were qualified as estimated due to continuing calibration %D and LCS %R outliers.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Port of Seattle
Duwamish East Waterway Recontamination Monitoring
Semivolatiles by SW846 Method 8270 SIM
SDG: KN89

This report documents the review of analytical data from the analysis of sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc. (ARI), Tukwila, Washington. Full validation (Level IV) was performed on all samples. Refer to the **Sample Index** for a list of samples reviewed.

I. DATA PACKAGE COMPLETENESS

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

II. EDD TO HARDCOPY VERIFICATION

A verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. Ten percent of the results were verified.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
GC/MS Tuning	Laboratory Control Samples (LCS)
Initial Calibration (ICAL)	1 Field Duplicates
2 Continuing Calibration (CCAL)	2 Internal Standards
Laboratory Blanks	2 Compound Identification
1 Field Blanks	Reporting Limits (MDL and MRL)
1 Surrogate Compounds	1 Calculation Verification

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.*

Continuing Calibration

All values for the relative response factor (RRF) were greater than the 0.05 minimum control limit. The values for percent difference (%D) were within the $\pm 25\%$ control limits, with the exceptions noted below. Results and reporting limits from samples associated with outliers indicative of a low bias were estimated (J/UJ-5B) and positive results in samples associated with outliers indicative of a high bias were estimated (J-5B).

CCAL Date	Instrument ID	Analyte	Bias
2/19/07	NT2	N-nitrosodimethylamine	Low
2/22/07	NT2	benzyl alcohol	Low

Field Blanks

To assess the impact of each blank contaminant on the reported sample results, an action level is established at five times the concentration detected in the blank (ten times for common laboratory contaminants). If a contaminant is detected in an associated field sample and the concentration is less than the action level, the result is qualified as not detected (U). If the result is also less than the reporting limit, then the result is elevated to the reporting limit. No action is taken if the sample result is greater than the action level, or for non-detected results. Laboratory method blanks are used to evaluate all associated field blanks. Any remaining positive results in the field blank are used to evaluate the associated samples.

Samples EW-RM07-39-RB and EW-RM07-45-RB were submitted as field blanks. No positive results were reported in these blanks.

Surrogate Compounds

The percent recovery (%R) values for 2,4,6-tribromophenol were less than the lower control limit of 30%, but greater than 10%, in all sediment samples. No qualifiers were required as all other surrogate %R values were within control limits.

Field Duplicates

Two sets of field duplicates were submitted. All RPD values were within control limits for Samples EW-RM07-45 and EW-RM07-101 and Samples EW-RM07-37 and EW-RM07-102. Field precision was acceptable.

Internal Standards

The areas for internal standards chrysene-d12 and perylene-d12 were greater than the upper control limits in Samples EW-RM07-15, EW-RM07-35, and EW-RM07-38. The positive results for butyl benzyl phthalate and dibenz(a,h)anthracene were qualified as estimated (J-19) in these samples.

Compound Identification

The laboratory flagged numerous results for dibenz(a,h)anthracene due to poor spectral matching. These results were qualified as estimated (J-14)

Some reporting limits for pentachlorophenol were elevated by the laboratory due to matrix interference.

Calculation Verification

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

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample (LCS), and matrix spike/matrix spike duplicate (MS/MSD) %R values, with the exceptions noted above. Precision was acceptable as demonstrated by the RPD values for the MS/MSD and field duplicate analyses.

Data were qualified as estimated due to continuing calibration %D and internal standard outliers, and poor spectral match.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Port of Seattle
Duwamish East Waterway Recontamination Monitoring
PCB Aroclors by SW846 Method 8082
SDG: KN89

This report documents the review of analytical data from the analysis of sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc. (ARI), Tukwila, Washington. Full validation (Level IV) was performed on all samples. Refer to the **Sample Index** for a list of samples reviewed.

I. DATA PACKAGE COMPLETENESS

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

II. EDD TO HARDCOPY VERIFICATION

A verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. Ten percent of the results were verified.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

- | | | |
|---|--|----------------------------------|
| 1 | Holding Times and Sample Preservation | Laboratory Control Samples (LCS) |
| | Initial Calibration (ICAL) | 1 Field Duplicates |
| | Continuing Calibration (CCAL) | Internal Standards |
| | Laboratory Blanks | Compound Identification |
| 1 | Field Blanks | 2 Reporting Limits (MDL and MRL) |
| | Surrogate Compounds | 1 Calculation Verification |
| 2 | Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | |

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

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

Holding Times and Sample Preservation

Sample EW-RM07-42 was re-extracted 26 days after the date of sampling. The QAPP-specified holding time is 14 days from date of sampling. However, the sample was stored frozen prior to re-extraction and the QAPP allows for the samples to remain frozen for up to one year prior to extraction; no qualifiers were assigned.

Field Blanks

Samples EW-RM07-39-RB and EW-RM07-45-RB were submitted as field blanks. No positive results were reported.

Matrix Spikes/Matrix Spike Duplicates (MS/MSD)

Two sets of matrix spike/matrix spike duplicate samples (MS/MSD) were analyzed. The percent recovery (%R) value for Aroclor 1260 was less than the lower control limit in the MS performed on Sample EW-RM07-45. As the %R values for Aroclor 1260 were acceptable in the LCS and the MSD, no qualifiers were assigned. The relative percent difference (RPD) value for Aroclor 1260 was greater than the control limit of 30% for this MS/MSD set. The Aroclor 1260 result for Sample EW-RM07-45 was estimated (J-9).

The %R values for Aroclor 1260 were less than the lower control limit for the MS/MSD performed on Sample EW-RM07-37. The Aroclor 1260 result was estimated (J-8) in the parent sample to indicate a potential low bias.

Field Duplicates

Two sets of field duplicates were submitted. All RPD values were within control limits for Samples EW-RM07-45 and EW-RM07-101. The RPD value for Aroclor 1260 was greater than the control limit of 50%, at 52%, for Samples EW-RM07-37 and EW-RM07-102. No data were qualified based on field duplicate precision outliers; however, users of the data should consider the impact of field precision outliers on the reported results.

Reporting Limits (Method Detection Limit and Method Reporting Limit)

Sample EW-RM07-42 was initially extracted with a smaller than normal sample size, which resulted elevated reporting limits. This sample was re-extracted with a normal sample size, both sets of data were reported. The results from the initial extraction were rejected (R-11) so that the most appropriate set of results was reported.

The results for one or more Aroclors in nine samples exceeded the linear range of the calibration. These samples were diluted and re-analyzed; the laboratory reported results for both analyses. The Aroclor results exceeding the linear range were rejected (R-20). Results for all other Aroclors were rejected (R-11) in the dilution, so that one usable result was reported for each Aroclor in every sample.

The RPD between analytical columns exceed 40% for the following results:

Aroclor 1254: Sample EW-RM07-101

Aroclor 1248: Sample EW-RM07-30

Aroclor 1248: Sample EW-RM07-4

The results for these Aroclors were qualified as estimated (J-3) in these samples.

Calculation Verification

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. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample, and MS/MSD percent recovery values, with the exceptions noted above. Precision was also acceptable as demonstrated by the RPD values for the MS/MSD and field duplicate analyses, with the exceptions previously noted.

Data were rejected in order to report the most appropriate result from multiple dilutions and analyses. A usable result remains for all analytes in all samples.

Data were qualified as estimated due to MS/MSD %R and RPD outliers and due to poor agreement between the two analytical columns.

Data that have been rejected should not be used for any purpose. All other data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Port of Seattle
Duwamish East Waterway Recontamination Monitoring
Organochlorine Pesticides by SW846 Method 8081A
SDG: KN89

This report documents the review of analytical data from the analysis of sediment samples and the associated laboratory and field quality control (QC) samples. Analytical Resources, Inc., Tukwila, Washington, analyzed the samples. Full validation (Level IV) was performed on all samples. Refer to the **SAMPLE INDEX** for a list of the individual samples.

I. DATA PACKAGE COMPLETENESS

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

II. EDD TO HARDCOPY VERIFICATION

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

III. TECHNICAL DATA VALIDATION

The quality control (QC) requirements that were reviewed are listed below.

1	Holding Times and Sample Preservation	Laboratory Control Samples (LCS)	
	Initial Calibration (ICAL)	1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
	Continuing Calibration (CCAL)		Internal Standards
	Laboratory Blanks		DDT/Endrin Breakdown
1	Field Blanks		Compound Identification
	Surrogate Compounds	2	Reporting Limits (MDL and MRL)
1	Field Duplicates	1	Calculation Verification

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

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

Holding Times and Sample Preservation

Sample EW-RM07-42 was re-extracted 26 days after the date of sampling. The QAPP-specified holding time is 14 days from date of sampling. However, the sample was stored frozen prior to re-extraction and the QAPP allows for the samples to remain frozen for up to one year prior to extraction; no qualifiers were assigned.

Field Blanks

Samples EW-RM07-45-RB and EW-RM07-39-RB were submitted as field rinsate blanks. No positive results were reported.

Field Duplicates

Two pairs of samples, EW-RM07-45 & EW-RM07-101 and EW-RM07-37 & EW-RM07-102 were submitted as field duplicates. No positive results were reported in any sample. Field precision was acceptable.

Matrix Spike/Matrix Spike Duplicate Analyses (MS/MSD)

Two sets of matrix spike/matrix spike duplicate samples (MS/MSD) were analyzed. All percent recovery (%R) and relative percent difference (RPD) values were acceptable in the MS/MSD performed on Sample EW-RM07-37. The %R values for 4,4'-DDT were greater than the upper control limit in the MS/MSD performed on Sample EW-RM07-45. This compound was not reported in the parent sample. The reporting limit was unaffected and no qualifiers were required.

Reporting Limits

The reporting limits in Samples EW-RM07-30, EW-RM07-34, and EW-RM07-32, were elevated due to sample dilution or a reduction in the amount extracted. In addition, the laboratory elevated reporting limits for one or more analytes in most samples due to interferences from Aroclors.

Sample EW-RM07-42 was initially extracted using a smaller than normal sample size, which resulted in elevated reporting limits. This sample was re-extracted and re-analyzed using a normal sample size. Both sets of data were reported. The results from the initial extraction were rejected (R-11) so that only the most appropriate set of results was reported.

Calculation Verification

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

IV. OVERALL ASSESSMENT OF THE DATA

As determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, MS/MSD, and LCS recovery values, with the exceptions noted above. Precision was acceptable, as demonstrated by the field duplicate and MS/MSD RPD values.

Data were rejected so that only one set of results per sample be reported. Data that have been rejected should not be used for any purpose.

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

DATA VALIDATION REPORT
Port of Seattle
Duwamish East Waterway Recontamination Monitoring
Metals by SW846 Methods 6010B, 7471A, and 7470A
SDG: KN89

This report documents the review of analytical data from the analysis of sediment samples and the associated laboratory and field quality control (QC) samples. Analytical Resources, Inc., Tukwila, Washington, analyzed the samples. Full validation (Level IV) was performed on all samples. Refer to the **SAMPLE INDEX** for a list of the individual samples.

I. DATA PACKAGE COMPLETENESS

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

II. EDD TO HARDCOPY VERIFICATION

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

III. TECHNICAL DATA VALIDATION

The QC requirements for review are listed below.

Holding Times and Sample Preservation	Laboratory Duplicates
Initial Calibration	1 Interference Check Samples
Calibration Verification	Serial Dilutions
1 CRDL Standards	1 Field Duplicates
Laboratory Blanks	Reporting Limits (MDL and MRL)
Laboratory Control Samples	Reported Results
1 Field Blanks	1 Calculation Verification
2 Matrix Spike Samples	

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.*

CRDL Standards

The contract required detection limit standard (CRDL) recovery for chromium (131%) was greater than the upper control limit of 130%. All associated sample results were greater than the action level of two times the CRDL concentration. No qualification of data was necessary.

Field Blanks

Two rinsate blanks, EW-RM07-45-RB and EW-RM07-39-RB, were submitted. There were positive results for zinc in both blanks. All associated results were greater than the action levels of five times the field blank concentrations; no qualification of data was necessary.

Matrix Spikes

Two QC samples were analyzed with this SDG. The %R values for antimony (16.9%, 21.0%) were less than the lower control limit of 75%. The post digestion spike recoveries (99%, 101%) were within the control limits of 75%-125%; therefore all associated results were estimated (UJ-8) instead of being rejected.

Interference Check Samples

The concentrations one or more interfering element (aluminum, calcium, iron, and magnesium) were greater than the level in the interference check samples (ICSA/ICSAB) in several samples. In these cases, the ICSA results were carefully evaluated to determine if there was a potential high or low bias caused by matrix interference. The ICSA values for chromium and lead were greater than \pm RL. An action level of two times the absolute value of the ICSA result was established. All associated results were greater than the action levels and no qualification of data was necessary.

Field Duplicates

Two field duplicate pairs, EW-RM07-45/EW-RM07-101 and EW-RM07-37/EW-RM07-102, were submitted with this SDG. The relative percent difference (RPD) values were less than the control limit of 50%. Field precision was acceptable.

Calculation Verification

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

IV. OVERALL ASSESSMENT OF THE DATA

As was determined by this evaluation, the laboratory followed the specified analytical methods. Precision was acceptable, as demonstrated by the laboratory and field duplicate RPD values. Accuracy was also acceptable, as demonstrated by the LCS and MS %R values, except as previously noted.

Data were qualified based on MS %R outliers.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Port of Seattle
Duwamish East Waterway Recontamination Monitoring
Conventional Parameters
SDG: KN89

This report documents the review of the data from the analysis of sediment samples for total solids, total organic carbon (TOC) and grain size. Samples were analyzed by Analytical Resources, Inc. (ARI), Tukwila, Washington. Full validation (Level IV) was performed on all samples. Refer to the **Sample Index** for a list of samples reviewed.

The analytical tests that were performed are summarized below:

Parameter	Method
Total Solids	160.3
Grain Size	PSEP 1986
Total Organic Carbon (TOC)	Plumb, 1981

I. DATA PACKAGE COMPLETENESS

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

II. EDD TO HARDCOPY VERIFICATION

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

III. TECHNICAL DATA VALIDATION

The quality control (QC) requirements for review are listed below.

Holding Times and Sample Preservation	Laboratory Triplicates
Initial Calibration	1 Field Duplicates
Calibration Verification	Reporting Limits
Laboratory Blanks	Reported Results
Laboratory Control Samples	1 Calculation Verification
2 Matrix Spikes	

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

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

Matrix Spikes

Two QC samples were analyzed with this SDG. The %R value for TOC (157.5%) was greater than the upper control limit of 125% for the matrix spike associated with Sample EW-RM07-37. As the recovery was within the control limits for the other QC sample, the TOC result for Sample EW-RM07-37 only was estimated (J-8) to indicate a potential high bias.

Field Duplicates

Two sets of field duplicates were submitted: EW-RM07-45 & EW-RM07-101 and EW-RM07-37 & EW-RM07-102. The relative percent difference (RPD) values were less than the control limit of 50%, with the exception of TOC (63%) for Samples EW-RM07-37 & EW-RM07-102. Although qualification of sample results based on the RPD outlier is not required, data users should take field precision into account when interpreting sample data.

Calculation Verification

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

IV. OVERALL ASSESSMENT OF THE DATA

As determined by this evaluation, the laboratory followed the specified analytical methods. The laboratory triplicate RSD values and field duplicate RPD values indicated acceptable precision, except as previously noted. Accuracy was also acceptable, as demonstrated by the matrix spike, LCS, and SRM %R values, except as noted above.

One TOC result was estimated based on a matrix spike %R outlier.

All data, as qualified, are acceptable for use.



EcoChem, INC.
Environmental Data Quality

APPENDIX A
DATA QUALIFIER DEFINITIONS
REASON CODES
AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES

National Functional Guidelines

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

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its 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 in the data review process:

DNR	Do-not-report. Duplicate results exist due to reanalyses. This result should not be reported.
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DATA QUALIFIER REASON CODES

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

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

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

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

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

DATA VALIDATION CRITERIA

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

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

DATA VALIDATION CRITERIA

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

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

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

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Soils: 4°C ±2°C Waters: Nitric Acid to pH < 2 For Dissolved metals, 0.45um filter & preserve after filtration	PJ - no qualifier for cooler temperature outliers J(+)/UJ(-) if preservation requirements are not met	1
Holding Time	180 days from date sampled	J(+)/UJ(-) if holding time exceeded	1
Initial Calibration	Blank + minimum 1 standard Once every 24 hours If more than 1 standard r>0.995	J(+)/UJ(-) if r<0.995 (multi point cal)	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after Cal %R within +/- 10% of true value	J(+)/UJ(-) if %R 75%-89% J(+) if %R = 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run %R within +/- 10% of true value	J(+)/UJ(-) if %R = 75%-89% J(+) if %R 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5B
CRQL/Reporting Limit Standard (CRI)	2X CRQL (RL) analyzed beginning of run (some labs use RL as concentration) Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Sb, Pb, Tl)	R(-)/J(+)<2X RL if %R <50% (< 30% Sb, Pb, Tl) J(+)<2X RL, UJ(-) if %R 50-69% (30%-49% Sb, Pb, Tl) J(+) <2X RL if %R 130%-180% (150%-200%Sb, Pb, Tl) R(+)<2X RL if %R>180% (200% Sb, Pb, Tl)	14
Initial and Continuing Calibration Blank (ICB/CCB)	After each ICV and CCV every ten samples and end of run blank < IDL (MDL)	Action level is 5x absolute value of blank conc. For (+) blanks, U(+) results < action level For (-) blanks, J(+)/UJ(-) results < action level refer to TM-02 for additional details	7
Method Blank	One per matrix per batch (batch not to exceed 20 samples)	Action level is 5x absolute value of blank conc. For (+) blk value, U(+) results < action level For (-) blk value, J(+)/UJ(-) results < action level	7
Interference Check Sample (ICSA/ICSAB)	Beginning and end of each run or every eight hours ICSAB %R 80% - 120% ICSA < IDL (MDL)	For samp with Al,Ca,Fe,Mg > ICS levels R(+/-) if %R<50% J(+) if %R >120% J(+)/UJ(-) if %R= 50% to 79% Professional Judgment for ICSA to determine if bias is present see TM-09 for additional details	17
Post-digestion Spike	If Matrix Spike is outside 75-125%, spike at twice the sample conc.	No qualifiers assigned based on this element	

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

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Matrix Spike	One per matrix per batch 75-125% for samples less than 4x spike level	J(+) if %R>125% J(+)/UJ(-) if %R <75% J(+)/R(-) if %R<30%: UJ(-) if Post Spike %R 75%-125% all samples in batch	8
Laboratory Duplicate	One per matrix per batch RPD <20% for samples > 5x RL Diff <RL for samples >RL and <5 x RL (may use RPD < 35%, Diff < 2X RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9
Serial Dilution	5x dilution one per matrix %D <10% for values > 50x MDL	J(+)/UJ(-) if %D >10% all samples in batch	16
Laboratory Control Sample (LCS)	Water: One per batch %R (80-120%)	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	Soil: One per batch Result within manufacturer's certified acceptance range	J(+)/UJ(-) if < LCL, J(+) if > UCL	10
Field Blank	Collected on same day as samples	Action level is 5x blank conc. U(+) sample values < AL	6
Field Duplicate	For results > 5X RL: Waters RPD < 35% Soils RPD < 50% For results < 5 x RL: Diff<RL (may use Diff < 2X RL for solids)	J(+)/UJ(-) in parent samples only	9
Instrument Detection Limit	determined every 3 months	No qualifiers assigned based on this element	
Linear Range	Determined annually Sample concentrations must fall within range	J(+) values over range	20

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

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Soils: 4°C ±2°C Waters: Nitric Acid to pH < 2 For Dissolved metals, 0.45um filter & preserve after filtration	PJ - no qualifier for cooler temperature outliers J(+)/UJ(-) if preservation requirements are not met	1
Holding Time	180 days from date sampled	J(+)/UJ(-) if holding time exceeded	1
Tune	Prior to ICAL monitoring compounds analyzed 5 times with Std Dev. ≤ 5% mass calibration <0.1 amu from True Value Resolution < 0.9 AMU @ 10% peak height or <0.75 amu @ 5% peak height	J(+)/UJ(-) if tune criteria not met	5A
Initial Calibration	Blank + minimum 1 standard once every 24 hours if more than 1 standard r>0.995	J(+)/UJ(-) if r<0.995 (for multi point cal)	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after Cal %R within +/- 10% of true value	J(+)/UJ(-) if %R 75%-89% J(+) if %R = 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run +/- 10% of True value	J(+)/UJ(-) if %R 75%-89% J(+) if %R = 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5B
CRDL/Reporting Limit Standard (CRI)	2X CRDL (RL) analyzed beginning of run (some labs use RL as concentration) Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Co,Mn, Zn)	R(-),(+) < 2X RL if %R < 50% (< 30% Co,Mn, Zn) J(+)<2X RL, UJ(-) if %R 50-69% (30%-49% Co,Mn, Zn) J(+)<2X RL if %R 130%-180% (150%-200% Co,Mn, Zn) R(+)<2X RL if %R>180%(200% Co,Mn, Zn)	14
Initial and Continuing Calibration Blanks (ICB/CCB)	After each ICV and CCV every ten samples and end of run blank < IDL (MDL)	Action level is 5x absolute value of blank conc. For (+) blanks, U(+) results < action level For (-) blanks, J(+)/UJ(-) results < action level refer to TM-02 for additional details	7
Method Blank	One per matrix per batch (batch not to exceed 20 samples)	Action level is 5x absolute value of blank conc. For (+) blk value, U(+) results < action level For (-) blk value, J(+)/UJ(-) results < action level	7
Field Blanks	Associated with samples taken on same day	Action level is 5x blank conc. U(+) sample values < AL	6

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

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Interference Check Sample (ICSA/ICSAB)	Required by SW 6020, but not 200.8 ICSAB +/- 20% of true value ICSA < +/- IDL	Where Al,Ca,Fe,Mg = ICS levels J(+) if %R >120% J(+)/UJ(-) if %R = 50% to 79% R(+/-) if %R<50% Professional Judgment for ICSA > +/- IDL see TM-09 for additional details	17
Post-digestion Spike	If Matrix Spike is outside 75-125% Spike parent sample at 2X the sample conc.	No qualifiers assigned based on this element	
Matrix Spike	One per matrix per batch 75-125% for samples where results do not exceed 4x spike level	J(+) if %R>125% J(+)/UJ(-) if %R <75% J(+)/R(-) if %R<30%: UJ(-) if Post Spike %R 75%-125% all samples in batch	8
Laboratory Duplicate	One per matrix per batch RPD <20% for samples > 5x RL Diff <RL for samples >RL and <5 x RL (may use RPD < 35%, Diff < 2X RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9
Laboratory Control Sample (LCS)	Water: One per batch %R (80-120%)	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	Soil: One per batch Result within manufacturer's certified acceptance range	J(+)/UJ(-) if < LCL, J(+) if > UCL	10
Serial Dilution	5x dilution one per matrix (or SDG) %D <10% of the undiluted value for values > 50x MDL	J(+)/UJ(-) if %D >10%	16
Field Duplicate	For results > 5X RL: Waters RPD < 35% Soils RPD < 50% For results < 5 x RL: Diff<RL (may use Diff < 2X RL for solids)	J(+)/UJ(-) in parent samples only	9
Internal Standards	Every Sample SW6020: 60%-125% 200.8: 30%-120%	J (+)/UJ (-) all analytes associated with IS outlier	19
Instrument Detection Limit	Determined every 3 months	No qualifiers assigned based on this element	
Linear Range	Determined annually Sample concentrations must fall within range	J(+) values over range	20

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

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Soils: 4°C ±2°C Waters: Nitric Acid to pH < 2 For Dissolved metals, 0.45um filter & preserve after filtration	PJ - no qualifier for cooler temperature outliers J(+)/UJ(-) if preservation requirements are not met	1
Holding Time	28 days from date sampled	J(+)/UJ(-) if holding time exceeded	1
Initial Calibration	Blank + 4 standards r > 0.995 once every 24 hours	J(+)/UJ(-) if r<0.995	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after Cal %R within +/- 20% of true value	R(+/-) if %R < 65% R(+) if %R > 135% J(+)/UJ(-) if %R = 65%-79% J(+) if %R = 121-135%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run %R within +/- 20% of true value	R(+/-) if %R < 65% R(+) if %R > 135% J(+)/UJ(-) if %R = 65%-79% J(+) if %R = 121-135%	5B
CRQL/Reporting Limit Standard (CRA)	@ CRQL/ RL - analyzed beginning of run %R = 70%-130%	R(-),(+) < 2XRL if %R < 50% J(+)<2X RL, UJ(-) if %R 50-69% J(+) < 2X RL if %R 130%-180% R(+)<2X RL if %R>180%	14
Initial and Continuing Calibration Blanks (ICB/CCB)	after each ICV and CCV every ten samples and end of run blank < IDL (MDL)	Action level is 5x absolute value of blank conc. For (+) blanks, U(+) results < action level For (-) blanks, J(+)/UJ(-) results < action level refer to TM-02 for additional details	7
Method Blank	One per matrix per batch (batch not to exceed 20 samples)	Action level is 5x absolute value of blank conc. For (+) blk value, U(+) results < action level For (-) blk value, J(+)/UJ(-) results < action level	7
Matrix Spike	One per matrix per batch 5% frequency 75-125% for samples less than 4x spike level	J(+) if %R>125% J(+)/UJ(-) if %R < 75% J(+)/R(-) if %R<30% all samples in batch	8
Laboratory Duplicate	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples > RL and < 5 x RL (may use RPD < 35%, Diff < 2X RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9

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

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Laboratory Control Sample (LCS)	Water: One per batch %R (80-120%)	R(+/-) if %R < 50%; J(+) if %R > 120% J(+)/UJ(-) if %R = 50-79%	10
	Soil: One per batch Result within manufacturer's certified acceptance range	J(+)/UJ(-) if < LCL, J(+) if > UCL	10
Field Blank	Collected on same day as samples	Action level is 5x blank conc. U(+) sample values < AL	6
Field Duplicate	For results > 5X RL: Waters RPD < 35% Soils RPD < 50% For results < 5 x RL: Diff < RL (may use Diff < 2X RL for solids)	J(+)/UJ(-) in parent samples only	9



EcoChem, INC.
Environmental Data Quality

APPENDIX B

QUALIFIED DATA SUMMARY TABLE

**Windward
East Waterway Recontamination Monitoring
Qualified Data Summary Table**

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Unit	Lab Qualifier	Validation Qualifier	Reason Code
KN89	EW-RM07-45	07-2277-KN89A	PSDDA SW8270D	Benzoic Acid	620	ug/kg	U	UJ	5B
KN89	EW-RM07-45	07-2277-KN89A	PSDDA SW8270D	2,4-Dinitrophenol	620	ug/kg	U	UJ	5B
KN89	EW-RM07-101	07-2278-KN89B	PSDDA SW8270D	Benzoic Acid	610	ug/kg	U	UJ	5B
KN89	EW-RM07-101	07-2278-KN89B	PSDDA SW8270D	2,4-Dinitrophenol	610	ug/kg	U	UJ	5B
KN89	EW-RM07-29	07-2279-KN89C	PSDDA SW8270D	Benzoic Acid	620	ug/kg	U	UJ	5B
KN89	EW-RM07-29	07-2279-KN89C	PSDDA SW8270D	2,4-Dinitrophenol	620	ug/kg	U	UJ	5B
KN89	EW-RM07-30	07-2280-KN89D	PSDDA SW8270D	Benzoic Acid	610	ug/kg	U	UJ	5B
KN89	EW-RM07-30	07-2280-KN89D	PSDDA SW8270D	2,4-Dinitrophenol	610	ug/kg	U	UJ	5B
KN89	EW-RM07-4	07-2281-KN89E	PSDDA SW8270D	Benzoic Acid	610	ug/kg	U	UJ	5B
KN89	EW-RM07-4	07-2281-KN89E	PSDDA SW8270D	2,4-Dinitrophenol	610	ug/kg	U	UJ	5B
KN89	EW-RM07-32	07-2282-KN89F	PSDDA SW8270D	Benzoic Acid	620	ug/kg	U	UJ	5B
KN89	EW-RM07-32	07-2282-KN89F	PSDDA SW8270D	2,4-Dinitrophenol	620	ug/kg	U	UJ	5B
KN89	EW-RM07-10	07-2283-KN89G	PSDDA SW8270D	Benzoic Acid	610	ug/kg	U	UJ	5B
KN89	EW-RM07-10	07-2283-KN89G	PSDDA SW8270D	2,4-Dinitrophenol	610	ug/kg	U	UJ	5B
KN89	EW-RM07-33	07-2284-KN89H	PSDDA SW8270D	Benzoic Acid	610	ug/kg	U	UJ	5B
KN89	EW-RM07-33	07-2284-KN89H	PSDDA SW8270D	2,4-Dinitrophenol	610	ug/kg	U	UJ	5B
KN89	EW-RM07-46	07-2285-KN89I	PSDDA SW8270D	Benzoic Acid	610	ug/kg	U	UJ	5B
KN89	EW-RM07-46	07-2285-KN89I	PSDDA SW8270D	2,4-Dinitrophenol	610	ug/kg	U	UJ	5B
KN89	EW-RM07-36	07-2286-KN89J	PSDDA SW8270D	Benzoic Acid	600	ug/kg	U	UJ	5B
KN89	EW-RM07-36	07-2286-KN89J	PSDDA SW8270D	2,4-Dinitrophenol	600	ug/kg	U	UJ	5B
KN89	EW-RM07-34	07-2287-KN89K	PSDDA SW8270D	Benzoic Acid	620	ug/kg	U	UJ	5B
KN89	EW-RM07-34	07-2287-KN89K	PSDDA SW8270D	2,4-Dinitrophenol	620	ug/kg	U	UJ	5B
KN89	EW-RM07-37	07-2288-KN89L	PSDDA SW8270D	Benzo(a)anthracene	44	ug/kg	J	J	10
KN89	EW-RM07-37	07-2288-KN89L	PSDDA SW8270D	Hexachlorocyclopentadiene	300	ug/kg	U	UJ	5B
KN89	EW-RM07-37	07-2288-KN89L	PSDDA SW8270D	Di-n-Octyl phthalate	61	ug/kg	U	UJ	10
KN89	EW-RM07-102	07-2289-KN89M	PSDDA SW8270D	Hexachlorocyclopentadiene	310	ug/kg	U	UJ	5B
KN89	EW-RM07-102	07-2289-KN89M	PSDDA SW8270D	Benzo(a)anthracene	50	ug/kg	J	J	10
KN89	EW-RM07-102	07-2289-KN89M	PSDDA SW8270D	Di-n-Octyl phthalate	62	ug/kg	U	UJ	10
KN89	EW-RM07-39	07-2290-KN89N	PSDDA SW8270D	Hexachlorocyclopentadiene	300	ug/kg	U	UJ	5B
KN89	EW-RM07-39	07-2290-KN89N	PSDDA SW8270D	Benzo(a)anthracene	52	ug/kg	J	J	10
KN89	EW-RM07-39	07-2290-KN89N	PSDDA SW8270D	Di-n-Octyl phthalate	60	ug/kg	U	UJ	10
KN89	EW-RM07-40	07-2291-KN89O	PSDDA SW8270D	Hexachlorocyclopentadiene	300	ug/kg	U	UJ	5B
KN89	EW-RM07-40	07-2291-KN89O	PSDDA SW8270D	Benzo(a)anthracene	61	ug/kg	U	UJ	10
KN89	EW-RM07-40	07-2291-KN89O	PSDDA SW8270D	Di-n-Octyl phthalate	61	ug/kg	U	UJ	10
KN89	EW-RM07-47	07-2292-KN89P	PSDDA SW8270D	Benzoic Acid	620	ug/kg	U	UJ	5B
KN89	EW-RM07-47	07-2292-KN89P	PSDDA SW8270D	2,4-Dinitrophenol	620	ug/kg	U	UJ	5B
KN89	EW-RM07-41	07-2293-KN89Q	PSDDA SW8270D	Benzoic Acid	610	ug/kg	U	UJ	5B
KN89	EW-RM07-41	07-2293-KN89Q	PSDDA SW8270D	2,4-Dinitrophenol	610	ug/kg	U	UJ	5B
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8270D	Benzoic Acid	610	ug/kg	U	UJ	5B
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8270D	2,4-Dinitrophenol	610	ug/kg	U	UJ	5B
KN89	EW-RM07-43	07-2295-KN89S	PSDDA SW8270D	Benzoic Acid	600	ug/kg	U	UJ	5B
KN89	EW-RM07-43	07-2295-KN89S	PSDDA SW8270D	2,4-Dinitrophenol	600	ug/kg	U	UJ	5B
KN89	EW-RM07-27	07-2296-KN89T	PSDDA SW8270D	Hexachlorocyclopentadiene	300	ug/kg	U	UJ	5B
KN89	EW-RM07-44	07-2297-KN89U	PSDDA SW8270D	Hexachlorocyclopentadiene	310	ug/kg	U	UJ	5B
KN89	EW-RM07-15	07-2298-KN89V	PSDDA SW8270D	Hexachlorocyclopentadiene	310	ug/kg	U	UJ	5B
KN89	EW-RM07-35	07-2299-KN89W	PSDDA SW8270D	Hexachlorocyclopentadiene	310	ug/kg	U	UJ	5B
KN89	EW-RM07-38	07-2300-KN89X	PSDDA SW8270D	Hexachlorocyclopentadiene	310	ug/kg	U	UJ	5B
KN89	EW-RM07-45-RB	07-2301-KN89Y	SW8270	Aniline	1	ug/L	U	UJ	10

**Windward
East Waterway Recontamination Monitoring
Qualified Data Summary Table**

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Unit	Lab Qualifier	Validation Qualifier	Reason Code
KN89	EW-RM07-39-RB	07-2302-KN89Z	SW8270	Aniline	1	ug/L	U	UJ	10
KN89	EW-RM07-45	07-2277-KN89A	BNASIM	Dibenz(a,h)anthracene	27	ug/kg	M	J	14
KN89	EW-RM07-101	07-2278-KN89B	BNASIM	Dibenz(a,h)anthracene	33	ug/kg	M	J	14
KN89	EW-RM07-29	07-2279-KN89C	BNASIM	Dibenz(a,h)anthracene	21	ug/kg	M	J	14
KN89	EW-RM07-30	07-2280-KN89D	BNASIM	Dibenz(a,h)anthracene	29	ug/kg	M	J	14
KN89	EW-RM07-4	07-2281-KN89E	BNASIM	Dibenz(a,h)anthracene	17	ug/kg	M	J	14
KN89	EW-RM07-32	07-2282-KN89F	BNASIM	Dibenz(a,h)anthracene	32	ug/kg	M	J	14
KN89	EW-RM07-10	07-2283-KN89G	BNASIM	Dibenz(a,h)anthracene	12	ug/kg	M	J	14
KN89	EW-RM07-33	07-2284-KN89H	BNASIM	Dibenz(a,h)anthracene	8.6	ug/kg	M	J	14
KN89	EW-RM07-34	07-2287-KN89K	BNASIM	Dibenz(a,h)anthracene	20	ug/kg	M	J	14
KN89	EW-RM07-37	07-2288-KN89L	BNASIM	Dibenz(a,h)anthracene	6.1	ug/kg	M	J	14
KN89	EW-RM07-37	07-2288-KN89L	BNASIM	Benzyl Alcohol	30	ug/kg	U	UJ	5B
KN89	EW-RM07-102	07-2289-KN89M	BNASIM	Dibenz(a,h)anthracene	7.4	ug/kg	M	J	14
KN89	EW-RM07-102	07-2289-KN89M	BNASIM	Benzyl Alcohol	31	ug/kg	U	UJ	5B
KN89	EW-RM07-39	07-2290-KN89N	BNASIM	Dibenz(a,h)anthracene	9.1	ug/kg	M	J	14
KN89	EW-RM07-39	07-2290-KN89N	BNASIM	Benzyl Alcohol	30	ug/kg	U	UJ	5B
KN89	EW-RM07-40	07-2291-KN89O	BNASIM	Benzyl Alcohol	30	ug/kg	U	UJ	5B
KN89	EW-RM07-47	07-2292-KN89P	BNASIM	Dibenz(a,h)anthracene	26	ug/kg	M	J	14
KN89	EW-RM07-41	07-2293-KN89Q	BNASIM	Dibenz(a,h)anthracene	27	ug/kg	M	J	14
KN89	EW-RM07-43	07-2295-KN89S	BNASIM	Dibenz(a,h)anthracene	8.5	ug/kg	M	J	14
KN89	EW-RM07-27	07-2296-KN89T	BNASIM	Dibenz(a,h)anthracene	9.1	ug/kg	M	J	14
KN89	EW-RM07-44	07-2297-KN89U	BNASIM	Dibenz(a,h)anthracene	20	ug/kg	M	J	14
KN89	EW-RM07-44	07-2297-KN89U	BNASIM	Benzyl Alcohol	31	ug/kg	U	UJ	5B
KN89	EW-RM07-15	07-2298-KN89V	BNASIM	Dibenz(a,h)anthracene	31	ug/kg	M	J	14,19
KN89	EW-RM07-15	07-2298-KN89V	BNASIM	Butylbenzylphthalate	46	ug/kg		J	19
KN89	EW-RM07-15	07-2298-KN89V	BNASIM	Benzyl Alcohol	31	ug/kg	U	UJ	5B
KN89	EW-RM07-35	07-2299-KN89W	BNASIM	Dibenz(a,h)anthracene	29	ug/kg	M	J	14,19
KN89	EW-RM07-35	07-2299-KN89W	BNASIM	Butylbenzylphthalate	36	ug/kg		J	19
KN89	EW-RM07-35	07-2299-KN89W	BNASIM	Benzyl Alcohol	31	ug/kg	U	UJ	5B
KN89	EW-RM07-38	07-2300-KN89X	BNASIM	Dibenz(a,h)anthracene	39	ug/kg	M	J	14,19
KN89	EW-RM07-38	07-2300-KN89X	BNASIM	Butylbenzylphthalate	40	ug/kg		J	19
KN89	EW-RM07-38	07-2300-KN89X	BNASIM	Benzyl Alcohol	31	ug/kg	U	UJ	5B
KN89	EW-RM07-45-RB	07-2301-KN89Y	BNASIM	N-Nitrosodimethylamine	0.5	ug/L	U	UJ	5B
KN89	EW-RM07-39-RB	07-2302-KN89Z	BNASIM	N-Nitrosodimethylamine	0.5	ug/L	U	UJ	5B
KN89	EW-RM07-45	07-2277-KN89A	PSDDA SW8082	Aroclor 1260	380	ug/kg	E	R	20
KN89	EW-RM07-45	07-2277-KN89ADL	PSDDA SW8082	Aroclor 1016	98	ug/kg	U	R	11
KN89	EW-RM07-45	07-2277-KN89ADL	PSDDA SW8082	Aroclor 1242	98	ug/kg	U	R	11
KN89	EW-RM07-45	07-2277-KN89ADL	PSDDA SW8082	Aroclor 1248	98	ug/kg	U	R	11
KN89	EW-RM07-45	07-2277-KN89ADL	PSDDA SW8082	Aroclor 1254	160	ug/kg		R	11
KN89	EW-RM07-45	07-2277-KN89ADL	PSDDA SW8082	Aroclor 1260	360	ug/kg		J	9
KN89	EW-RM07-45	07-2277-KN89ADL	PSDDA SW8082	Aroclor 1221	98	ug/kg	U	R	11
KN89	EW-RM07-45	07-2277-KN89ADL	PSDDA SW8082	Aroclor 1232	98	ug/kg	U	R	11
KN89	EW-RM07-101	07-2278-KN89B	PSDDA SW8082	Aroclor 1254	150	ug/kg	P	J	3
KN89	EW-RM07-101	07-2278-KN89B	PSDDA SW8082	Aroclor 1260	230	ug/kg	EP	R	20
KN89	EW-RM07-101	07-2278-KN89BDL	PSDDA SW8082	Aroclor 1016	59	ug/kg	U	R	11
KN89	EW-RM07-101	07-2278-KN89BDL	PSDDA SW8082	Aroclor 1242	59	ug/kg	U	R	11
KN89	EW-RM07-101	07-2278-KN89BDL	PSDDA SW8082	Aroclor 1248	59	ug/kg	U	R	11
KN89	EW-RM07-101	07-2278-KN89BDL	PSDDA SW8082	Aroclor 1254	120	ug/kg		R	11

**Windward
East Waterway Recontamination Monitoring
Qualified Data Summary Table**

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Unit	Lab Qualifier	Validation Qualifier	Reason Code
KN89	EW-RM07-101	07-2278-KN89BDL	PSDDA SW8082	Aroclor 1221	59	ug/kg	U	R	11
KN89	EW-RM07-101	07-2278-KN89BDL	PSDDA SW8082	Aroclor 1232	59	ug/kg	U	R	11
KN89	EW-RM07-29	07-2279-KN89C	PSDDA SW8082	Aroclor 1254	220	ug/kg	E	R	20
KN89	EW-RM07-29	07-2279-KN89C	PSDDA SW8082	Aroclor 1260	330	ug/kg	E	R	20
KN89	EW-RM07-29	07-2279-KN89CDL	PSDDA SW8082	Aroclor 1016	96	ug/kg	U	R	11
KN89	EW-RM07-29	07-2279-KN89CDL	PSDDA SW8082	Aroclor 1242	96	ug/kg	U	R	11
KN89	EW-RM07-29	07-2279-KN89CDL	PSDDA SW8082	Aroclor 1248	96	ug/kg	U	R	11
KN89	EW-RM07-29	07-2279-KN89CDL	PSDDA SW8082	Aroclor 1221	96	ug/kg	U	R	11
KN89	EW-RM07-29	07-2279-KN89CDL	PSDDA SW8082	Aroclor 1232	96	ug/kg	U	R	11
KN89	EW-RM07-30	07-2280-KN89D	PSDDA SW8082	Aroclor 1248	46	ug/kg	P	J	3
KN89	EW-RM07-30	07-2280-KN89D	PSDDA SW8082	Aroclor 1260	230	ug/kg	E	R	20
KN89	EW-RM07-30	07-2280-KN89DDL	PSDDA SW8082	Aroclor 1016	57	ug/kg	U	R	11
KN89	EW-RM07-30	07-2280-KN89DDL	PSDDA SW8082	Aroclor 1242	57	ug/kg	U	R	11
KN89	EW-RM07-30	07-2280-KN89DDL	PSDDA SW8082	Aroclor 1248	57	ug/kg	U	R	11
KN89	EW-RM07-30	07-2280-KN89DDL	PSDDA SW8082	Aroclor 1254	150	ug/kg		R	11
KN89	EW-RM07-30	07-2280-KN89DDL	PSDDA SW8082	Aroclor 1221	57	ug/kg	U	R	11
KN89	EW-RM07-30	07-2280-KN89DDL	PSDDA SW8082	Aroclor 1232	57	ug/kg	U	R	11
KN89	EW-RM07-4	07-2281-KN89E	PSDDA SW8082	Aroclor 1248	34	ug/kg	P	J	3
KN89	EW-RM07-32	07-2282-KN89F	PSDDA SW8082	Aroclor 1260	300	ug/kg	E	R	20
KN89	EW-RM07-32	07-2282-KN89FDL	PSDDA SW8082	Aroclor 1016	58	ug/kg	U	R	11
KN89	EW-RM07-32	07-2282-KN89FDL	PSDDA SW8082	Aroclor 1242	58	ug/kg	U	R	11
KN89	EW-RM07-32	07-2282-KN89FDL	PSDDA SW8082	Aroclor 1248	58	ug/kg	U	R	11
KN89	EW-RM07-32	07-2282-KN89FDL	PSDDA SW8082	Aroclor 1254	120	ug/kg		R	11
KN89	EW-RM07-32	07-2282-KN89FDL	PSDDA SW8082	Aroclor 1221	58	ug/kg	U	R	11
KN89	EW-RM07-32	07-2282-KN89FDL	PSDDA SW8082	Aroclor 1232	58	ug/kg	U	R	11
KN89	EW-RM07-34	07-2287-KN89K	PSDDA SW8082	Aroclor 1248	280	ug/kg	E	R	20
KN89	EW-RM07-34	07-2287-KN89K	PSDDA SW8082	Aroclor 1254	820	ug/kg	EP	R	20
KN89	EW-RM07-34	07-2287-KN89K	PSDDA SW8082	Aroclor 1260	1900	ug/kg	E	R	20
KN89	EW-RM07-34	07-2287-KN89KDL	PSDDA SW8082	Aroclor 1016	400	ug/kg	U	R	11
KN89	EW-RM07-34	07-2287-KN89KDL	PSDDA SW8082	Aroclor 1242	400	ug/kg	U	R	11
KN89	EW-RM07-34	07-2287-KN89KDL	PSDDA SW8082	Aroclor 1221	400	ug/kg	U	R	11
KN89	EW-RM07-34	07-2287-KN89KDL	PSDDA SW8082	Aroclor 1232	400	ug/kg	U	R	11
KN89	EW-RM07-37	07-2288-KN89L	PSDDA SW8082	Aroclor 1260	160	ug/kg		J	8
KN89	EW-RM07-47	07-2292-KN89P	PSDDA SW8082	Aroclor 1260	290	ug/kg	E	R	20
KN89	EW-RM07-47	07-2292-KN89PDL	PSDDA SW8082	Aroclor 1016	58	ug/kg	U	R	11
KN89	EW-RM07-47	07-2292-KN89PDL	PSDDA SW8082	Aroclor 1242	58	ug/kg	U	R	11
KN89	EW-RM07-47	07-2292-KN89PDL	PSDDA SW8082	Aroclor 1248	58	ug/kg	U	R	11
KN89	EW-RM07-47	07-2292-KN89PDL	PSDDA SW8082	Aroclor 1254	140	ug/kg		R	11
KN89	EW-RM07-47	07-2292-KN89PDL	PSDDA SW8082	Aroclor 1221	58	ug/kg	U	R	11
KN89	EW-RM07-47	07-2292-KN89PDL	PSDDA SW8082	Aroclor 1232	58	ug/kg	U	R	11
KN89	EW-RM07-41	07-2293-KN89Q	PSDDA SW8082	Aroclor 1254	280	ug/kg	E	R	20
KN89	EW-RM07-41	07-2293-KN89Q	PSDDA SW8082	Aroclor 1260	500	ug/kg	E	R	20
KN89	EW-RM07-41	07-2293-KN89QDL	PSDDA SW8082	Aroclor 1016	98	ug/kg	U	R	11
KN89	EW-RM07-41	07-2293-KN89QDL	PSDDA SW8082	Aroclor 1242	98	ug/kg	U	R	11
KN89	EW-RM07-41	07-2293-KN89QDL	PSDDA SW8082	Aroclor 1248	98	ug/kg	U	R	11
KN89	EW-RM07-41	07-2293-KN89QDL	PSDDA SW8082	Aroclor 1221	98	ug/kg	U	R	11
KN89	EW-RM07-41	07-2293-KN89QDL	PSDDA SW8082	Aroclor 1232	98	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8082	Aroclor 1016	78	ug/kg	U	R	11

**Windward
East Waterway Recontamination Monitoring
Qualified Data Summary Table**

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Unit	Lab Qualifier	Validation Qualifier	Reason Code
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8082	Aroclor 1242	78	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8082	Aroclor 1248	78	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8082	Aroclor 1254	78	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8082	Aroclor 1260	78	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8082	Aroclor 1221	78	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8082	Aroclor 1232	78	ug/kg	U	R	11
KN89	EW-RM07-15	07-2298-KN89V	PSDDA SW8082	Aroclor 1260	330	ug/kg	E	R	20
KN89	EW-RM07-15	07-2298-KN89VDL	PSDDA SW8082	Aroclor 1016	59	ug/kg	U	R	11
KN89	EW-RM07-15	07-2298-KN89VDL	PSDDA SW8082	Aroclor 1242	59	ug/kg	U	R	11
KN89	EW-RM07-15	07-2298-KN89VDL	PSDDA SW8082	Aroclor 1248	59	ug/kg	U	R	11
KN89	EW-RM07-15	07-2298-KN89VDL	PSDDA SW8082	Aroclor 1254	130	ug/kg		R	11
KN89	EW-RM07-15	07-2298-KN89VDL	PSDDA SW8082	Aroclor 1221	59	ug/kg	U	R	11
KN89	EW-RM07-15	07-2298-KN89VDL	PSDDA SW8082	Aroclor 1232	59	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	alpha-BHC	3.9	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	beta-BHC	3.9	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	delta-BHC	3.9	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	gamma-BHC (Lindane)	3.9	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	Heptachlor	3.9	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	Aldrin	3.9	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	Heptachlor Epoxide	3.9	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	Endosulfan I	3.9	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	Dieldrin	7.7	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	4,4'-DDE	7.7	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	Endrin	7.7	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	Endosulfan II	7.7	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	4,4'-DDD	7.7	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	Endosulfan Sulfate	7.7	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	4,4'-DDT	7.7	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	Methoxychlor	39	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	Endrin Ketone	7.7	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	Endrin Aldehyde	7.7	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	gamma Chlordane	3.9	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	alpha Chlordane	3.9	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	Toxaphene	390	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	Hexachlorobenzene	3.9	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	Hexachlorobutadiene	3.9	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	2,4'-DDT	7.7	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	2,4'-DDE	7.7	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	2,4'-DDD	7.7	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	oxy Chlordane	7.7	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	cis-Nonachlor	7.7	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	trans-Nonachlor	7.7	ug/kg	U	R	11
KN89	EW-RM07-42	07-2294-KN89R	PSDDA SW8081	Mirex	7.7	ug/kg	U	R	11
KN89	EW-RM07-45	07-2277-KN89A	SW6010B	Antimony	8	mg/kg	U	UJ	8
KN89	EW-RM07-101	07-2278-KN89B	SW6010B	Antimony	9	mg/kg	U	UJ	8
KN89	EW-RM07-29	07-2279-KN89C	SW6010B	Antimony	8	mg/kg	U	UJ	8
KN89	EW-RM07-30	07-2280-KN89D	SW6010B	Antimony	6	mg/kg	U	UJ	8
KN89	EW-RM07-4	07-2281-KN89E	SW6010B	Antimony	7	mg/kg	U	UJ	8

**Windward
East Waterway Recontamination Monitoring
Qualified Data Summary Table**

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Unit	Lab Qualifier	Validation Qualifier	Reason Code
KN89	EW-RM07-32	07-2282-KN89F	SW6010B	Antimony	8	mg/kg	U	UJ	8
KN89	EW-RM07-10	07-2283-KN89G	SW6010B	Antimony	6	mg/kg	U	UJ	8
KN89	EW-RM07-33	07-2284-KN89H	SW6010B	Antimony	7	mg/kg	U	UJ	8
KN89	EW-RM07-46	07-2285-KN89I	SW6010B	Antimony	6	mg/kg	U	UJ	8
KN89	EW-RM07-36	07-2286-KN89J	SW6010B	Antimony	6	mg/kg	U	UJ	8
KN89	EW-RM07-34	07-2287-KN89K	SW6010B	Antimony	8	mg/kg	U	UJ	8
KN89	EW-RM07-37	07-2288-KN89L	SW6010B	Antimony	6	mg/kg	U	UJ	8
KN89	EW-RM07-102	07-2289-KN89M	SW6010B	Antimony	7	mg/kg	U	UJ	8
KN89	EW-RM07-39	07-2290-KN89N	SW6010B	Antimony	7	mg/kg	U	UJ	8
KN89	EW-RM07-40	07-2291-KN89O	SW6010B	Antimony	6	mg/kg	U	UJ	8
KN89	EW-RM07-47	07-2292-KN89P	SW6010B	Antimony	8	mg/kg	U	UJ	8
KN89	EW-RM07-41	07-2293-KN89Q	SW6010B	Antimony	9	mg/kg	U	UJ	8
KN89	EW-RM07-42	07-2294-KN89R	SW6010B	Antimony	6	mg/kg	U	UJ	8
KN89	EW-RM07-43	07-2295-KN89S	SW6010B	Antimony	6	mg/kg	U	UJ	8
KN89	EW-RM07-27	07-2296-KN89T	SW6010B	Antimony	7	mg/kg	U	UJ	8
KN89	EW-RM07-44	07-2297-KN89U	SW6010B	Antimony	7	mg/kg	U	UJ	8
KN89	EW-RM07-15	07-2298-KN89V	SW6010B	Antimony	9	mg/kg	U	UJ	8
KN89	EW-RM07-35	07-2299-KN89W	SW6010B	Antimony	9	mg/kg	U	UJ	8
KN89	EW-RM07-38	07-2300-KN89X	SW6010B	Antimony	9	mg/kg	U	UJ	8
KN89	EW-RM07-37	07-2288-KN89L	Plumb,1981	Total Organic Carbon	0.766	%		J	8



EcoChem, INC.
Environmental Data Quality

APPENDIX C

COMMUNICATION RECORDS

John Mitchell

From: Craig Hutchings
Sent: Thursday, March 29, 2007 11:21 AM
To: John Mitchell
Subject: FW: Me again
Attachments: ECD4_WND16_030807.pdf

John,
Here's the data for that missing ccal for the windward data. There's no summary form but it passes so the quals are all good.

Craig Hutchings
EcoChem, Inc.
360-754-2552
710 Second Ave.
Suite 660
Seattle WA 98104

From: Sue Dunninghoo [mailto:sue@arilabs.com]
Sent: Thu 3/29/2007 11:00 AM
To: Craig Hutchings
Cc: Chris Ransom
Subject: RE: Me again

Argh – can you get by with just the data for now?

We are converting the 5-point forms to 7-point forms, and Pete is right in the middle of rewriting the Macro. Let me know if you want me to figure out the calculations for recoveries/RPDs - S

Susan D. Dunninghoo
206-695-6207

-----Original Message-----

From: Craig Hutchings [mailto:chutchings@ecochem.net]
Sent: Wednesday, March 28, 2007 1:24 PM
To: sue@arilabs.com
Cc: Chris Ransom
Subject: Me again

Sue,
Sorry to keep bothering you, but they keep handing me your data. Now I'm working on the re-analysis of KN89 R for Windward and the package is missing one CCAL. Can you please email me a copy of the WND16 CCAL from ECD4 3/8/07 at 21:21. Everything else looks good.

Thanks

Craig Hutchings
360-754-2552
710 Second Ave
Suite 660

3/29/2007

Analytical Resources Inc.
Dual Column Pesticide Quantitation Report

Data file 1: /chem2/ecd4.i/20070117.b/0308.b/0308-16R.d ARI ID: WND16
 Data file 2: /chem2/ecd4.i/20070117.b/0308.b/0308B-16R.d Client ID:
 Method: /chem2/ecd4.i/20070117.b/PEST0117.m Injection Date: 08-MAR-2007 21:21
 Compound Sublist: WND Report Date: 03/29/2007 10:59
 Instrument, Inj. Vol.: ecd4.i, 1ul Matrix: NONE
 Operator: YZ Dilution Factor: 1.000

RTX-440 Col			CLP2 Col			RTX-440	CLP2	RPD	Compound/Flag
RT	Shift	Response	RT	Shift	Response	on col	on col		
4.853	0.009	5450844	3.643	0.008	5006155	80.0000	80.0000	0.0	1Bromo-2nitrobenzene A B
11.196	-0.017	1802151	6.947	0.001	2266274	34.0112	39.7225	15.5	Oxychlorane A B
11.606	-0.016	1174606	7.325	-0.002	1597467	33.6752	39.1393	15.0	2,4-DDE A B
11.968	-0.013	1726370	7.489	0.001	2638482	36.6944	37.6783	2.6	trans-Nonachlor A B
12.399	-0.013	868697	8.207	-0.008	1479466	35.8685	36.8713	2.8	2,4-DDD A B
12.928	-0.012	1017168	8.857	-0.005	1779166	37.1787	38.5702	3.7	2,4-DDT A B
13.055	-0.012	1438254	8.967	-0.001	2831466	36.4929	37.0867	1.6	cis-Nonachlor A B
15.983	-0.011	1154235	11.723	0.002	1788496	37.3607	37.1302	0.6	Mirex A B
20.326	0.033	1434984	14.135	0.014	1756162	80.0000	80.0000	0.0	Hexabromobiphenyl A B
6.563	0.013	2334531	4.627	0.008	2157973	41.5958	39.0634	6.3	Tetrachloro-m-xylene A B
18.407	0.028	1791878	13.455	0.014	2173925	41.6806	38.7053	7.4	Decachlorobiphenyl A B

- * Indicates RPD > 40%
- A Indicates Peak Area was used for Column 1 quantitation instead of Height
- B Indicates Peak Area was used for Column 2 quantitation instead of Height
- M Indicates Column 1 peak was manually integrated
- N Indicates Column 2 peak was manually integrated

SURROGATE/SPIKE PERCENT RECOVERY

SURR/SPIKE	Col1	Col2	Lower	Limits
Tetrachloro-m-xylene	104.0	97.7	97.7~	150- 0
Decachlorobiphenyl	104.2	96.8	96.8~	150- 0

~ Indicates recovery outside QC Limits

INTERNAL STANDARD SUMMARY

Standard Cpnd	Column 1		%D
	Standard Area*	Sample Area	
Bromo-Nitrobenzene	6222983	5450844	-12.4
Hexabromobiphenyl	1893442	1434984	-24.2

Standard Cpnd	Column 2		%D
	Standard Area*	Sample Area	
Bromo-Nitrobenzene	6048767	5006155	-17.2
Hexabromobiphenyl	2169909	1756162	-19.1

* Standard Areas taken from Initial Cal Level 3
Initial Calibration Date: 17-JAN-2007
<- Indicates standard response outside Limits (-50 to +100%)

Aroclor	RTX-440 Col				CLP2 Col			
	Peak#	RT	Shift	Height Amount	Peak#	RT	Shift	Height Amount
=====								

LOS
3.29.2007

