

Appendix C

Data Validation Report



EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT

Washington Department of Ecology Toxics Cleanup Program
South Park Marina – Site Reconnaissance Investigation

Prepared for:

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Approved for Release


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INTRODUCTION

Basis for the Data Validation

This report summarizes the results of the summary (Level III) data validation performed on sediment, water, and quality control (QC) sample data for the Washington Department of Ecology – Site Reconnaissance Investigation at South Park Marina, Seattle, Washington. A complete list of samples is provided in the **Sample Index**. Columbia Analytical Services, Kelso, Washington performed all analyses. The analytical methods and EcoChem project chemists are listed below.

Analysis	Method of Analysis	Primary Review	Secondary Review
Volatile Organic Compounds	SW8260B	Mark Brindle	John Mitchell
Semivolatile Organic Compounds	SW8270C	Jennifer Newkirk Mark Brindle	John Mitchell
Chlorinated Pesticides	SW8081A	Melissa Swanson Craig Hutchings	John Mitchell
PCB Aroclors	SW8082	Melissa Swanson Craig Hutchings	John Mitchell
Diesel and Residual Range Hydrocarbons	NWTPH-Dx	Mark Lybeer	Mark Brindle
Gasoline Range Hydrocarbons	NWTPH-Gx	Mark Lybeer	Mark Brindle
Hydrocarbon Identification	NWTPH-HCID	Mark Lybeer	Mark Brindle
Metals	SW6020, SW7471A, SW7470A	Patricia Lambrecht Jennifer Newkirk	Christine Ransom
Total Solids	EPA 160.3	Patricia Lambrecht Jennifer Newkirk	Christine Ransom

The data validation is based on QC criteria documented in the above listed methods, the *Sampling and Analysis Plan (SAP) – South Park Marina, Seattle, Washington Site Reconnaissance Investigation, (2007)*; and *USEPA National Functional Guidelines for Organic (1999) and Inorganic (2004) Data Review*. The QC criteria are summarized in **Appendix A**.

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

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

Sample Index
SAIC - South Park Marina
SDG: K0708852

Sample ID	SW8270C	SW8082	SW8081A	HCID	NWTPH-Dx	NWTPH-Gx	SW6020	SW7471A	EPA160.3M
SB-1-9	X	X	X	X			X	X	X
SB-3-7	X	X	X	X			X	X	X
SB-3-13.5	X	X	X	X			X	X	X
SB-4-8	X	X	X	X			X	X	X
SB-5-8	X	X	X	X	X		X	X	X
SB-8-9	X	X	X	X			X	X	X
SB-9-10	X	X	X	X			X	X	X

Sample Index
SAIC - South Park Marina
SDG: K0708895

Sample ID	SW8260B	SW8270C	SW8082	SW8081A	HCID	NWTPH-Dx	NWTPH-Gx	SW6020	SW7471A	EPA160.3M
SB-2-9		X	X	X	X			X	X	X
SB-6-8		X	X	X	X	X	X	X	X	X
SB-7-9		X	X	X	X			X	X	X
SB-10-14		X	X	X	X			X	X	X
SB-11-2.5	X	X	X	X	X	X		X	X	X
SB-12-1.5	X	X	X	X	X	X		X	X	X

Sample Index
SAIC - South Park Marina
SDG: K0709002

Sample ID	SW8260B	SW8270C	SW8082	SW8081A	HCID	NWTPH-Dx	NWTPH-Gx	SW6020	SW7471A	EPA160.3M
ER-1			X	X						
SB-2-1		X	X	X	X			X	X	X
SB-13-1		X	X	X	X			X	X	X
SB-13-3.5		X	X	X	X			X	X	X
SB-13-7		X	X	X	X	X	X	X	X	X
SB-14-3		X	X	X	X	X		X	X	X
SB-14-7.5	X	X	X	X	X	X	X	X	X	X
SB-15-3.5	X	X	X	X	X	X	X	X	X	X
SB-16-3.5	X	X	X	X	X	X		X	X	X

Sample Index
SAIC - South Park Marina
SDG: K0709371

Sample ID	SW8260B	SW8270C	SW8082	SW8081A	HCID	NWTPH-Dx	NWTPH-Gx	SW6020	SW7471A	EPA160.3M
ER-2			X							
MW-1-100907	X	X	X	X	X			X	X	
MW-2-100907	X	X	X	X	X			X	X	
MW-3-100807	X	X	X	X	X			X	X	
MW-3-FD-100807	X	X	X	X	X			X	X	
Trans-A-Bot		X	X	X	X	X		X	X	X
Trans-A-Top		X	X	X	X	X		X	X	X
Trans-B-Bot		X	X	X	X			X	X	X
Trans-B-Top		X	X	X	X	X	X	X	X	X
TB-1	X	X	X	X	X			X	X	

DATA VALIDATION REPORT

South Park Marina

Volatile Organic Compounds - EPA Method 8260B

This report documents the review of analytical data from the analyses of sediment and water samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Columbia Analytical Services, Inc., Kelso, Washington. Summary (Level III) validation was performed for all data.

SDG	Number of Samples
K0708895	2 Soil
K0709002	3 Soil
K0709371	5 Water

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 complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. Laboratory QC results were also verified (10%).

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

- | | | | |
|---|------------------------------------|---|---|
| 1 | Holding Times & Sample Receipt | 2 | Matrix Spikes/Matrix Spike Duplicates (MS/MSD) |
| | GC/MS Instrument Performance Check | 1 | Laboratory Control Sample/Laboratory Control Sample Duplicates (LCS/LCSD) |
| 1 | Initial Calibration (ICAL) | 1 | Internal Standards |
| 2 | Continuing Calibration (CCAL) | | Field Duplicates |
| 2 | Laboratory Blanks | | Target Analyte List |
| | Field Blanks | 1 | Reporting Limits (MDL and MRL) |
| 2 | Surrogate Compounds | | Reported Results |

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

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

Holding Times and Sample Preservation

The validation guidance documents state that the cooler temperatures should be within an advisory temperature range of 2° to 6°C. Temperature outliers did not impact data quality and no qualifiers were required.

SDG K0708895: The cooler was received at the laboratory at a temperature below these limits, at -0.3 °C.

SDG K0709371: Two of three coolers were received at the laboratory at temperatures below these limits, at 0.5°C and 0.3°C.

Initial Calibration

All relative response factor (RRF) values were greater than the 0.05 minimum control limit with the exceptions noted below. No qualifiers were required when the continuing calibration demonstrated that the compound responses were stable. If the continuing calibration percent difference (%D) for these compounds exceeds the control limits, the sample results and reporting limits were qualified (J/R-5A). All percent relative standard deviation (%RSD) values or correlation coefficients were within control limits.

SDG K0708895: The RRF values for acetone and 2-butanone from the ICAL analyzed on 9/20/07 (Instrument MS05) were less than the minimum control limit of 0.05. The RRF values for acetone, 2-butanone, and 2-hexanone from the ICAL analyzed on 7/17/07 (Instrument MS13) were less than the minimum control limit of 0.05.

SDG K0709002: The RRF values for acetone and 2-butanone from the ICAL analyzed on 9/20/07 (Instrument MS05) were less than the minimum control limit of 0.05. The RRF values for acetone, 2-butanone, and 2-hexanone from the ICAL analyzed on 7/17/07 (Instrument MS13) were less than the minimum control limit of 0.05.

SDG K0709371: The RRF values for acetone, 2-butanone, 2-hexanone, and 4-methyl-2-pentanone from the ICAL analyzed on 9/26/07 (Instrument MS18) were less than the minimum control limit of 0.05. The RRF values for acetone, 2-butanone, and 2-hexanone from the ICAL analyzed on 7/17/07 (Instrument MS13) were less than the minimum control limit of 0.05.

Continuing Calibration

All RRF values were greater than the 0.05 minimum control limit for the continuing calibrations (CCALs) with the exceptions noted below. When responses were stable, no qualifiers were applied on this basis. If CCAL responses for these analytes were unstable, associated sample results were rejected (R-5B) due to potential low sensitivity.

All CCAL %D values were within the $\pm 25\%$ control limit, with the exceptions noted below.

SDG K0708895: The RRF values were less than the minimum control limit of 0.05 for acetone, 2-butanone, 2-hexanone, 4-methyl-2-pentanone, and 1,2-dibromo-3-chloropropane in the CCAL analyzed 10/2/07 (Instrument MS13).

The RRF values were less than the minimum control limit of 0.05 for acetone and 2-butanone in the CCAL analyzed 10/4/07 (Instrument MS05).

SDG K0709002: The RRF values were less than the minimum control limit of 0.05 for acetone and 2-butanone in the CCAL analyzed 10/4/07 (Instrument MS05).

The RRF value was less than the minimum control limit of 0.05 for 2-butanone in the CCAL analyzed 10/5/07 (Instrument MS05).

The RRF value were less than the minimum control limit of 0.05 for acetone, 2-butanone, 2-hexanone, 4-methyl-2-pentanone, and 1,2-dibromo-3-chloropropane in the CCAL analyzed 10/12/07 (Instrument MS13).

The %D values exceeded the $\pm 25\%$ control limit for bromomethane, acetone, 2,2-dichloropropane, 2-hexanone, 4-methyl-2-pentanone, and 1,2-dibromo-3-chloropropane due to low response in the same CCAL. Results and reporting limits were qualified as estimated (J/UJ-5B) in the associated Sample SB-16-3.5, except the reporting limit for 2-hexanone (%D and RRF outliers) which was rejected.

SDG K0709371: The RRF values were less than the minimum control limit of 0.05 for acetone, 2-butanone, 2-hexanone, 4-methyl-2-pentanone, and 1,2-dibromo-2-chloropropane in the CCAL analyzed 10/21/07 (Instrument MS13).

The RRF values were less than the minimum control limit of 0.05 for acetone, 2-butanone, 2-hexanone, and 4-methyl-2-pentanone in the CCAL analyzed 10/22/07 (Instrument MS18). The %D value exceeded the $\pm 25\%$ control limit for bromomethane due to low response in the same CCAL. The reporting limit for bromomethane in trip blank TB-1 was qualified as estimated (UJ-5B).

The RRF values were less than the minimum control limit of 0.05 for acetone, 2-butanone, 2-hexanone, 4-methyl-2-pentanone, and 1,2-dibromo-2-chloropropane in the CCAL analyzed 10/23/07 (Instrument MS18). The %D value exceeded the $\pm 25\%$ control limit for bromomethane due to low response in the same CCAL. The reporting limits for bromomethane in Samples MW-1-100907 and MW-2-100907 were qualified as estimated (UJ-5B).

Laboratory Blanks

To assess the impact of each blank contaminant on the reported sample results, an action level is established at five times the concentration reported in the blank. If a contaminant is reported in an associated field sample and the concentration is less than the action level, the result is qualified as not detected (U-7). 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.

Method blanks were analyzed at the appropriate frequency. A summary of contaminant levels, associated samples, and action levels is provided in the data validation worksheets. Various target analytes were detected in the method blanks. However, only the following analytes were qualified as not detected in one or more samples in the associated laboratory data sets.

SDG K0708895: Methylene chloride (1 result) and acetone (1 result)

SDG K0709002: Methylene chloride (2 results) and acetone (2 results)

Field Blanks

SDG K0709371: A positive result for dibromochloromethane was reported in trip blank TB-1. No positive results for this analyte were reported in the field samples and no qualifiers were required.

Surrogate Compounds

SDG K0708895: The percent recovery (%R) values for dibromofluoromethane were greater than the upper control limit of 115%, at 126% and 122% in Samples SB-12-1.5MS and SB-12-1.5MSD. No action was taken as qualifiers are not assigned to QC samples.

SDG K0709002: The %R value for 4-bromofluorobenzene was greater than the upper control limit of 129%, at 176% in Sample SB-15-3.5. The outlier was indicative of a potential high bias and all positive results were qualified as estimated (J-13).

Matrix Spike/Matrix Spike Duplicates

SDG K0708895: Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed using Samples SB-11-2.5 and SB-12-1.5. For SB-11-2.5MS/MSD the %R value for 1,1-dichloroethene was greater than the upper control limit of 122%, at 126% in the MS sample. The %R value for 1,1-dichloroethene was within control limits in the MSD and no qualifiers were required.

SDG K0709002: MS/MSD analyses were performed using Samples SB-14-7.5 and SB-16-3.5. For SB-14-7.5MS/MSD, all relative percent difference (RPD) values exceeded the control limit of 40%. Toluene was the only spiking compound detected in the parent sample. The toluene result was qualified as estimated for precision (J-9) in Sample SB-14-7.5.

Laboratory Control Samples

SDG K0709371: The %R value for bromochloromethane was greater than the upper control limit of 119%, at 122% in the LCS analyzed 10/21/07. Bromochloromethane was not detected in the associated samples. As the outlier was indicative of a potential high bias; no qualifiers were required.

Internal Standards

SDG K0708895: The areas for internal standards chlorobenzene-d5 and 1,4-dichlorobenzene-d4 were less than the lower control limit in Sample SB-12-1.5MS. The internal standard area for 1,4-dichlorobenzene-d4 was less than the lower control limit in Sample SB-12-1.5MSD. No qualifiers are applied to QC samples and no action was required.

Field Duplicates

The measurement quality objective (MQO) for field duplicate RPD is 35% for water samples where concentrations are greater than five times (5x) the reporting limit (RL). For concentrations less than 5x the RL, the difference between the sample result and the replicate result must be less than the RL.

SDG K0709371: One set of field duplicates, MW-3-100807 & MW-3-FD-100807, were included. The differences between results were within control limits. Field precision was acceptable.

Reporting Limits

SDG K0709002: Sample SB-16-3.5 was analyzed as a medium level soil based on the preanalysis screening results. The reporting limits for this sample were raised accordingly.

IV. OVERALL ASSESSMENT

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

Data were qualified as not detected based on contamination in the associated laboratory blanks. Data were qualified as estimated due to surrogate %R, MS/MSD RPD, and CCAL %D outliers.

Data were rejected because of very low CCAL response combined with a calibration %D outlier. Data that has been rejected should not be used for any purpose.

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

DATA VALIDATION REPORT

South Park Marina

Semivolatile Organic Compounds – EPA Method 8270C

This report documents the review of analytical data from the analyses of soil samples and the associated laboratory and field quality control (QC) samples. Columbia Analytical Services, Inc., Kelso, Washington, analyzed the samples. Summary (Level III) validation was performed for all data.

SDG	Number of Samples
K0708852	7 Soil
K0708895	6 Soil
K0709002	8 Soil
K0709371	4 Water & 4 Soil

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 complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. Laboratory QC results were also verified (10%).

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

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

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

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

Holding Times and Sample Receipt

SDG K0708895: The laboratory received the sample cooler at a temperature outside the advisory control limits of 2° to 6°C, at -0.3°. This temperature outlier did not impact the data and no qualifiers were required.

SDG K0709371: The laboratory received two of three sample coolers at temperatures outside the advisory control limits of 2° to 6°C, at 0.5° and 0.3°. These temperature outliers did not impact the data and no qualifiers were required.

Laboratory Blanks

To assess the impact of each blank contaminant on the reported sample results, an action level is established at five times the concentration reported in the blank. If a contaminant is reported in an associated field sample and the concentration is less than the action level, the result is qualified as not detected (U-7). 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 blanks were analyzed at the appropriate frequency. Various target analytes were detected in the method blanks. However, only the following analytes were qualified as not detected in one or more samples in the associated laboratory data sets.

SDG K0708852: Phenol (7 results), diethyl phthalate (4 results), di-n-butyl phthalate (5 results), bis(2-ethylhexyl) phthalate (5 results)

SDG K0708895: Phenol (5 results), diethyl phthalate (4 results), di-n-butyl phthalate (6 results), bis(2-ethylhexyl) phthalate (5 results)

SDG K0709002: Phenol (3 results) and diethyl phthalate (2 results)

SDG K0709371: Water: diethyl phthalate (4 results) and di-n-butyl phthalate (4 results)

Soil: phenol, acenaphthylene, diethyl phthalate, phenanthrene, anthracene, pyrene (3 results each); naphthalene, 2-methylnaphthalene, di-n-butyl phthalate, fluoranthene, benzo(a)anthracene, chrysene, bis(2-ethylhexyl)phthalate, benzo(a)pyrene (2 results each); acenaphthene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene (1 result each)

Surrogate Compounds

SDG K0709002: The percent recovery (%R) values for one or more surrogate compounds were not reported due to required dilutions of several sample extracts. No data qualifiers were required.

Matrix Spike/Matrix Spike Duplicate

SDG K0709371: Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed using Sample Trans-A-Top. The %R value for phenol was greater than the upper control limit of 95%, at 99%, in the MSD and the %R value for pentachlorophenol was greater than the upper control limit of 110%, at 112%, in the MS. The %R values for phenol in the MS and pentachlorophenol in the MSD were within control limits. No qualifiers were required.

Laboratory Control Sample/Laboratory Control Sample Duplicate

SDGs K0708852, K0708895: The %R values for 2,4-dimethylphenol were less than the lower control limit of 10%, at 5% and 6% in the laboratory control sample/laboratory control sample duplicate (LCS/LCSD) set prepared and analyzed with these samples. 2,4-dimethylphenol was not detected in the associated samples and the reporting limits were rejected (R-10) to indicate potential low bias.

SDG K0709002: The %R values for 2,4-dimethylphenol were less than the lower control limit of 10%, at 6% and 9% in the LCS/LCSD set prepared and analyzed with the samples. The relative percent difference (RPD) value for 2,4-dimethylphenol was greater than the control limit of 40%, at 42%. 2,4-dimethylphenol was not detected in the associated samples. The 2,4-dimethylphenol reporting limits were rejected (R-10) in all samples.

SDG K0709371: The %R values for fluoranthene were less than the lower control limit of 44%, at 41% and 42% in the water LCS/LCSD set. Fluoranthene was not detected in the associated water samples and the reporting limits were qualified as estimated (UJ-10). The RPD value for 2,4-dimethylphenol was greater than the control limit of 40%, at 95% in the soil LCS/LCSD set. 2,4-Dimethylphenol was not detected in the associated samples, so no qualifiers were required.

Field Duplicates

The measurement quality objective (MQO) for field duplicate RPD is 35% for water samples, where concentrations are greater than five times (5x) the reporting limit (RL). For concentrations less than 5x the RL, the difference between the sample result and the replicate result must be less than the RL.

SDG K0709371: One set of field duplicates, MW-3-100807 & MW-3-FD-100807, were included. The differences between results were within control limits. Field precision was acceptable.

Reporting Limits (Method Detection Limits and Method Reporting Limit)

SDG K0708895: Samples SB-11-2.5 and SB12-1.5 were analyzed at dilution (10x) and RLs were elevated accordingly.

SDG K0709002: Samples SB-13-7, SB-14-3, SB-14-7.5, SB-15-3.5, and SB-16-3.5 were analyzed at dilutions ranging from 20x to 100x. The RLs were elevated accordingly for these samples, although no target analytes were detected in Samples SB-13-7 or SB-14-3.

SDG K0709371: Samples Trans-A-Top (20x) and Trans-B-Top (5x) were analyzed at dilutions. The RLs were elevated accordingly.

IV. OVERALL ASSESSMENT

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

Data were qualified as not detected based on contamination in the associated laboratory blanks.
Data were qualified as estimated based on LCS/LCSD %R outliers.

Data were rejected due to very low %R values in the LCS/LCSD. Data that have been rejected are not useable for any purpose.

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

DATA VALIDATION REPORT
South Park Marina
Chlorinated Pesticides by EPA Method 8081A

This report documents the review of analytical data from the analyses of soil samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Columbia Analytical Services, Inc., Kelso, Washington. Summary (Level III) validation was performed for all data.

SDG	No. Samples
K0708852	7 Soil
K0708895	6 Soil
K0709002	8 Soil & 1 Rinse Blank
K0709371	4 Soil & 4 Water

I. DATA PACKAGE COMPLETENESS

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

II. EDD TO HARDCOPY VERIFICATION

A complete (100%) verification of the electronic data deliverables (EDD) results was performed by comparison to the hardcopy laboratory data package. Laboratory QC results were also verified (10%). No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

- | | | |
|---|----------------------------------|--|
| 1 | Holding Times and Sample Receipt | Matrix Spikes/Matrix Spike Duplicates (MS/MSD) |
| | Initial Calibration (ICAL) | 1 Laboratory Control Samples (LCS) |
| | Continuing Calibration (CCAL) | 2 Certified Reference Material (CRM) |
| | Analyte Breakdown | 2 Field Duplicates |
| 2 | Laboratory Blanks | Target Analyte List |
| 1 | Field Blanks | 1 Reporting Limits (MDL and MRL) |
| 1 | Surrogate Compounds | 2 Compound Identification |

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

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

Holding Times and Sample Receipt

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

Laboratory 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. 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-7). 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.

Method blanks were analyzed at the appropriate frequency. A summary of contaminant levels, associated samples, and action levels is provided in the data validation worksheets. Various target analytes were detected in the method blanks. However, only the following analytes were qualified as not detected in one or more samples in the associated laboratory data sets:

SDG K0709002 (aqueous): 4,4'-DDT (1 result)

SDG K0709371 (aqueous): 4,4'-DDT (1 result)

Field Blanks

Method blanks are used to evaluate all associated samples, including field blanks. Any remaining positive results in the field blanks are used to evaluate all samples. If a contaminant is reported in any field sample and the concentration is less than the action level, the result is qualified as not detected (U-6).

SDG K0709002: One rinsate blank, ER-1, was reported. Results for gamma-BHC and aldrin were detected in this sample. Positive results for these analytes were greater than the action levels, so no qualifiers were applied.

Surrogate Compounds

SDG K0708895: The percent recovery (%R) values for tetrachloro-m-xylene and decachlorobiphenyl were greater than the upper control limits in Sample SB-11-2.5. This sample was analyzed at a dilution factor of 100X, no qualifiers were applied.

SDG K0709002: The %R values for tetrachloro-m-xylene and decachlorobiphenyl exceeded the upper control limits in Sample SB-16-3.5; the %R values for tetrachloro-m-xylene also exceeded the upper control limit in Samples SB-13-7, SB-14-3, and SB-15-3.5. These samples were analyzed at dilution factors of 10 - 500X, no qualifiers were applied.

Laboratory Control Samples

SDG K0709371 (aqueous): The %R value for chlordane in the laboratory control sample duplicate (LCSD) was less than the lower control limit. In addition, the relative percent difference (RPD) value for chlordane was greater than the control limit. No positive values for chlordane were detected in the samples and as the %R value in the laboratory control sample (LCS) was acceptable no qualifiers were assigned.

Certified Reference Material

SDG K0709002: The laboratory analyzed SRM 1944 – New York/New Jersey Waterway Sediment from NIST. This reference material has certified values for DDT isomers and metabolites. The reported concentration for 4,4'-DDT exceeded the upper control limit for the acceptance window [$\pm 20\%$ of the 95% confidence interval]. All positive results for 4,4'-DDT were estimated (J-12).

SDG K0709371 (soil): The laboratory analyzed SRM 1944 – New York/New Jersey Waterway Sediment from NIST. This reference material has certified values for DDT isomers and metabolites. The reported concentration for 4,4'-DDT exceeded the upper control limit for the acceptance window [$\pm 20\%$ of the 95% confidence interval]. All positive results for 4,4'-DDT were estimated (J-12).

Field Duplicates

SDG K0709371 (aqueous): Samples MW-3-100807 and MW-3-FD-100807 were submitted as field duplicates. The difference between results for dieldrin exceeded the reporting limit. The results for dieldrin were estimated (J-9) in these samples.

Reporting Limits (Method Detection Limit and Method Reporting Limit)

SDG K0708895: Sample SB-11-2.5 (100x) and Sample SB-12-1.5 (20x) were analyzed at dilutions; reporting limits were elevated accordingly.

SDG K0709002: Samples SB-13-7, SB-15-3.5, and SB-16-3.5 (100x) and Samples SB-14-3 and SB-14-7.5 (10-500x) were analyzed at dilutions; reporting limits were elevated accordingly.

SDG K0709371 (soil): Sample Trans-A-Top was analyzed at dilution; reporting limits were elevated accordingly.

Compound Identification

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

SDG K0708852: In Sample SB-3-7, the result for 4,4'-DDD was qualified as estimated (J-3), and the result for 4,4'-DDE was qualified as tentatively identified (NJ-3).

SDG K0708895: In Sample SB-2-9, the result for dieldrin was qualified as estimated (J-3), and the results for 2,4'-DDD and 2,4'-DDT were qualified as tentatively identified (NJ-3). In Sample SB-11-2.5, the result for 2,4'-DDT was qualified as estimated (J-3).

SDG K0709002: In Sample ER-1, the result for aldrin was qualified as estimated (J-3). In Samples SB-14-3 and SB-14-7.5, the results for 4,4'-DDE were qualified as estimated (J-3). In Sample

SB-13-1, the result for 2,4'-DDT was qualified as tentatively identified (NJ-3). In Sample SB-16-3.5, the result for 2,4'-DDT was qualified as estimated (J-3).

SDG K0709371 (soil): In Sample Trans-A-Bot the result for 4,4'-DDE was qualified as tentatively identified (NJ-3) and the result for 2,4'-DDD was qualified as estimated (J-3). In Samples Trans-A-Top and Trans-B-Top the results for 2,4'-DDT were qualified as tentatively identified (NJ-3).

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, LCS/LCSD, 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, LCS/LCSD, and field duplicate analyses, with the exceptions noted above.

Data were qualified as estimated or tentatively identified because the confirmation criteria were not met. Data were also qualified as estimated because of certified reference material recovery outliers and a field duplicate precision outlier. Data were qualified as not detected due to contamination in the associated laboratory blanks.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT

South Park Marina

PCB Aroclors by Method SW8082

This report documents the review of analytical data from the analyses of soil samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Columbia Analytical Services, Inc., Kelso, Washington. Summary (Level III) validation was performed for all data.

SDG	No. Samples
K0708852	7 Soil
K0708895	6 Soil
K0709002	8 Soil & 1 Rinse Blank
K0709371	4 Soil, 4 Water, & 1 Rinse Blank

I. DATA PACKAGE COMPLETENESS

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

II. EDD TO HARDCOPY VERIFICATION

A complete (100%) verification of the electronic data deliverables (EDD) results was performed by comparison to the hardcopy laboratory data package. Laboratory QC results were also verified (10%). No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Receipt	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
	Initial Calibration (ICAL)	Laboratory Control Samples (LCS/LCSD)
	Continuing Calibration (CCAL)	1 Field Duplicates
	Laboratory Blanks	Target Analyte List
1	Field Blanks	1 Reporting Limits (MDL and MRL)
1	Surrogate Compounds	2 Compound Identification
	Certified Reference Material (CRM)	

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

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

Holding Times and Sample Receipt

Some coolers were received at temperatures less than the recommended range of 4°C ±2°. These temperature outliers did not impact data quality and no qualifiers were required.

Field Blanks

Method blanks are used to evaluate all associated samples, including field blanks. Any remaining positive results in the field blanks are used to evaluate all samples. If a contaminant is reported in any field sample and the concentration is less than the action level, the result is qualified as not detected (U-6).

SDG K0709002: One rinsate blank, ER-1, was reported. A positive result for Aroclor1254 was detected in this sample. Positive results for Aroclor1254 were greater than the action level in the associated samples, so no qualifiers were applied.

SDG K0709371: One rinsate blank, ER-2, was reported. No target analytes were detected in this blank.

Surrogate Compounds

SDG K0708895: The percent recovery (%R) value for decachlorobiphenyl exceeded the upper control limit in Sample SB-11-2.5. This sample was analyzed at a dilution factor of 100x, no qualifiers were applied.

SDG K0709002: The %R values for decachlorobiphenyl exceeded the upper control limits in Samples SB-13-7, SB-15-3.5, and SB-16-3.5. These samples were analyzed at a dilution factor of 100x, no qualifiers were applied.

Field Duplicates

SDG K0709371: Samples MW-3-100807 and MW-3-FD-100807 were submitted as field duplicates. No positive results were reported in either sample; field precision was acceptable.

Reporting Limits (Method Detection Limit and Method Reporting Limit)

SDG K0708895: Sample SB-11-2.5 (100x) and Sample SB-12-1.5 (10x) were analyzed at dilutions. Reporting limits were elevated accordingly.

SDG K0709002: Samples SB-13-7, SB-15-3.5, and SB-16-3.5 (100x) and Samples SB-14-3 and SB-14-7.5 (10x) were analyzed at dilutions. Reporting limits were elevated accordingly.

Compound Identification

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

SDG K0708895: In Sample SB-7-9, the result for Aroclor 1254 was qualified as estimated (J-3).

IV. OVERALL ASSESSMENT

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

Data were qualified as estimated or tentatively identified because the confirmation criteria were not met.

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

DATA VALIDATION REPORT

South Park Marina

Hydrocarbon Identification by NWTPH-HCID

This report documents the review of analytical data from the analyses of soil samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Columbia Analytical Services, Inc., Kelso, Washington. Summary (Level III) validation was performed for all data.

SDG	Number of Samples
K0708852	7 Soil
K0708895	6 Soil
K0709002	8 Soil
K0709371	8 Soil

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.

All samples were initially analyzed by this method. Only samples with positively identified petroleum hydrocarbons were subsequently analyzed by method NWTPH-Gx and/or NWTPH-Dx to provide a quantitative measurement of the specific hydrocarbon range.

II. EDD TO HARDCOPY VERIFICATION

A complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy data package. Laboratory QC results were also verified (10%).

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Receipt	Laboratory Control Samples (LCS)
	Initial Calibration (ICAL)	1 Laboratory Duplicates
	Continuing Calibration (CCAL)	1 Field Replicates
	Laboratory Blanks	Target Analyte List
1	Surrogate Compounds	Reporting Limits (MDL and MRL)

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

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

Holding Times and Sample Receipt

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

Surrogate Compounds

SDG K0708895: The percent recovery (%R) values for o-terphenyl and n-triacontane exceeded the control limits in Sample SB-11-2.5, due to dilution (100x). No qualifiers were required.

SDG K0709002: The %R values for n-triacontane were outside of the control limits in Samples SB-14-3 and SB-16-3.5, due to dilutions (10x). No qualifiers were required.

Laboratory Duplicates

No laboratory duplicates were analyzed for HCID analysis.

Field Replicates

SDG K0709371: One set of field duplicates, Samples MW-3-100807 & MW-3-FD-100807, were submitted. There were no positive results detected in either sample. Field precision was acceptable.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate %R values. No laboratory replicates were analyzed, therefore precision could not be assessed.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
South Park Marina
Diesel and Residual Range Hydrocarbons by Method NWTPH-Dx

This report documents the review of analytical data from the analyses of soil samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Columbia Analytical Services, Inc., Kelso, Washington. Summary (Level III) validation was performed for all data.

SDG	Number of Samples
K0708852	1 Soil
K0708895	3 Soil
K0709002	6 Soil
K0709371	3 Soil

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 complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy data package. Laboratory QC results were also verified (10%).

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Receipt	Laboratory Duplicates
Initial Calibration (ICAL)	1 Field Replicates
1 Continuing Calibration (CCAL)	Target Analyte List
2 Laboratory Blanks	Reporting Limits (MDL and MRL)
1 Surrogate Compounds	2 Compound Identification
Laboratory Control Samples (LCS)	

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 (CCAL)

SDG K0709002: The percent difference (%D) value for residual range hydrocarbons (RRO) exceeded the control limit of $\pm 15\%$ in the CCAL analyzed on 10/11/07 at 08:57. The associated samples were reanalyzed for RRO and no qualifiers were required.

Laboratory Blanks

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

SDG K0708852: Positive results for diesel and residual range organics were reported in the laboratory blank extracted on 10/8/07. The diesel and residual range organics results in the associated sample were above the action levels. No qualifiers were required.

SDG K0709002: Positive results for diesel range organics (DRO) and RRO were reported in the laboratory blank extracted on 10/10/07. Results for these compounds were qualified as not detected (U-7) in Sample SB-13-1.

SDG K0709371: A positive result for DRO was reported in the laboratory blank extracted on 10/18/07. The DRO results in the associated samples were above the action levels. No qualifiers were required.

Surrogate Compounds

SDG K0708895: The percent recovery (%R) values for o-terphenyl and n-triacontane exceeded the control limits in Sample SB-11-2.5, due to dilution (100x). No qualifiers were required.

SDG K0709002: The %R values for n-triacontane exceeded the control limit in Samples SB-14-3 and SB-16-3.5, due to dilutions (10x). No qualifiers were required.

Field Replicates

SDG K0709371: One set of field duplicates, Samples MW-3-100807 & MW-3-FD-100807 were submitted for screening. No hydrocarbons were detected so further analyses were not required.

Compound Identification

SDG K0708852: The chromatographic pattern for Sample SB-5-8 did not match that of the RRO standard used for calibration. This result was flagged by the laboratory and qualified as estimated (J-2).

SDG K0708895: The chromatographic patterns for Samples SB-11-2.5 and SB-12-1.5 did not match those of the DRO or RRO standards used for calibration. These results were flagged by the laboratory and qualified as estimated (J-2).

SDG K0709002: The chromatographic patterns for five samples did not match those of the DRO or RRO standards used for calibration. These results were flagged by the laboratory and qualified as estimated (J-2).

SDG K0709371: The chromatographic patterns for Samples Trans-A-Bot, Trans-A-Top and Trans-B-Top did not match those of the DRO and/or RRO standards used for calibration. These results were flagged by the laboratory and qualified as estimated (J-2).

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and laboratory control sample %R values. Precision was also acceptable as demonstrated by the laboratory duplicate relative percent difference values.

Data were qualified as estimated due to chromatographic pattern mismatches. Data were also qualified as not detected because of laboratory blank contamination.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
South Park Marina
Gasoline Range Hydrocarbons by Method NWTPH-Gx

This report documents the review of analytical data from the analyses of soil samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Columbia Analytical Services, Inc., Kelso, Washington. Summary (Level III) validation was performed for all data.

SDG	Number of Samples
K0709002	3 Soil
K0709371	1 Soil

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 complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy data package. Laboratory QC results were also verified (10%).

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

- | | | |
|---|----------------------------------|--------------------------------|
| 1 | Holding Times and Sample Receipt | Laboratory Duplicates |
| | Initial Calibration (ICAL) | 1 Field Replicates |
| | Continuing Calibration (CCAL) | Target Analyte List |
| 2 | Laboratory Blanks | Reporting Limits (MDL and MRL) |
| | Surrogate Compounds | 2 Compound Identification |
| | Laboratory Control Samples (LCS) | |

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

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

Holding Times and Sample Receipt

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

Laboratory Blanks

In order to assess the impact of laboratory blank contamination on the reported sample results, action levels at five times the blank concentrations are established. If the concentrations in the associated

field samples are less than the action levels, the results are qualified as not detected (U). If the result is also less than the reporting limit, the result is elevated to the reporting limit.

SDG K0709002: A positive result for gasoline range organics (GRO) was reported in the laboratory blank extracted on 10/15/07. The result for this analyte was qualified as not detected (U-7) in Sample SB-13-7.

SDG K0709371: A positive result for GRO was reported in the laboratory blank extracted on 10/22/07. The result for this analyte was qualified as not detected (U-7) in Sample Trans-B-Top.

Field Replicates

SDG K0709371: One set of field duplicates, Samples MW-3-100807 & MW-3-FD-100807 were submitted for screening. No hydrocarbons were detected so further analyses were not required.

Compound Identification

SDG K0709002: The chromatographic patterns for Samples SB-14-7.5 and SB-15-3.5 did not match that of the GRO standard used for calibration. These results were flagged by the laboratory and qualified as estimated (J-2).

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and laboratory control sample percent recovery values. Precision was also acceptable as demonstrated by the laboratory duplicate relative percent difference values.

Data were qualified as estimated due to chromatographic pattern mismatches. Data were also qualified as not detected because of laboratory blank contamination.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
South Park Marina
Metals by Methods SW6020, SW7471A, SW7470A
Total Solids by Method 160.3

This report documents the review of analytical data from the analyses of soil and water samples and the associated laboratory and field quality control (QC) samples. Columbia Analytical Services, Inc., Kelso, Washington, analyzed the samples.

SDG	No. Samples	Validation Level
K0708852	7 Soil	Summary
K0708895	6 Soil	Summary
K0709002	8 Soil	Summary
K0709371	4 Soil and 4 Water	Summary

I. DATA PACKAGE COMPLETENESS

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

II. EDD TO HARDCOPY VERIFICATION

A complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy data package. Laboratory QC results were also verified (10%).

III. TECHNICAL DATA VALIDATION

The QC requirements for review are listed below.

- | | |
|---|---|
| <ul style="list-style-type: none"> 1 Holding Times and Sample Preservation Initial Calibration Calibration Verification CRDL Standards 2 Laboratory Blanks Laboratory Control Samples (LCS) Matrix Spikes (MS) | <ul style="list-style-type: none"> Laboratory Duplicates 2 Field Duplicates Interference Check Samples 2 Serial Dilutions ICPMS Internal Standards Reported Results |
|---|---|

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

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

Holding Times and Sample Preservation

The validation guidance documents state that the cooler temperatures should be within an advisory temperature range of 2° to 6°C. Two coolers were received at the laboratory at temperatures less than 2°C. These temperature outliers did not impact data quality and no action was taken.

Laboratory Blanks

Various analytes were detected in the method and instrument blanks at levels greater than the method detection limits (MDL). To evaluate the effect on the sample data, action levels of five times the blank concentrations were established. The following analytes were present in one or more laboratory blank:

SDGs K0708852, K0708895 & K0709002: chromium, copper, and zinc – Associated results were greater than the action limits; no qualification of data was necessary.

SDG K0709371: arsenic, chromium, copper, lead, silver, and zinc – Associated results were qualified as estimated (U-7) for silver. All other results were greater than the action limits and no qualification of data was necessary.

In addition, there were results for chromium and mercury in some instrument blanks that were less than the negative MDL. Associated results were greater than the action limits; no qualification of data was necessary.

Field Duplicates

SDG K0709371: Samples MW-3-100807 and MW-3-FD-100807 were submitted as field duplicates. The relative percent difference (RPD) for dissolved chromium (104%) was greater than the control limit of 35%. The dissolved chromium results for these two samples were estimated (J-9).

ICP Serial Dilutions

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

SDGs K0708852 & K0708895: The serial dilution %D value for lead (11%) was greater than the control limit. All associated results were estimated (J-16).

IV. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical methods. The laboratory and field duplicate RPD values indicated acceptable precision, with the exception noted above. Accuracy was also acceptable, as demonstrated by the matrix spike and laboratory control sample recoveries.

Data were qualified as not-detected based on laboratory blank contamination. Data were estimated based on field duplicate RPD and serial dilution %D outliers.

All data, as qualified, are acceptable for use.

**Qualified Data Summary Table
SAIC - South Park Marina**

SDG	Sample_ID	Method	Total or Dissolved	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
K0708852	SB-1-9	SW6020	T	Lead	1.29	mg/Kg	X	J	16
K0708852	SB-1-9	SW8270C	D	Phenol	31	ug/Kg	B	U	7
K0708852	SB-1-9	SW8270C	D	2,4-Dimethylphenol	50	ug/Kg	U	R	10
K0708852	SB-1-9	SW8270C	D	Di-N-Butylphthalate	11	ug/Kg	T	U	7
K0708852	SB-1-9	SW8270C	D	Bis(2-Ethylhexyl) Phthalate	9.5	ug/Kg	T	U	7
K0708852	SB-3-13.5	SW6020	T	Lead	2.23	mg/Kg		J	16
K0708852	SB-3-13.5	SW8270C	D	Phenol	26	ug/Kg	BJ	U	7
K0708852	SB-3-13.5	SW8270C	D	2,4-Dimethylphenol	50	ug/Kg	U	R	10
K0708852	SB-3-13.5	SW8270C	D	Diethylphthalate	1.9	ug/Kg	T	U	7
K0708852	SB-3-13.5	SW8270C	D	Di-N-Butylphthalate	19	ug/Kg	T	U	7
K0708852	SB-3-13.5	SW8270C	D	Bis(2-Ethylhexyl) Phthalate	12	ug/Kg	T	U	7
K0708852	SB-3-7	SW6020	T	Lead	31.8	mg/Kg		J	16
K0708852	SB-3-7	SW8081A	D	4,4'-DDE	2.9	ug/Kg	P	NJ	3
K0708852	SB-3-7	SW8081A	D	4,4'-DDD	0.35	ug/Kg	JP	J	3
K0708852	SB-3-7	SW8270C	D	Phenol	31	ug/Kg	B	U	7
K0708852	SB-3-7	SW8270C	D	2,4-Dimethylphenol	50	ug/Kg	U	R	10
K0708852	SB-3-7	SW8270C	D	Di-N-Butylphthalate	16	ug/Kg	T	U	7
K0708852	SB-3-7	SW8270C	D	Bis(2-Ethylhexyl) Phthalate	14	ug/Kg	T	U	7
K0708852	SB-4-8	SW6020	T	Lead	3.32	mg/Kg		J	16
K0708852	SB-4-8	SW8270C	D	Phenol	35	ug/Kg	B	U	7
K0708852	SB-4-8	SW8270C	D	2,4-Dimethylphenol	50	ug/Kg	U	R	10
K0708852	SB-4-8	SW8270C	D	Diethylphthalate	2.3	ug/Kg	T	U	7
K0708852	SB-4-8	SW8270C	D	Di-N-Butylphthalate	19	ug/Kg	T	U	7
K0708852	SB-5-8	NWTPH-DX	D	Residual Range Organics	220	mg/Kg	Z	J	2
K0708852	SB-5-8	SW6020	T	Lead	4.39	mg/Kg		J	16
K0708852	SB-5-8	SW8270C	D	Phenol	45	ug/Kg	B	U	7
K0708852	SB-5-8	SW8270C	D	2,4-Dimethylphenol	50	ug/Kg	U	R	10
K0708852	SB-8-9	SW6020	T	Lead	2.09	mg/Kg		J	16
K0708852	SB-8-9	SW8270C	D	Phenol	24	ug/Kg	BJ	U	7
K0708852	SB-8-9	SW8270C	D	2,4-Dimethylphenol	50	ug/Kg	U	R	10
K0708852	SB-8-9	SW8270C	D	Diethylphthalate	3	ug/Kg	T	U	7
K0708852	SB-8-9	SW8270C	D	Di-N-Butylphthalate	12	ug/Kg	T	U	7
K0708852	SB-8-9	SW8270C	D	Bis(2-Ethylhexyl) Phthalate	12	ug/Kg	T	U	7
K0708852	SB-9-10	SW6020	T	Lead	1.46	mg/Kg	X	J	16
K0708852	SB-9-10	SW8270C	D	Phenol	21	ug/Kg	BJ	U	7
K0708852	SB-9-10	SW8270C	D	2,4-Dimethylphenol	49	ug/Kg	U	R	10
K0708852	SB-9-10	SW8270C	D	Diethylphthalate	2.3	ug/Kg	T	U	7

**Qualified Data Summary Table
SAIC - South Park Marina**

SDG	Sample_ID	Method	Total or Dissolved	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
K0708852	SB-9-10	SW8270C	D	Bis(2-Ethylhexyl) Phthalate	11	ug/Kg	T	U	7
K0708895	SB-10-14	SW6020	T	Lead	16.3	mg/Kg		J	16
K0708895	SB-10-14	SW8270C	D	Phenol	14	ug/Kg	BJ	U	7
K0708895	SB-10-14	SW8270C	D	2,4-Dimethylphenol	50	ug/Kg	U	R	10
K0708895	SB-10-14	SW8270C	D	Diethylphthalate	2.1	ug/Kg	T	U	7
K0708895	SB-10-14	SW8270C	D	Di-N-Butylphthalate	110	ug/Kg		U	7
K0708895	SB-10-14	SW8270C	D	Bis(2-Ethylhexyl) Phthalate	21	ug/Kg	T	U	7
K0708895	SB-11-2.5	NWTPH-DX	D	Diesel Range Organics	9600	mg/Kg	DH	J	2
K0708895	SB-11-2.5	NWTPH-DX	D	Residual Range Organics	26000	mg/Kg	DO	J	2
K0708895	SB-11-2.5	SW6020	T	Lead	3100	mg/Kg		J	16
K0708895	SB-11-2.5	SW8081A	D	2,4'-DDT	3400	ug/Kg	PD	J	3
K0708895	SB-11-2.5	SW8260B	D	Acetone	0.93	mg/Kg	T	U	7
K0708895	SB-11-2.5	SW8270C	D	2,4-Dimethylphenol	1300	ug/Kg	U	R	10
K0708895	SB-11-2.5	SW8270C	D	Di-N-Butylphthalate	800	ug/Kg	D	U	7
K0708895	SB-11-2.5	SW8270C	D	Bis(2-Ethylhexyl) Phthalate	3700	ug/Kg	D	U	7
K0708895	SB-12-1.5	NWTPH-DX	D	Diesel Range Organics	1300	mg/Kg	DH	J	2
K0708895	SB-12-1.5	NWTPH-DX	D	Residual Range Organics	3700	mg/Kg	DO	J	2
K0708895	SB-12-1.5	SW6020	T	Lead	1000	mg/Kg		J	16
K0708895	SB-12-1.5	SW8260B	D	Methylene Chloride	0.44	ug/Kg	T	U	7
K0708895	SB-12-1.5	SW8270C	D	Phenol	83	ug/Kg	BJD	U	7
K0708895	SB-12-1.5	SW8270C	D	2,4-Dimethylphenol	500	ug/Kg	U	R	10
K0708895	SB-12-1.5	SW8270C	D	Di-N-Butylphthalate	420	ug/Kg	D	U	7
K0708895	SB-12-1.5	SW8270C	D	Bis(2-Ethylhexyl) Phthalate	1100	ug/Kg	D	U	7
K0708895	SB-2-9	SW6020	T	Lead	13.7	mg/Kg		J	16
K0708895	SB-2-9	SW8081A	D	Dieldrin	0.58	ug/Kg	JP	J	3
K0708895	SB-2-9	SW8081A	D	2,4'-DDD	2.3	ug/Kg	P	NJ	3
K0708895	SB-2-9	SW8081A	D	2,4'-DDT	1.2	ug/Kg	P	NJ	3
K0708895	SB-2-9	SW8270C	D	Phenol	20	ug/Kg	BJ	U	7
K0708895	SB-2-9	SW8270C	D	2,4-Dimethylphenol	50	ug/Kg	U	R	10
K0708895	SB-2-9	SW8270C	D	Diethylphthalate	2.1	ug/Kg	T	U	7
K0708895	SB-2-9	SW8270C	D	Di-N-Butylphthalate	17	ug/Kg	T	U	7
K0708895	SB-2-9	SW8270C	D	Bis(2-Ethylhexyl) Phthalate	35	ug/Kg	T	U	7
K0708895	SB-6-8	SW6020	T	Lead	1.49	mg/Kg	X	J	16
K0708895	SB-6-8	SW8270C	D	Phenol	21	ug/Kg	BJ	U	7
K0708895	SB-6-8	SW8270C	D	2,4-Dimethylphenol	49	ug/Kg	U	R	10
K0708895	SB-6-8	SW8270C	D	Diethylphthalate	3.6	ug/Kg	T	U	7
K0708895	SB-6-8	SW8270C	D	Di-N-Butylphthalate	11	ug/Kg	T	U	7

**Qualified Data Summary Table
SAIC - South Park Marina**

SDG	Sample_ID	Method	Total or Dissolved	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
K0708895	SB-6-8	SW8270C	D	Bis(2-Ethylhexyl) Phthalate	18	ug/Kg	T	U	7
K0708895	SB-7-9	SW6020	T	Lead	2.13	mg/Kg		J	16
K0708895	SB-7-9	SW8082	D	PCB-aroclor 1254	5.9	ug/Kg	JP	J	3
K0708895	SB-7-9	SW8270C	D	Phenol	16	ug/Kg	BJ	U	7
K0708895	SB-7-9	SW8270C	D	2,4-Dimethylphenol	50	ug/Kg	U	R	10
K0708895	SB-7-9	SW8270C	D	Diethylphthalate	1.9	ug/Kg	T	U	7
K0708895	SB-7-9	SW8270C	D	Di-N-Butylphthalate	9.5	ug/Kg	T	U	7
K0709002	ER-1	SW8081A	D	Aldrin	0.00068	ug/L	JP	J	3
K0709002	ER-1	SW8081A	D	4,4'-DDT	0.0094	ug/L	T	U	7
K0709002	SB-13-1	NWTPH-DX	D	Diesel Range Organics	1.8	mg/Kg	T	U	7
K0709002	SB-13-1	NWTPH-DX	D	Residual Range Organics (RRO)	6.5	mg/Kg	T	U	7
K0709002	SB-13-1	SW8081A	D	4,4'-DDT	1.3	ug/Kg		J	12
K0709002	SB-13-1	SW8081A	D	2,4'-DDT	0.73	ug/Kg	JP	NJ	3
K0709002	SB-13-1	SW8270C	D	Phenol	30	ug/Kg		U	7
K0709002	SB-13-1	SW8270C	D	2,4-Dimethylphenol	47	ug/Kg	U	R	10
K0709002	SB-13-1	SW8270C	D	Diethylphthalate	2.5	ug/Kg	T	U	7
K0709002	SB-13-3.5	SW8270C	D	Phenol	32	ug/Kg		U	7
K0709002	SB-13-3.5	SW8270C	D	2,4-Dimethylphenol	49	ug/Kg	U	R	10
K0709002	SB-13-3.5	SW8270C	D	Diethylphthalate	9.7	ug/Kg	T	U	7
K0709002	SB-13-7	NWTPH-DX	D	Diesel Range Organics	950	mg/Kg	H	J	2
K0709002	SB-13-7	NWTPH-DX	D	Residual Range Organics (RRO)	4700	mg/Kg	DO	J	2
K0709002	SB-13-7	NWTPH-GX	D	Gasoline Range Organics-NWTPH	1.6	mg/Kg	T	U	7
K0709002	SB-13-7	SW8081A	D	4,4'-DDT	1600	ug/Kg	D	J	12
K0709002	SB-13-7	SW8270C	D	2,4-Dimethylphenol	940	ug/Kg	U	R	10
K0709002	SB-14-3	NWTPH-DX	D	Diesel Range Organics	2100	mg/Kg	DH	J	2
K0709002	SB-14-3	NWTPH-DX	D	Residual Range Organics (RRO)	8200	mg/Kg	DO	J	2
K0709002	SB-14-3	SW8081A	D	4,4'-DDE	370	ug/Kg	PD	NJ	3
K0709002	SB-14-3	SW8081A	D	4,4'-DDT	1100	ug/Kg	D	J	12
K0709002	SB-14-3	SW8270C	D	2,4-Dimethylphenol	2400	ug/Kg	U	R	10
K0709002	SB-14-7.5	NWTPH-DX	D	Diesel Range Organics	3000	mg/Kg	H	J	2
K0709002	SB-14-7.5	NWTPH-DX	D	Residual Range Organics (RRO)	8900	mg/Kg	DO	J	2
K0709002	SB-14-7.5	NWTPH-GX	D	Gasoline Range Organics-NWTPH	350	mg/Kg	H	J	2
K0709002	SB-14-7.5	SW8081A	D	4,4'-DDE	390	ug/Kg	PD	NJ	3
K0709002	SB-14-7.5	SW8081A	D	4,4'-DDT	1200	ug/Kg	D	J	12
K0709002	SB-14-7.5	SW8260B	D	Acetone	14	ug/Kg	T	U	7
K0709002	SB-14-7.5	SW8260B	D	Methylene Chloride	1	ug/Kg	T	U	7
K0709002	SB-14-7.5	SW8260B	D	Toluene	0.89	ug/Kg	T	J	9

**Qualified Data Summary Table
SAIC - South Park Marina**

SDG	Sample_ID	Method	Total or Dissolved	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
K0709002	SB-14-7.5	SW8270C	D	2,4-Dimethylphenol	5000	ug/Kg	U	R	10
K0709002	SB-15-3.5	NWTPH-DX	D	Diesel Range Organics	4100	mg/Kg	DH	J	2
K0709002	SB-15-3.5	NWTPH-DX	D	Residual Range Organics (RRO)	10000	mg/Kg	DO	J	2
K0709002	SB-15-3.5	NWTPH-GX	D	Gasoline Range Organics-NWTPH	150	mg/Kg	H	J	2
K0709002	SB-15-3.5	SW8081A	D	4,4'-DDT	1500	ug/Kg	D	J	12
K0709002	SB-15-3.5	SW8260B	D	Vinyl Chloride	2.7	ug/Kg	T	J	13
K0709002	SB-15-3.5	SW8260B	D	Acetone	44	ug/Kg		J	13
K0709002	SB-15-3.5	SW8260B	D	Carbon Disulfide	0.67	ug/Kg	T	J	13
K0709002	SB-15-3.5	SW8260B	D	Methylene Chloride	0.97	ug/Kg	T	UJ	7,13
K0709002	SB-15-3.5	SW8260B	D	2-Butanone	6.1	ug/Kg	T	J	13
K0709002	SB-15-3.5	SW8260B	D	Cis-1,2-Dichloroethene	0.54	ug/Kg	T	J	13
K0709002	SB-15-3.5	SW8260B	D	Toluene	2.3	ug/Kg	T	J	13
K0709002	SB-15-3.5	SW8260B	D	Tetrachloroethene	0.73	ug/Kg	T	J	13
K0709002	SB-15-3.5	SW8260B	D	Ethylbenzene	7.8	ug/Kg		J	13
K0709002	SB-15-3.5	SW8260B	D	m,p-Xylene	4.6	ug/Kg	T	J	13
K0709002	SB-15-3.5	SW8260B	D	o-Xylene	1.3	ug/Kg	T	J	13
K0709002	SB-15-3.5	SW8260B	D	Isopropylbenzene (Cumene)	10	ug/Kg	T	J	13
K0709002	SB-15-3.5	SW8260B	D	1,3,5-Trimethylbenzene	58	ug/Kg		J	13
K0709002	SB-15-3.5	SW8260B	D	p-Isopropyltoluene	39	ug/Kg		J	13
K0709002	SB-15-3.5	SW8260B	D	Naphthalene	12	ug/Kg	T	J	13
K0709002	SB-15-3.5	SW8270C	D	2,4-Dimethylphenol	5000	ug/Kg	U	R	10
K0709002	SB-16-3.5	NWTPH-DX	D	Diesel Range Organics	12000	mg/Kg	DH	J	2
K0709002	SB-16-3.5	NWTPH-DX	D	Residual Range Organics (RRO)	27000	mg/Kg	DO	J	2
K0709002	SB-16-3.5	SW8081A	D	4,4'-DDT	4000	ug/Kg	D	J	12
K0709002	SB-16-3.5	SW8081A	D	2,4'-DDT	3600	ug/Kg	PD	J	3
K0709002	SB-16-3.5	SW8260B	D	Bromomethane	0.068	mg/Kg	U	UJ	5B
K0709002	SB-16-3.5	SW8260B	D	Acetone	0.58	mg/Kg	T	UJ	5A,5B,7
K0709002	SB-16-3.5	SW8260B	D	2,2-Dichloropropane	0.068	mg/Kg	U	UJ	5B
K0709002	SB-16-3.5	SW8260B	D	2-Hexanone	2.7	mg/Kg	U	R	5A,5B
K0709002	SB-16-3.5	SW8260B	D	4-Methyl-2-Pentanone	0.66	mg/Kg	T	J	5B
K0709002	SB-16-3.5	SW8260B	D	1,2-Dibromo-3-Chloropropane	0.27	mg/Kg	U	UJ	5B
K0709002	SB-16-3.5	SW8270C	D	2,4-Dimethylphenol	4600	ug/Kg	U	R	10
K0709002	SB-2-1	SW8081A	D	4,4'-DDT	0.87	ug/Kg	T	J	12
K0709002	SB-2-1	SW8270C	D	Phenol	30	ug/Kg		U	7
K0709002	SB-2-1	SW8270C	D	2,4-Dimethylphenol	45	ug/Kg	U	R	10
K0709371	MW-1-100907	SW8260B	D	Bromomethane	0.5	ug/L	U	UJ	5B
K0709371	MW-1-100907	SW8270C	D	Diethylphthalate	0.036	ug/L	T	U	7

**Qualified Data Summary Table
SAIC - South Park Marina**

SDG	Sample_ID	Method	Total or Dissolved	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
K0709371	MW-1-100907	SW8270C	D	Di-N-Butylphthalate	0.065	ug/L	T	U	7
K0709371	MW-1-100907	SW8270C	D	Fluoranthene	0.21	ug/L	U	UJ	10
K0709371	MW-2-100907	SW6020	D	Silver	0.02	ug/L	U	U	7
K0709371	MW-2-100907	SW8081A	D	4,4'-DDT	0.0022	ug/L	JP	U	7
K0709371	MW-2-100907	SW8260B	D	Bromomethane	0.5	ug/L	U	UJ	5B
K0709371	MW-2-100907	SW8270C	D	Diethylphthalate	0.059	ug/L	T	U	7
K0709371	MW-2-100907	SW8270C	D	Di-N-Butylphthalate	0.08	ug/L	T	U	7
K0709371	MW-2-100907	SW8270C	D	Fluoranthene	0.21	ug/L	U	UJ	10
K0709371	MW-3-100807	SW6020	T	Silver	0.01	ug/L	B	U	7
K0709371	MW-3-100807	SW6020	D	Chromium	1.25	ug/L		J	9
K0709371	MW-3-100807	SW8081A	D	Dieldrin	0.021	ug/L		J	9
K0709371	MW-3-100807	SW8270C	D	Diethylphthalate	0.047	ug/L	T	U	7
K0709371	MW-3-100807	SW8270C	D	Di-N-Butylphthalate	0.08	ug/L	T	U	7
K0709371	MW-3-100807	SW8270C	D	Fluoranthene	0.21	ug/L	U	UJ	10
K0709371	MW-3-FD-100807	SW6020	D	Chromium	3.98	ug/L		J	9
K0709371	MW-3-FD-100807	SW8081A	D	Dieldrin	0.063	ug/L		J	9
K0709371	MW-3-FD-100807	SW8270C	D	Diethylphthalate	0.041	ug/L	T	U	7
K0709371	MW-3-FD-100807	SW8270C	D	Di-N-Butylphthalate	0.094	ug/L	T	U	7
K0709371	MW-3-FD-100807	SW8270C	D	Fluoranthene	0.21	ug/L	U	UJ	10
K0709371	TB-1	SW8260B	D	Bromomethane	0.5	ug/L	U	UJ	5B
K0709371	Trans-A-Bot	NWTPH-DX	D	Diesel Range Organics	26	mg/Kg	T		
K0709371	Trans-A-Bot	NWTPH-DX	D	Residual Range Organics	240	mg/Kg	O	J	2
K0709371	Trans-A-Bot	SW8081A	D	4,4'-DDE	0.9	ug/Kg	P	NJ	3
K0709371	Trans-A-Bot	SW8081A	D	4,4'-DDT	27	ug/Kg		J	12
K0709371	Trans-A-Bot	SW8081A	D	2,4'-DDD	8.5	ug/Kg	P	J	3
K0709371	Trans-A-Bot	SW8270C	D	Phenol	55	ug/Kg		U	7
K0709371	Trans-A-Bot	SW8270C	D	Naphthalene	5.8	ug/Kg	BJ	U	7
K0709371	Trans-A-Bot	SW8270C	D	2-Methylnaphthalene	4.4	ug/Kg	T	U	7
K0709371	Trans-A-Bot	SW8270C	D	Acenaphthylene	6.2	ug/Kg	T	U	7
K0709371	Trans-A-Bot	SW8270C	D	Acenaphthene	4.2	ug/Kg	T	U	7
K0709371	Trans-A-Bot	SW8270C	D	Diethylphthalate	3.5	ug/Kg	T	U	7
K0709371	Trans-A-Bot	SW8270C	D	Phenanthrene	77	ug/Kg	B	U	7
K0709371	Trans-A-Bot	SW8270C	D	Anthracene	11	ug/Kg		U	7
K0709371	Trans-A-Bot	SW8270C	D	Pyrene	170	ug/Kg	B	U	7
K0709371	Trans-A-Top	NWTPH-DX	D	Diesel Range Organics	1300	mg/Kg	Y	J	2
K0709371	Trans-A-Top	NWTPH-DX	D	Residual Range Organics	360	mg/Kg	L	J	2
K0709371	Trans-A-Top	SW8081A	D	2,4'-DDT	6.3	ug/Kg	PD	NJ	3

**Qualified Data Summary Table
SAIC - South Park Marina**

SDG	Sample_ID	Method	Total or Dissolved	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
K0709371	Trans-A-Top	SW8270C	D	Bis(2-Ethylhexyl) Phthalate	310	ug/Kg	JD	U	7
K0709371	Trans-B-Bot	SW8081A	D	4,4'-DDT	17	ug/Kg		J	12
K0709371	Trans-B-Bot	SW8270C	D	Phenol	28	ug/Kg	T	U	7
K0709371	Trans-B-Bot	SW8270C	D	Acenaphthylene	1.9	ug/Kg	T	U	7
K0709371	Trans-B-Bot	SW8270C	D	Diethylphthalate	2	ug/Kg	T	U	7
K0709371	Trans-B-Bot	SW8270C	D	Phenanthrene	11	ug/Kg	B	U	7
K0709371	Trans-B-Bot	SW8270C	D	Anthracene	3	ug/Kg	T	U	7
K0709371	Trans-B-Bot	SW8270C	D	Di-N-Butylphthalate	28	ug/Kg		U	7
K0709371	Trans-B-Bot	SW8270C	D	Fluoranthene	30	ug/Kg	B	U	7
K0709371	Trans-B-Bot	SW8270C	D	Pyrene	30	ug/Kg	B	U	7
K0709371	Trans-B-Bot	SW8270C	D	Benzo(a)anthracene	12	ug/Kg	B	U	7
K0709371	Trans-B-Bot	SW8270C	D	Chrysene	24	ug/Kg	B	U	7
K0709371	Trans-B-Bot	SW8270C	D	Bis(2-Ethylhexyl) Phthalate	76	ug/Kg	T	U	7
K0709371	Trans-B-Bot	SW8270C	D	Benzo(b)fluoranthene	26	ug/Kg	B	U	7
K0709371	Trans-B-Bot	SW8270C	D	Benzo(k)fluoranthene	9	ug/Kg	T	U	7
K0709371	Trans-B-Bot	SW8270C	D	Benzo(a)pyrene	16	ug/Kg	B	U	7
K0709371	Trans-B-Bot	SW8270C	D	Indeno(1,2,3-cd)pyrene	17	ug/Kg	B	U	7
K0709371	Trans-B-Bot	SW8270C	D	Benzo(ghi)perylene	20	ug/Kg	B	U	7
K0709371	Trans-B-Top	NWTPH-DX	D	Diesel Range Organics	160	mg/Kg	H	J	2
K0709371	Trans-B-Top	NWTPH-DX	D	Residual Range Organics	620	mg/Kg	O	J	2
K0709371	Trans-B-Top	NWTPH-GX	D	Gasoline Range Organics	5.1	mg/Kg	T	U	7
K0709371	Trans-B-Top	SW8081A	D	4,4'-DDT	95	ug/Kg	D	J	12
K0709371	Trans-B-Top	SW8081A	D	2,4'-DDT	27	ug/Kg	P	NJ	3
K0709371	Trans-B-Top	SW8270C	D	Phenol	250	ug/Kg	D	U	7
K0709371	Trans-B-Top	SW8270C	D	Naphthalene	17	ug/Kg	BJD	U	7
K0709371	Trans-B-Top	SW8270C	D	2-Methylnaphthalene	14	ug/Kg	JD	U	7
K0709371	Trans-B-Top	SW8270C	D	Acenaphthylene	15	ug/Kg	JD	U	7
K0709371	Trans-B-Top	SW8270C	D	Diethylphthalate	39	ug/Kg	JD	U	7
K0709371	Trans-B-Top	SW8270C	D	Phenanthrene	130	ug/Kg	BD	U	7
K0709371	Trans-B-Top	SW8270C	D	Anthracene	35	ug/Kg	JD	U	7
K0709371	Trans-B-Top	SW8270C	D	Di-N-Butylphthalate	430	ug/Kg	D	U	7
K0709371	Trans-B-Top	SW8270C	D	Fluoranthene	360	ug/Kg	BD	U	7
K0709371	Trans-B-Top	SW8270C	D	Pyrene	380	ug/Kg	BD	U	7
K0709371	Trans-B-Top	SW8270C	D	Benzo(a)anthracene	190	ug/Kg	BD	U	7
K0709371	Trans-B-Top	SW8270C	D	Chrysene	420	ug/Kg	D	U	7
K0709371	Trans-B-Top	SW8270C	D	Benzo(a)pyrene	250	ug/Kg	D	U	7



EcoChem, INC.
Environmental Data Quality

Transmittal

DATE: May 16, 2008

PROJECT NO.: C4124-2

TO: Mark Dage
SAIC
18912 North Creek Parkway, Suite 101
Bothell, Washington 98011

FROM: Christine Ransom
EcoChem, Inc.
710 Second Avenue, Suite 660
Seattle, Washington 98104
(206) 233-9332 ext. 102

VIA: USPS

WE ARE SENDING THE FOLLOWING MATERIALS:

South Park Marina Site data validation report

Sincerely,

Chris Ransom
Project Manager
EcoChem, Inc.

Copies: Project files
Chron



EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT

**Washington Department of Ecology Toxics Cleanup Program
South Park Marina – Site Reconnaissance Investigation**

Prepared for:

SAIC
18912 North Creek Parkway, Suite 101
Bothell, Washington 98011

Prepared by:

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

EcoChem Project: C4124-2

May 14, 2008

Approved for Release


Christine Ransom
Project Manager
EcoChem, INC.

INTRODUCTION

Basis for the Data Validation

This report summarizes the results of the summary (Level III) data validation performed on sediment, water, and quality control (QC) sample data for the Washington Department of Ecology – Site Reconnaissance Investigation at South Park Marina, Seattle, Washington. A complete list of samples is provided in the **Sample Index**. Columbia Analytical Services, Kelso, Washington performed all analyses. The analytical methods and EcoChem project chemists are listed below.

Analysis	Method of Analysis	Primary Review	Secondary Review
Volatile Organic Compounds	SW8260B	Jennifer Newkirk	Mark Brindle
Semivolatile Organic Compounds	SW8270C	Jennifer Newkirk	Mark Brindle
Chlorinated Pesticides	SW8081A	Mark Lybeer	Mark Brindle
PCB Aroclors	SW8082	Mark Lybeer	Mark Brindle
Diesel and Residual Range Hydrocarbons	NWTPH-Dx	Mark Lybeer	Mark Brindle
Hydrocarbon Identification	NWTPH-HCID	Mark Lybeer	Mark Brindle
Metals	SW6020, SW7471A, SW7470A	Linda Holz	Christine Ransom
Total Solids	EPA 160.3	Linda Holz	Christine Ransom

The data validation is based on QC criteria documented in the above listed methods, the *Sampling and Analysis Plan (SAP) – South Park Marina, Seattle, Washington Site Reconnaissance Investigation, (2007)*; and *USEPA National Functional Guidelines for Organic (1999) and Inorganic (2004) Data Review*. The QC criteria are summarized in **Appendix A**.

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

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

Sample Index
SAIC - South Park Marina
SDG: K0802276

SAMPLE ID	LAB ID	MATRIX	SW8260B	SW8270C	SW8082	SW8081A	HCID	NWTPH-Dx	SW6020	SW7471A	EPA160.3M
MW-3-031208	K0802776-001	Water	X			X			X	X	
MW-1-031208	K0802776-003	Water	X			X			X	X	
MW-2-031208	K0802776-005	Water	X			X			X	X	
TB-2	K0802776-006	Water	X								
Trans-A-Sed	K0802776-002	Sediment		X	X	X	X	X	X	X	X
Trans-B-Sed	K0802776-004	Sediment		X	X	X	X	X	X	X	X

DATA VALIDATION REPORT

South Park Marina

Semivolatile Organic Compounds – EPA Method 8270C

This report documents the review of analytical data from the analyses of sediment samples and the associated laboratory quality control (QC) samples. Columbia Analytical Services, Inc., Kelso, Washington, analyzed the samples. Summary (Level III) validation was performed for all data.

SDG	Number of Samples
K0802276	2 Sediment

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 complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

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

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.

Laboratory Blanks

A laboratory blank was analyzed at the appropriate frequency. Positive results for benzyl alcohol and diethyl phthalate were reported in the blank. To assess the impact of each blank contaminant on the reported sample results, an action level was established at five times the concentration reported in the blank. Positive results in the associated sample less than the action level were qualified as not detected (U-7). If the result was less than the reporting limit, then the result was elevated to the reporting limit. No action was taken if the sample result was greater than the action level or for non-detected results.

Surrogate Compounds

The percent recovery (%R) value for 2,4,6-tribromophenol was greater than the upper control limit in Sample Trans-A-SedMSD. No action was taken as qualifiers are not assigned to QC samples.

Laboratory Control Samples (LCS/LCSD)

The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) relative percent difference (RPD) value for benzoic acid was greater than the control limit of 40%. Benzoic acid was not detected in the associated samples, therefore no qualifiers were required.

Standard Reference Material (SRM)

The SRM result for benzo(k)fluoranthene was greater than the upper control limit. The associated results for this compound were estimated (J-12) to indicate a potential high bias.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, LCS/LCSD, SRM, and matrix spike/matrix spike duplicate (MS/MSD) %R values, with the exceptions noted above. Precision was also acceptable as demonstrated by the LCS/LCSD and MS/MSD RPD values, with the exception previously noted.

Detection limits were elevated based on laboratory blank contamination. Data were estimated based on an SRM %R outlier.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
South Park Marina
Volatile Organic Compounds - EPA Method 8260B

This report documents the review of analytical data from the analyses of water samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Columbia Analytical Services, Inc., Kelso, Washington. Summary (Level III) validation was performed for all data.

SDG	Number of Samples
K0802276	3 Water and 1 Trip Blank

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 complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

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

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

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

Initial Calibration

The relative response factor (RRF) values were greater than the 0.05 minimum control limit with the exceptions noted below. No qualifiers were required as the continuing calibration (CCAL) demonstrated that the compound responses were stable. All percent relative standard deviation (%RSD) values or correlation coefficients were within control limits.

The RRF values for acetone, 2-butanone, and 2-hexanone from the ICAL analyzed on 3/3/08 (Instrument MS18) were less than the minimum control limit.

Continuing Calibration

The RRF values were greater than the 0.05 minimum control limit for the CCALs with the exceptions noted below. The responses were stable, therefore no qualifiers were applied on this basis. The CCAL percent difference (%D) values were within the $\pm 25\%$ control limits, with the exceptions noted below.

The RRF values were less than the minimum control limit of 0.05 for acetone, 2-butanone, 2-hexanone, and 1,2-dibromo-3-chloropropane in the CCAL analyzed 3/24/08 (Instrument MS18). The %D value for bromomethane exceeded the $\pm 25\%$ control limit. The %D outlier was indicative of a potential high bias. Bromomethane was not detected in the associated samples; reporting limits were unaffected by the high bias and no qualification of data was necessary.

Field Blanks

A positive result for toluene was reported in trip blank, TB-2. No positive results for this analyte were reported in the field samples, therefore no qualifiers were required.

IV. OVERALL ASSESSMENT

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

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT

South Park Marina

Chlorinated Pesticides - EPA Method 8081A

This report documents the review of analytical data from the analyses of sediment and water samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Columbia Analytical Services, Inc., Kelso, Washington. Summary (Level III) validation was performed for all data.

SDG	Number of Samples
K0802276	2 Sediment, 3 Water

I. DATA PACKAGE COMPLETENESS

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

II. EDD TO HARDCOPY VERIFICATION

A complete (100%) verification of the electronic data deliverables (EDD) results was performed by comparison to the hardcopy laboratory data package. No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Receipt	2	Matrix Spike/Matrix Spike Duplicate (MS/MSD)
Initial Calibration (ICAL)	2	Laboratory Control Samples (LCS/LCSD)
Continuing Calibration (CCAL)		Target Analyte List
Analyte Breakdown	1	Reporting Limits (MDL and MRL)
Laboratory Blanks	2	Compound Identification
Surrogate Compounds		

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

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

Matrix Spike/Matrix Spike Duplicates

For the sediment samples, matrix spike/matrix spike duplicate (MS/MSD) analyses were performed using Sample Trans-A-Sed. The %R values for aldrin and 2,4'-DDD were less than 10%. The positive results for these analytes were estimated (J-8) in the parent sample to indicate a potential low bias. The %R values for 2,4'-DDT were greater than the upper control limit. This analyte was not detected in the parent sample; no qualification was necessary for the potential high bias. The MS %R value for 4,4'-DDE was greater than the upper control limit. The MSD recovery was acceptable, therefore no action was taken. The MS/MSD RPD value for dieldrin was greater than the control limit. This analyte was not detected in the parent sample and no qualification was necessary.

Laboratory Control Samples (LCS/LCSD)

For the laboratory control sample/laboratory control sample duplicates (LCS/LCSD) associated with the water analyses, the relative percent difference (RPD) value for aldrin was greater than the upper control limit. The positive result for aldrin Sample MW-3-031208 was estimated (J-9).

Reporting Limits (Method Detection Limit and Method Reporting Limit)

Sample MW-3-031208 was analyzed at a dilution of 5x for dieldrin; the reporting limit was elevated accordingly.

Sample Trans-A-Sed was analyzed at a 10x dilution for 2,4'-DDD, 2,4'-DDT, and 4,4'-DDT. The reporting limits were elevated accordingly.

For the sediment samples Trans-A-Sed and Trans-B-Sed, the detection limits for several target analytes were elevated due to interferences from high levels of Aroclor 1260.

Compound Identification

The results from the two analytical columns were compared for agreement. The control limit for the RPD value between the two columns is 40%. An elevated RPD value may indicate the presence of an interferent resulting in a high bias.

The RPD value for 2,4'-DDD for Sample Trans-A-Sed was greater than the control limit. Because the RPD was also greater than 60%, the 2,4'-DDD result for this sample was qualified as tentatively identified (NJ-3).

IV. OVERALL ASSESSMENT

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

One result for 2,4'-DDD was qualified as tentatively identified because the confirmation criterion was not met. Data were also estimated because of LCS/LCSD RPD and MS/MSD %R outliers.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT

South Park Marina

PCB Aroclors - Method SW8082

This report documents the review of analytical data from the analyses of sediment samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Columbia Analytical Services, Inc., Kelso, Washington. Summary (Level III) validation was performed for all data.

SDG	Number of Samples
K0802276	2 Sediment

I. DATA PACKAGE COMPLETENESS

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

II. EDD TO HARDCOPY VERIFICATION

A complete (100%) verification of the electronic data deliverables (EDD) results was performed by comparison to the hardcopy laboratory data package. No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Receipt	Matrix Spike/Matrix Spike Duplicate (MS/MSD)
Initial Calibration (ICAL)	Laboratory Control Samples (LCS/LCSD)
Continuing Calibration (CCAL)	Target Analyte List
Laboratory Blanks	1 Reporting Limits (MDL and MRL)
Surrogate Compounds	Compound Identification
Standard Reference Material (SRM)	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.

Reporting Limits (Method Detection Limit and Method Reporting Limit)

Sample Trans-A-Sed was analyzed at a dilution of 5x. Reporting limits were elevated accordingly.

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) percent recovery values. Precision was also acceptable as demonstrated by the relative percent difference values for the MS/MSD analyses.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
South Park Marina
Diesel and Residual Range Hydrocarbons - Method NWTPH-Dx
Hydrocarbon Identification – NWTPH-HCID

This report documents the review of analytical data from the analyses of sediment samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Columbia Analytical Services, Inc., Kelso, Washington. Summary (Level III) validation was performed for all data.

SDG	Number of Samples
K0802276	2 Sediment

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.

All samples were initially analyzed by method NWTPH-HCID. Only samples with positively identified petroleum hydrocarbons were subsequently analyzed by method NWTPH-Gx and/or NWTPH-Dx to provide a quantitative measurement of the specific hydrocarbon range.

II. EDD TO HARDCOPY VERIFICATION

A complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy data package. No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Receipt	Laboratory Control Samples (LCS)
Initial Calibration (ICAL)	Laboratory Duplicates
Continuing Calibration (CCAL)	Target Analyte List
Laboratory Blanks	Reporting Limits (MDL and MRL)
Surrogate Compounds	2 Compound Identification

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

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

Compound Identification

The chromatographic patterns for Samples TRANS-A-SED and TRANS-B-SED did not match those of the diesel and residual range organics (DRO and RRO) standards used for calibration. These results were estimated (J-2).

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and laboratory control sample percent recovery values. Precision was also acceptable as demonstrated by the laboratory duplicate relative percent difference values.

Data were estimated due to chromatographic patterns that did not match the calibration standards.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
South Park Marina
Metals - Methods SW6020, SW7471A and SW7470A
Total Solids - Method 160.3

This report documents the review of analytical data from the analyses of sediment and water samples and the associated laboratory quality control (QC) samples. Columbia Analytical Services, Inc., Kelso, Washington, analyzed the samples. Summary (Level III) validation was performed for all data.

SDG	Number of Samples
K0802276	2 Sediment, 3 Water

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 complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy data package. No errors were found

III. TECHNICAL DATA VALIDATION

The QC requirements for review are listed below.

- | | |
|--|---|
| <ul style="list-style-type: none"> 1 Holding Times and Sample Preservation Initial Calibration Calibration Verification CRDL Standards | <ul style="list-style-type: none"> Matrix Spikes (MS) Laboratory Duplicates Interference Check Samples |
| <ul style="list-style-type: none"> 2 Laboratory Blanks Laboratory Control Samples (LCS) | <ul style="list-style-type: none"> 2 Serial Dilutions ICPMS Internal Standards Reported Results |

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

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

Holding Times and Sample Preservation

The preservation requirement for water samples submitted for total metals analysis is that the pH must be less than 2. The pH of Sample MW-1-031208 was greater than 2 when received at the laboratory; concentrated nitric acid was added upon receipt. This pH outlier did not impact data quality and no action was taken.

Laboratory Blanks

Cadmium, chromium, mercury, silver, and zinc were detected the method blank and various instrument blanks at levels greater than the method detection limits (MDL). To evaluate the effect on the sample data, action levels of five times the blank concentrations were established. The silver results for the water samples were qualified as not detected (U-7). Results for the other analytes were greater than the action limits and no qualification of data was necessary.

ICP Serial Dilutions

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

For the sediment samples, the serial dilution %D values for arsenic (19%), copper (22%), and zinc (31%) were greater than the control limit. All associated results were estimated (J-16).

IV. OVERALL ASSESSMENT

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

Detection limits were elevated based on blank contamination. Data were estimated based on serial dilution %D outliers

All data, as qualified, are acceptable for use.



EcoChem, INC.
Environmental Data Quality

APPENDIX A
DATA QUALIFIER DEFINITIONS
REASON CODES

DATA VALIDATION QUALIFIER CODES National Functional Guidelines

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

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

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

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

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

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

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Hold Time	Waters: 14 days preserved 7 Days: unpreserved (for aromatics) Solids: 14 Days	J(+)/UJ(-) if hold times exceeded If exceeded by > 3X HT: J(+)/R(-) (EcoChem PJ)	1
Tuning	BFB 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+/- 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
Storage Blank	One per SDG <CRQL	U(+) the specific analyte(s) results in all assoc.samples using the 5x or 10x rule	7
Trip Blank	Frequency as per project QAPP	Same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned	18
Field Blanks (if required in QAPP)	No results > CRQL	Apply 5X/10X rule; U(+) < action level	6

EcoChem Validation Guidelines for Volatile 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 <i>low conc. H2O VOA</i>	One per lab batch Within method control limits	J(+) assoc. compd if > UCL J(+)/R(-) assoc. compd if < LCL J(+)/R(-) all compds if half are < LCL	10
LCS <i>regular VOA (H2O & solid)</i>	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 <i>(if required)</i>	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. compd. in all samples	9
Surrogates	Added to all samples Within method control limits	J(+) if %R > UCL J(+)/UJ(-) if %R < LCL but > 10% (see PJ ¹) J(+)/R(-) if < 10%	13
Internal Standard (IS)	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J(+) if > 200% J(+)/UJ(-) if < 50% J(+)/R(-) if < 25% RT > 30 seconds, narrate and Notify PM	19
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD < 50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD < 35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R(+) common laboratory contaminants See Technical Director for ID issues	4
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers	14 21 (false +)

PJ¹ No action if there are 4+ surrogates and only 1 outlier.

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	Water: J(+)/UJ(-) if ext. > 7 and < 21 days J(+)/R(-) if ext > 21 days (EcoChem PJ) Solids/Wastes: 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. compd if > UCL J(+)/R(-) assoc. compd if < LCL J(+)/R(-) all compds 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. compd. in all samples	9
Surrogates	Minimum of 3 acid and 3 base/neutral compounds Use method acceptance criteria	Do not qualify if only 1 acid and/or 1 B/N surrogate is out unless <10% J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) if %R < 10%	13
Internal Standards	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J(+) if > 200% J(+)/UJ(-) if < 50% J(+)/R(-) if < 25% RT>30 seconds, narrate and Notify PM	19
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R(+) common laboratory contaminants See Technical Director for ID issues	4
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers	14 21 (false +)

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

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

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

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One set per matrix per batch Method Acceptance Criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One set per matrix per batch Method Acceptance Criteria	J(+) in parent sample if RPD > CL	9
LCS	One per SDG Method Acceptance Criteria	J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) using PJ if %R <<LCL (< 10%)	10
LCS/LCSD (if required)	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. 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: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate (Qualify if required by project QAPP)	9

DATA VALIDATION CRITERIA

Table No.: NWTPH-Dx

Revision No.: 2

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EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range (Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx, June 1997, Wa DOE & Oregon DEQ)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature & Preservation	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6 deg. C	1
Holding Time	Ext. Waters: 14 days preserved 7 days unpreserved Ext. Solids: 14 Days Analysis: 40 days from extraction	J(+)/UJ(-) if hold times exceeded J(+)/R(-) if exceeded > 3X (EcoChem PJ)	1
Initial Calibration	5 calibration points (All within 15% of true value) Linear Regression: R ² ≥ 0.990 If used, RSD of response factors ≤ 20%	Narrate if fewer than 5 calibration levels or if %R > 15% J(+)/UJ(-) if R ² < 0.990 J(+)/UJ(-) if %RSD > 20%	5A
Mid-range Calibration Check Std.	Analyzed before and after each analysis shift & every 20 samples. Recovery range 85% to 115%	Narrate if frequency not met. J(+)/UJ(-) if %R < 85% J(+) if %R > 115%	5B
Method Blank	At least one per batch (≤10 samples) No results >RL	U (at the RL) if sample result is < RL & < 5X blank result.	7
		U (at reported sample value) if sample result is ≥ RL and < 5X blank result	7
Field Blanks (if required by project)	No results > RL	Action is same as method blank for positive results remaining in the field blank after method blank qualifiers are assigned.	6
MS samples (accuracy) (if required by project)	%R within lab control limits	Qualify parent only, unless other QC indicates systematic problems. J(+) if both %R > upper control limit (UCL) J(+)/UJ(-) if both %R < lower control limit (LCL) No action if parent conc. >5X the amount spiked. Use PJ if only one %R outlier	8
Precision: MS/MSD or LCS/LCSD or sample/dup	At least one set per batch (≤10 samples) RPD ≤ lab control limit	J(+) if RPD > lab control limits	9
LCS (not required by method)	%R within lab control limits	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R < 10% (EcoChem PJ)	10

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range
 (Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx,
 June 1997, Wa DOE & Oregon DEQ)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Surrogates	2-fluorobiphenyl, p-terphenyl, o-terphenyl, and/or pentacosane added to all samples (inc. QC samples). %R = 50-150%	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R < 10% No action if 2 or more surrogates are used, and only one is outside control limits. (EcoChem PJ)	13
Pattern Identification	Compare sample chromatogram to standard chromatogram to ensure range and pattern are reasonable match. Laboratory may flag results which have poor match.	J(+)	2
Field Duplicates	Use project control limits, if stated in QAPP EcoChem default: water: RPD < 35% solids: RPD < 50%	Narrate (Use Professional Judgement to qualify)	9
Two analyses for one sample (dilution)	Report only one result per analyte	"DNR" (or client requested qualifier) all results that should not be reported. (See TM-04)	11

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

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

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

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	One per matrix per batch 75-125% for samples where results do not exceed 4x spike level	J(+) if %R>125% J(+)/UJ(-) if %R <75% J(+)/R(-) if %R<30% or J(+)/UJ(-) if Post Spike %R 75%-125% Qualify all samples in batch	8
Post-digestion Spike	If Matrix Spike is outside 75-125%, Spike parent sample at 2x the sample conc.	No qualifiers assigned based on this element	
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples > RL and < 5 x RL (Diff < 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9
Serial Dilution	5x dilution one per matrix %D < 10% for original sample values > 50x MDL	J(+)/UJ(-) if %D >10% All samples in batch	16
Internal Standards	Every sample SW6020: 60%-125% of cal blank IS 200.8: 30%-120% of cal blank IS	J (+)/UJ (-) all analytes associated with IS outlier	19
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < AL in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9
Linear Range	Sample concentrations must fall within range	J values over range	20

DATA VALIDATION CRITERIA

Table No.: NFG-HG
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EcoChem Validation Guidelines for Mercury Analysis by CVAA (Based on Inorganic NFG 1994 & 2004)

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

DATA VALIDATION CRITERIA

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

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

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

DATA VALIDATION CRITERIA

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

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

DATA VALIDATION CRITERIA

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

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



EcoChem, INC.
Environmental Data Quality

APPENDIX B

QUALIFIED DATA SUMMARY TABLE

Qualified Data Summary Table
SAIC - South Park Marina
SDG K0802276

Sample_ID	Lab ID	Method	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
MW-1-031208	K0802776-003	SW6020	Silver	0.012	ug/L	B	U ✓	7
MW-2-031208	K0802776-005	SW6020	Silver	0.005	ug/L	B	U ✓	7
MW-3-031208	K0802776-001	SW6020	Silver	0.011	ug/L	B	U ✓	7
MW-3-031208	K0802776-001	SW8081A	Aldrin	1.2	ng/L		J ✓	9
Trans-A-Sed	K0802776-002	NWTPH-DX	Diesel Range Organics	87	mg/Kg	H	J ✓	2
Trans-A-Sed	K0802776-002	NWTPH-DX	Residual Range Organics	490	mg/Kg	O	J	2
Trans-A-Sed	K0802776-002	SW6020	Arsenic	13	mg/Kg		J	16
Trans-A-Sed	K0802776-002	SW6020	Copper	42.5	mg/Kg		J	16
Trans-A-Sed	K0802776-002	SW6020	Zinc	83.8	mg/Kg		J	16
Trans-A-Sed	K0802776-002	SW8081A	2,4'-DDD	78	ug/Kg	PD	NJ	3,8
Trans-A-Sed	K0802776-002	SW8081A	Aldrin	46	ug/Kg		J	8
Trans-A-Sed	K0802776-002	SW8270C	Benzo(k)fluoranthene	54	ug/Kg		J	12
Trans-A-Sed	K0802776-002	SW8270C	Benzyl Alcohol	30	ug/Kg		U	7
Trans-A-Sed	K0802776-002	SW8270C	Diethylphthalate	6.3	ug/Kg	T	U	7
Trans-B-Sed	K0802776-004	NWTPH-DX	Diesel Range Organics	98	mg/Kg	H	J	2
Trans-B-Sed	K0802776-004	NWTPH-DX	Residual Range Organics	570	mg/Kg	O	J	2
Trans-B-Sed	K0802776-004	SW6020	Arsenic	18.5	mg/Kg		J	16
Trans-B-Sed	K0802776-004	SW6020	Copper	66.9	mg/Kg		J	16
Trans-B-Sed	K0802776-004	SW6020	Zinc	104	mg/Kg		J	16
Trans-B-Sed	K0802776-004	SW8270C	Benzo(k)fluoranthene	61	ug/Kg		J	12
Trans-B-Sed	K0802776-004	SW8270C	Diethylphthalate	14	ug/Kg	T	U	7