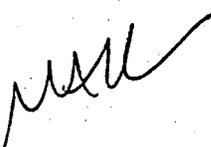
**TECHNICAL MEMORANDUM****DATE:** September 1, 2005**TO:** Janis Kesy
Project Manager
Foth & Van Dyke**FROM:** Marcia A. Kuehl
President/Owner
MAKuehl Company **SUBJECT:** Data Validation for Lower Fox River OU 1 2005 Remedial Action
Sampling Events of June 23-July 28, 2005
Foth & Van Dyke Project # : 04G007, 02G005**1.0 OVERVIEW**

Analytical results for samples listed in Table 1 and their associated laboratory QC samples collected from the Lower Fox River OU 1 have been evaluated using the EPA guidance documents "National Functional Guidelines for Organic Data Review", dated October 1999, EPA-540/R-99/008, and the "National Functional Guidelines for Inorganic Data Review", dated July, 2002, EPA-540/R-01-008.

The specific calibration and laboratory QC check requirements contained in the "Lower Fox River Operable Unit 1 Remedial Action-2004 Remedial Action Work Plan" dated May, 2004 (RAWP) were the primary criteria used in the assessment of the data for compliance with the project data quality objectives. The review was based on the data packages supplied by the analytical laboratory, Pace, located in Kimberly, Wisconsin.

All Aroclor data as reported by Pace was acceptable for use without qualification, or qualified as estimated due to the concentration being between the LOD and LOQ.

The BOD result for sample IRA-05-DEWT-EF64 was estimated from a holding time exceedance. Detected ammonia results for IRA-05-DEWT-EFF64 and IRA-05-DEWT-EFF68 were qualified as undetected, as the concentration reported is not significantly different (> 5 X) from lab background. TSS in IRA-05-SW209-912 BASELINE 6/DUP, IRA-05-SW210-902-BASELINE 7/DUP and IRA-05-SW225-902/DUP was estimated from a field duplicate precision limit exceedance.

Mercury in IRA-05-DEWT-EF55, IRA-05-DEWT-EF60 and IRA-05-DEWT-POLYMER1 was qualified as undetected as the concentration is not significantly different from field background.

All qualifiers assigned during the data validation process are discussed in detail below. The validated data sheets are attached, and the checklist used during the validation are in Appendix A.

2.0 PCB AS AROCLORS DATA

Pace utilized the EPA SW846 reference methods 3510C and 8082 as specified in their Standard Operating Procedure SVO-52, Revision No. 3 dated January, 2000 for water samples and EPA SW846 reference methods 35141 and 8082, automated soxhlet extraction on the air dried sample, acid clean-up and sulfur clean-up using copper for solid samples as specified in their Standard Operating Procedure K-SVO-77, Revision No. 3 dated June 24, 2004. No significant deviations from these SOPs were apparent from the documentation reviewed. No action was needed to qualify sample data.

2.1 Completeness Assessment

The Pace data packages received were complete. All samples listed in Table 1 that were submitted and indicated for analysis were analyzed. The data packages received for PCB analysis did not require any follow-up with Pace to enable data validation.

2.2 Compliance Assessment

2.2.1 Holding Times/Preservation

All samples for PCBs were received on ice. No notation of receipt temperature in exceedance of 2-6°C and no intact ice was noted for any samples analyzed for PCBs. None of the SDGs contained temperature blanks shipped with them, but as all samples were received "on ice", no action was needed to qualify sample data.

Water samples were extracted within 7 days after collection and sediment and soil samples within 14 days after collection. After extraction all samples were analyzed within 14 days. No action was needed to qualify sample data.

2.2.2 Initial Calibration (ICAL)

Five point initial calibration curves ranging from 0.1-1.0 ug/ml for Aroclor 1016/1260, 1242 and 1254 were analyzed on both columns, RTX-CLP (primary quantitation column) and RTX-CLP2 (confirmation column) on 6/27/05, 6/28/05, 6/30/03, 7/20/05 and 7/27/05. The rsd values measured for each peak were less than the 20 % data validation criteria. No action was taken to qualify sample data based on initial calibration results.

2.2.3 Calibration Verification (CCAL)

The required method frequency of calibration verification was every 10 samples and at the end of the instrument run was met for every SDG. In all of the SDGs reviewed in Table 1, the CCALs consisted of a 0.3 ug/ml solution of Aroclor 1242 alternating with a 0.3 ug/ml solution of Aroclor 1254. The mean percent difference between the CCAL and ICAL calibration factors for the 5-10 peaks used for identification and quantitation were all less than the 15 % data validation criteria on the primary quantitation column. No action was needed to qualify sample data.

2.2.4 Laboratory Blanks

At least one laboratory blank was prepared and extracted with every 20 project samples or less analyzed. No laboratory blanks contained detectable Aroclors above the Limit of Detection (LOD).

2.2.5 Surrogate Recoveries

Decachlorobiphenyl (DCB) and tetrachloro-m-xylene (TCX) recoveries in all project water samples were within the Pace limits of 7 - 113 % (DCB) and 49 - 112 % (TCX). No action was needed to qualify sample data.

Decachlorobiphenyl (DCB) and tetrachloro-m-xylene (TCX) recoveries in all project sediment samples were within the Pace and RAWP limits of 60 - 140 %. No action was needed to qualify sample data.

2.2.6 Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD)

At least one Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) at 5 ug/L Aroclor 1242 was prepared and analyzed with each SDG, or 20 water samples. All recoveries measured in the LCS were within the Pace limits of 47 - 138 % and < 20 % RPD. No action was needed to qualify sample data based on LCS recoveries.

At least one Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) at 500 ug/kg Aroclor 1242 was prepared and analyzed with each SDG, or 20 sediment samples. All recoveries measured in the LCS were within the RAWP 65 - 135 % and < 20 % RPD. No action was needed to qualify sample data based on LCS recoveries.

2.2.7 Detection Limit Attainment

The RAWP Reporting Limits of 1.0 ug/L and 50 ug/kg were attained in all samples when accounting for the actual sample volume extracted or the percent solids of the sample. No action was needed to qualify sample data.

Sample G-SC-1, 0-1/4" did not have enough sample volume supplied to do a percent solids analysis. PCB data for G-SC=1, 0-1/4" was reported on an as received wet weight basis.

2.2.8 Verification of Reported Results

No detectable Aroclors were present in the project water samples analyzed. No discrepancies or false negatives were detected. QC sample results such as RPD, recovery and % difference were also recalculated, but at a 10 % frequency. No discrepancies that were not due to differences in lab instrument software and the validator's calculator significant figure/rounding protocols were found in QC sample results. All detected Aroclor values reported for QC and sediment sample results are from the primary column. The analysis on the secondary column was reviewed to assess if the Aroclor pattern(s) were confirmed, and all were.

All reported Aroclors in QC and sediment samples were quantified on at least an 4 peak match. Peaks with obvious interferences were not included in the quantitation. The method retention time window criteria of ± 0.03 minutes for a minimum of a 4 peak match for Aroclor identification was met

in all QC and sediment samples.

2.3 Field QC Results

No field equipment rinsates associated with the project samples in Table 1 were analyzed for PCBs. No action was needed to qualify sample data.

A field duplicate for PCB analysis was collected for sample IRA-05-DEWT-EF65. No PCBs were detected in these samples, resulting in RPD values of 0 %, within the RAWP < 30 % RPD limit. Acceptable field precision was achieved and no action was needed to qualify sample data.

2.4 Data Usability

All Aroclor data as reported by Pace was acceptable for use without qualification. Detected PCBs in sediment samples at concentrations greater than the LOD, but below the LOQ were qualified by Pace with a "Q" qualifier, and further qualified during validation as estimated with a J code, as they are within the region of quantitation associated with less precision.

3.0 AMMONIA, BOD and TSS DATA

Pace utilized EPA reference methods 160.2 and 350.1 as specified in their Standard Operating Procedure G2-WCM-01, Revision No. 2 dated January 1, 2003 and G2-WCM-58, Revision No. 0 dated January 16, 2004. No significant deviations from this SOP was apparent from the documentation reviewed. No action was needed to qualify sample data.

BOD analysis was not a requirement in the RAWP. Pace utilized Standard Methods 5210B for BOD analysis. No significant deviations from this reference method was apparent from the documentation reviewed. No action was needed to qualify sample data.

3.1 Completeness Assessment

The Pace data packages received were complete. All samples listed in Table 1 that were submitted and indicated for analysis were analyzed. The data packages received for ammonia, BOD and TSS analysis did not require any follow-up with Pace to enable data validation.

3.2 Compliance Assessment

3.2.1 Holding Time/Preservation

Documentation of adequate acid preservation for ammonia was present. All samples were received at Pace on ice. No notation of receipt temperature in exceedance of 2-6°C was noted for any samples analyzed for BOD, ammonia and TSS. None of the SDGs contained temperature blanks shipped with them, but as all samples were received "on ice", no action was needed to qualify sample data.

All EPA recommended holding times for the methods cited above were met except for the 48 hour holding time for BOD in sample IRA-05-DEWT-EF64. The sample was received with the holding time exceeded by half and hour. Pace indicated this on the data report with a "H" qualifier. Action

taken was to qualify the BOD result for sample IRA-05-DEWT-EF64 with a J code indicating estimated data.

3.2.2 Calibration

All ammonia initial instrument calibrations for ammonia were properly performed using at least five standards and met the correlation coefficient criteria of greater than 0.995. Continuing calibration checks were performed at least once every 10 samples and all checks met performance criteria of 90-110%.

3.2.3 Laboratory Blanks

Laboratory blanks did not contain any BOD or TSS above the Limit of Detection (LOD). No action was needed to qualify sample data.

The initial calibration blank analyzed with samples IRA-05-DEWT-EFF64 and IRA-05-DEWT-EFF68 contained detectable ammonia at 0.201 mg/L, above the Pace LOD of 0.20 mg/L. Action taken was to qualify the detected ammonia results for IRA-05-DEWT-EFF64 and IRA-05-DEWT-EFF68 as undetected with a "U" code, as the concentration reported is not significantly different ($> 5 X$) from lab background.

3.2.4 Reference Standards

Recovery of reference (EPA/ERA/APG) standards were all within Pace and RAWP accuracy limits. No action was needed to qualify sample data.

3.2.5 Laboratory Duplicate Sample Analysis

All laboratory duplicate results were within the Pace and RAWP precision limits. No action was needed to qualify sample data.

3.2.6 Matrix Spike Samples

All matrix spike sample recoveries were within the Pace and RAWP accuracy limits. No action was needed to qualify sample data.

3.3 Field QC Results

Field equipment rinsates associated with the project samples in Table 1 were collected with the project samples. One rinsate, IRA-05-SW213-RINSE-902 BASELINE 10 contained detectable TSS at 0.60 mg/L. No action was needed to qualify sample data, as all samples collected with this rinsate contained TSS at concentrations exceeding 5 X the rinsate concentration.

No field equipment rinsates associated with the project samples in Table 1 were analyzed for BOD or ammonia. No action was taken to qualify ammonia or BOD sample data.

Field duplicates for TSS were collected with the project samples listed in Table 1 and the Relative Percent Difference (RPD) calculated below:

Sample ID (IRA-05-)	TSS (mg/L)	TSS (mg/L) DUP	RPD
SW209-912 BASELINE 6	18	19	6 %
SW210-902 BASELINE 7	71	53	29 %
SW225-902	18	17	64 %

None of the RPD values met the RAWP precision limit of 5 %. Action taken was to qualify TSS in IRA-05-SW209-912 BASELINE 6/DUP, IRA-05-SW210-902-BASELINE 7/DUP and IRA-05-SW225-902/DUP as estimated with a J code from this precision limit exceedance.

No field duplicates were collected with the project samples listed in Table 1 for ammonia and BOD. No action was taken to qualify sample data.

3.4 Data Usability

The BOD result for sample IRA-05-DEWT-EF64 was estimated from a holding time exceedance. Detected ammonia results for IRA-05-DEWT-EFF64 and IRA-05-DEWT-EFF68 were qualified as undetected, as the concentration reported is not significantly different ($> 5 X$) from lab background. TSS in IRA-05-SW209-912 BASELINE 6/DUP, IRA-05-SW210-902-BASELINE 7/DUP and IRA-05-SW225-902/DUP was estimated from a field duplicate precision limit exceedance.

Results greater than the LOD, but less than the LOQ were qualified by Pace with a "Q" qualifier. During the validation process, all "Q" qualified results were further qualified with a J code indicating estimated data. These concentrations should be considered estimated as they are within the region of quantitation associated with less precision.

4.0 MERCURY DATA

Pace utilized EPA method 1631E. No significant deviations from the EPA reference method was apparent from the documentation reviewed. No action was needed to qualify sample data.

4.1 Completeness Assessment

The data packages received for mercury analysis were complete. All samples submitted were digested and analyzed. No action was needed to qualify sample data.

4.2 Compliance Assessment

4.2.1 Holding Time/Preservation

All samples were analyzed within the 28 day holding time. No notation of storage or shipping temperature in exceedance of $4 \pm 2^{\circ}\text{C}$ was noted. No action was needed to qualify mercury sample data based on exceedance of holding time or preservation requirements.

4.2.2 Calibration

The initial instrument calibrations were five points ranging from 0.05 - 4 ng/L and correlation

coefficients were all ≥ 0.995 . Continuing calibration checks were performed at least once every 10 samples and were within Pace's 80-120% limits. No action was needed to qualify sample data.

4.2.3 Laboratory Blanks

Mercury in most bottle blanks and method blanks were below the Pace LOD of 0.197 ng/L, except for three method blanks with detectable mercury at 0.334 ng/L, 0.275 ng/L and 0.254 ng/L. No action was needed to qualify sample data, as all samples analyzed with these blanks contained detectable mercury at concentrations greater than 5 X the method blank.

4.2.4 Ongoing Precision and Recovery (OPR) Standard

An OPR was prepared with each set of samples at 5 ng/L. Recoveries were all within Pace's limits of 79 - 121 %. No action was needed to qualify sample data.

4.2.5 Matrix Spike/Matrix Spike Duplicate

MS/MSD recoveries and RPD were all within Pace's limits of 75 - 125 % and < 24 % RPD. No action was needed to qualify sample data.

4.3 Field QC Results

A field blank was collected with each of the project samples. Mercury was detected in these blanks at concentrations ranging from 0.282 - 0.584 ng/L. The field blank SLURRY1 FB, contained mercury above the LOQ and was confirmed by reanalysis. Action taken was to qualify the detected sample concentration associated with the field blank if the concentration was not significantly different ($< 5 X$) from the field blank as undetected with a "U" code. Mercury in IRA-05-DEWT-EF55, IRA-05-DEWT-EF60 and IRA-05-DEWT-POLYMER1 was qualified as undetected.

No field duplicates were collected for mercury. No action was needed to qualify sample data.

4.4 Data Usability

Mercury in IRA-05-DEWT-EF55, IRA-05-DEWT-EF60 and IRA-05-DEWT-POLYMER1 was qualified as undetected as the concentration is not significantly different from field background.

Results greater than the LOD, but less than the LOQ were qualified by Pace with a "Q" qualifier. During the validation process, all "Q" qualified results were further qualified with a J code indicating estimated data. These concentrations should be considered estimated as they are within the region of quantitation associated with less precision.

If you have any questions regarding the qualification of data or the data validation process/criteria used, please contact me at (920) 469-9113.

Attachments:

Table 1

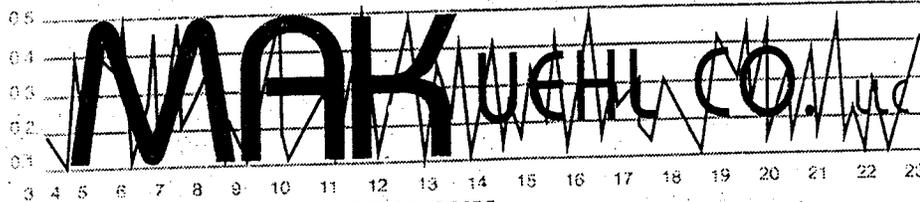
Validated hard copy Data Sheets

Appendix A: Data Validation Checklist

copy w/o attachments

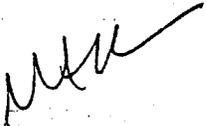
Table 1 Data Validated - Lower Fox River Foth Van Dyke

LAB(S)	SDG#	Date Rec'd by		Field		Field		Analytes
		Kuehl	Matrix	Sample ID	Collection Date	Lab sample ID		
Enchem	860824	20-Jul-05	sediment	G-SC-1, 0-0.25"	23-Jun-05	860824-001	PCBS	
Enchem	860824	20-Jul-05	sediment	G-SC-3, 0-1"	23-Jun-05	860824-002	PCBS, % solids	
Enchem	860824	20-Jul-05	sediment	G-SC-4, 0-5 "	23-Jun-05	860824-003	PCBS, % solids	
Enchem	860824	20-Jul-05	sediment	G-SC-4, 0-5 "	23-Jun-05	860824-003	PCB-FRM, % solids	
Enchem	860404	20-Jul-05	water	IRA-05-DEWT-EF-CONSTRUCTION DEWATERING	14-Jun-05	860404-001	TSS, BOD, NH3, PCBs	
Enchem	860708	20-Jul-05	water	IRA-05-000A SW204-912 BASELINE 1	22-Jun-05	860708-001	TSS	
Enchem	860708	20-Jul-05	water	IRA-05-000A SW205-912 BASELINE 2	23-Jun-05	860825-001	TSS	
Enchem	860886	20-Jul-05	water	IRA-05-000A SW206-912 BASELINE 3	27-Jun-05	860886-001	TSS	
Enchem	861035	20-Jul-05	water	IRA-05-SW207-912, BASELINE 4	29-Jun-05	861035-001	TSS	
Enchem	861035	20-Jul-05	water	IRA-05-SW208-902, BASELINE 5	29-Jun-05	861035-002	TSS	
Enchem	861035	20-Jul-05	water	IRA-05-SW209-912, BASELINE 6	30-Jun-03	861035-003	TSS	
Enchem	861035	20-Jul-05	water field duplicate	IRA-05-SW209-912 DUP, BASELINE 6	30-Jun-03	861035-004	TSS	
Enchem	861035	20-Jul-05	water	IRA-05-SW210-902, BASELINE 7	30-Jun-03	861035-005	TSS	
Enchem	861035	20-Jul-05	water field duplicate	IRA-05-SW210-902 DUP, BASELINE 7	30-Jun-03	861035-006	TSS	
Enchem	861545	9-Aug-05	water	IRA-05-SW220-902	15-Jul-05	861545-001	TSS	
Enchem	861035	20-Jul-05	water	IRA-05-SW221-912	15-Jul-05	861545-002	TSS	
Enchem	861545	9-Aug-05	water	IRA-05-DEWT-EF57	15-Jul-05	861545-003	TSS, BOD, NH3, PCBs	
Enchem	861740	9-Aug-05	water	IRA-05-DEWT-EF62	21-Jul-05	861740-001	TSS, BOD, NH3, PCBs	
Enchem	861740	9-Aug-05	water	IRA-05-DEWT-EF63	22-Jul-05	861767-001	TSS, BOD, NH3, PCBs	
Enchem	861740	9-Aug-05	water	IRA-05-DEWT-EF63 DUP	22-Jul-05	861767-002	TSS, BOD, NH3, PCBs	
Enchem	861740	9-Aug-05	water	IRA-05-000A-SW228-905	22-Jul-05	861767-003	TSS	
Enchem	861740	9-Aug-05	water	IRA-05-000A-SW229-902	22-Jul-05	861767-004	TSS	
Enchem	861740	9-Aug-05	water	IRA-05-000A-SW230-912	22-Jul-05	861767-005	TSS	
Enchem	861565	9-Aug-05	water	IRA-05-DEWT-EF58	16-Jul-05	861565-001	TSS, BOD, NH3, PCBs	
Enchem	861613	9-Aug-05	water	IRA-05-DEWT-EF59	19-Jul-05	861613-001	TSS, BOD, NH3, PCBs	
Enchem	861578	8-Aug-05	water	IRA-05-SW222-902	18-Jul-05	861578-001	TSS	
Enchem	861578	8-Aug-05	water	IRA-05-SW223-912	18-Jul-05	861578-002	TSS	
Enchem	861275	8-Aug-05	water	IRA-05-SW217-912	8-Jul-05	861275-001	TSS	
Enchem	861275	8-Aug-05	water	IRA-05-SW216-902	8-Jul-05	861275-002	TSS	
Enchem	861275	8-Aug-05	water	IRA-05-SW219-912	11-Jul-05	861314-001	TSS	
Enchem	861275	8-Aug-05	water	IRA-05-SW218-902	11-Jul-05	861314-002	TSS	
Enchem	861117	8-Aug-05	water	IRA-05-SW211-912 BASELINE 8	5-Jul-05	861117-001	TSS	
Enchem	861117	8-Aug-05	water	IRA-05-SW212-902 BASELINE 9	5-Jul-05	861117-002	TSS	
Enchem	861117	8-Aug-05	water field rinsate	IRA-05-SW213RINSE-902-BASELINE 10	5-Jul-05	861117-003	TSS	
Enchem	861398	8-Aug-05	water	IRA-05-DEWT-EF56	13-Jul-05	861398-005	TSS, BOD, NH3, PCBs	
Enchem	861398	8-Aug-05	water	IRA-05-DEWT-EF55	12-Jul-05	861398-001	low level Hg	
Enchem	861398	8-Aug-05	water field blank	IRA-05-DEWT-EF55-FB	12-Jul-05	861398-002	low level Hg	
Enchem	861398	8-Aug-05	water	IRA-05-DEWT-WEEP1	12-Jul-05	861398-003	low level Hg	
Enchem	861398	8-Aug-05	water field blank	IRA-05-DEWT-WEEP1-FB	12-Jul-05	861398-004	low level Hg	
Enchem	861689	12-Aug-05	water	IRA-05-DEWT-EF60	19-Jul-05	861689-001	low level Hg	
Enchem	861689	12-Aug-05	water field blank	IRA-05-DEWT-EF60-FB	19-Jul-05	861689-002	low level Hg	
Enchem	861689	12-Aug-05	water	IRA-05-DEWT-WEEP2	19-Jul-05	861689-003	low level Hg	
Enchem	861689	12-Aug-05	water field blank	IRA-05-DEWT-WEEP2-FB	19-Jul-05	861689-004	low level Hg	
Enchem	861689	12-Aug-05	water	IRA-05-DEWT-RIVER1	19-Jul-05	861689-005	low level Hg	
Enchem	861689	12-Aug-05	water field blank	IRA-05-DEWT-RIVER1 FB	19-Jul-05	861689-006	low level Hg	
Enchem	861689	12-Aug-05	water	IRA-05-DEWT-POLYMER1	20-Jul-05	861691-001	low level Hg	
Enchem	861689	12-Aug-05	water field blank	IRA-05-DEWT-POLYMER1 FB	20-Jul-05	861691-002	low level Hg	
Enchem	861689	12-Aug-05	water	IRA-05-DEWT-FERRIC SULFATE1	20-Jul-05	861691-003	low level Hg	
Enchem	861689	12-Aug-05	water field blank	IRA-05-DEWT-FERRIC SULFATE1 FB	20-Jul-05	861691-004	low level Hg	
Enchem	861689	12-Aug-05	water	IRA-05-DEWT-SLURRY1	20-Jul-05	861691-005	low level Hg	
Enchem	861689	12-Aug-05	water field blank	IRA-05-DEWT-SLURRY1 FB	20-Jul-05	861691-006	low level Hg	
Enchem	861689	12-Aug-05	water	IRA-05-DEWT-EF61	20-Jul-05	861689-007	TSS, BOD, NH3, PCBs	
Enchem	861689	12-Aug-05	water	IRA-05-SW224-905	20-Jul-05	861689-008	TSS	
Enchem	861689	12-Aug-05	water	IRA-05-SW225-902	20-Jul-05	861689-009	TSS	
Enchem	861689	12-Aug-05	water field duplicate	IRA-05-SW225DUP-902	20-Jul-05	861689-010	TSS	
Enchem	861689	12-Aug-05	water	IRA-05-SW226-912	20-Jul-05	861689-011	TSS	
Enchem	861689	12-Aug-05	water field blank	IRA-05-SW227-RINSE-912	20-Jul-05	861689-012	TSS	
Enchem	861228	12-Aug-05	water	IRA-05-SW214-902	7-Jul-05	861228-001	TSS	
Enchem	861228	12-Aug-05	water	IRA-05-SW215-912	7-Jul-05	861228-002	TSS	
Enchem	861968	12-Aug-05	water	IRA-05-DEWT-EF68	28-Jul-05	861968-001	TSS, BOD, NH3, PCBs	
Enchem	861968	12-Aug-05	water	IRA-05-SW234-905	28-Jul-05	861968-002	TSS	
Enchem	861968	12-Aug-05	water	IRA-05-SW235-902	28-Jul-05	861968-003	TSS	
Enchem	861968	12-Aug-05	water	IRA-05-SW236-912	28-Jul-05	861968-004	TSS	
Enchem	861817	12-Aug-05	water	IRA-05-DEWT-EF64	23-Jul-05	861817-001	TSS, BOD, NH3, PCBs	
Enchem	861817	12-Aug-05	water	IRA-05-DEWT-EF65	26-Jul-05	861844-001	TSS, BOD, NH3, PCBs	
Enchem	861817	12-Aug-05	water field duplicate	IRA-05-DEWT-EF65DUP	26-Jul-05	861844-002	PCBs	

**TECHNICAL MEMORANDUM**

DATE: September 13, 2005

TO: Janis Kesy
Project Manager
Foth & Van Dyke

FROM: Marcia A. Kuehl 
President/Owner
MAKuehl Company

SUBJECT: Data Validation for Lower Fox River OU 1 2005 Remedial Action
Sampling Events of July 26-August 20, 2005
Foth & Van Dyke Project # : 04G007, 02G005

1.0 OVERVIEW

Analytical results for samples listed in Table 1 and their associated laboratory QC samples collected from the Lower Fox River OU 1 have been evaluated using the EPA guidance documents "National Functional Guidelines for Organic Data Review", dated October 1999, EPA-540/R-99/008, and the "National Functional Guidelines for Inorganic Data Review", dated July, 2002, EPA-540/R-01-008.

The specific calibration and laboratory QC check requirements contained in the "Lower Fox River Operable Unit 1 Remedial Action-2004 Remedial Action Work Plan" dated May, 2004 (RAWP) were the primary criteria used in the assessment of the data for compliance with the project data quality objectives. The review was based on the data packages supplied by the analytical laboratory, Pace, located in Kimberly, Wisconsin.

All Aroclor data as reported by Pace was acceptable for use without qualification, or qualified as estimated due to the concentration being between the LOD and LOQ.

Ammonia in samples IRA-05-DEWT-EF67, 82 and 84 were qualified as undetected as the concentration reported is not significantly different from lab background. TSS in IRA-05-SW241-902/DUP was estimated from a laboratory precision limit exceedance. Ammonia in IRA-05-DEWT-EF75./DUP was estimated from greater than expected field imprecision/matrix variability.

Mercury in IRA-05-DEWT-EF66, IRA-05-DEWT-EF83 and IRA-05-DEWT-EF78 as undetected as the concentrations were not significantly different from lab background. Mercury in IRA-05-DEWT-EF72 and IRA-05-DEWT-EF83 was qualified as undetected as the concentration is not significantly different from field background.

All qualifiers assigned during the data validation process are discussed in detail below. The validated data sheets are attached, and the checklist used during the validation are in Appendix A.

2.0 PCB AS AROCLORS DATA

Pace utilized the EPA SW846 reference methods 3510C and 8082 as specified in their Standard Operating Procedure SVO-52, Revision No. 3 dated January, 2000 for water samples and EPA SW846 reference methods 35141 and 8082, automated soxhlet extraction on the air dried sample, acid clean-up and sulfur clean-up using copper for solid samples as specified in their Standard Operating Procedure K-SVO-77, Revision No. 3 dated June 24, 2004. No significant deviations from these SOPs were apparent from the documentation reviewed. No action was needed to qualify sample data.

2.1 Completeness Assessment

The Pace data packages received were complete. All samples listed in Table 1 that were submitted and indicated for analysis were analyzed. The data packages received for PCB analysis did not require any follow-up with Pace to enable data validation.

2.2 Compliance Assessment

2.2.1 Holding Times/Preservation

All samples for PCBs were received on ice. No notation of receipt temperature in exceedance of 2-6°C and no intact ice was noted for any samples analyzed for PCBs. None of the SDGs contained temperature blanks shipped with them, but as all samples were received "on ice", no action was needed to qualify sample data.

Water samples were extracted within 7 days after collection and sediment and soil samples within 14 days after collection. After extraction all samples were analyzed within 14 days. No action was needed to qualify sample data.

2.2.2 Initial Calibration (ICAL)

Five point initial calibration curves ranging from 0.1-1.0 ug/ml for Aroclor 1016/1260, 1242 and 1254 were analyzed on both columns, RTX-CLP (primary quantitation column) and RTX-CLP2 (confirmation column) on 6/28/05, 7/27/05, 8/1/05, 8/9/05 and 8/16/05. The rsd values measured for each peak were less than the 20 % data validation criteria. No action was taken to qualify sample data based on initial calibration results.

2.2.3 Calibration Verification (CCAL)

The required method frequency of calibration verification was every 10 samples and at the end of the instrument run was met for every SDG. In all of the SDGs reviewed in Table 1, the CCALs consisted of a 0.3 ug/ml solution of Aroclor 1242 alternating with a 0.3 ug/ml solution of Aroclor 1254. The mean percent difference between the CCAL and ICAL calibration factors for the 5-10 peaks used for identification and quantitation were all less than the 15 % data validation criteria on the primary quantitation column. No action was needed to qualify sample data.

2.2.4 Laboratory Blanks

At least one laboratory blank was prepared and extracted with every 20 project samples or less

analyzed. No laboratory blanks contained detectable Aroclors above the Limit of Detection (LOD).

2.2.5 Surrogate Recoveries

Decachlorobiphenyl (DCB) and tetrachloro-m-xylene (TCX) recoveries in all project water samples were within the Pace limits of 7 - 113 % (DCB) and 49 - 112 % (TCX). No action was needed to qualify sample data.

Decachlorobiphenyl (DCB) and tetrachloro-m-xylene (TCX) recoveries in all project sediment samples were within the Pace and RAWP limits of 60 - 140 %. No action was needed to qualify sample data.

2.2.6 Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD)

At least one Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) at 5 ug/L Aroclor 1242 was prepared and analyzed with each SDG, or 20 water samples. All recoveries measured in the LCS were within the Pace limits of 47 - 138 % and < 20 % RPD. No action was needed to qualify sample data based on LCS recoveries.

At least one Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) at 500 ug/kg Aroclor 1242 was prepared and analyzed with each SDG, or 20 sediment samples. All recoveries measured in the LCS were within the RAWP 65 - 135 % and < 20 % RPD. No action was needed to qualify sample data based on LCS recoveries.

2.2.7 Detection Limit Attainment

The RAWP Reporting Limits of 1.0 ug/L and 50 ug/kg were attained in all samples when accounting for the actual sample volume extracted or the percent solids of the sample. No action was needed to qualify sample data.

2.2.8 Verification of Reported Results

No detectable Aroclors were present in the project water samples analyzed. No discrepancies or false negatives were detected. QC sample results such as RPD, recovery and % difference were also recalculated, but at a 10 % frequency. No discrepancies that were not due to differences in lab instrument software and the validator's calculator significant figure/rounding protocols were found in QC sample results. All detected Aroclor values reported for QC and sediment sample results are from the primary column. The analysis on the secondary column was reviewed to assess if the Aroclor pattern(s) were confirmed, and all were.

All reported Aroclors in QC and the sediment sample were quantified on at least an 4 peak match. Peaks with obvious interferences were not included in the quantitation. The method retention time window criteria of ± 0.03 minutes for a minimum of a 4 peak match for Aroclor identification was met in all QC and sediment samples.

2.3 Field QC Results

No field equipment rinsates associated with the project samples in Table 1 were analyzed for PCBs. No action was needed to qualify sample data.

A field duplicate for PCB analysis was collected for sample IRA-05-DEWT-EF75. No PCBs were detected in these samples, resulting in RPD values of 0 %, within the RAWP < 30 % RPD limit. Acceptable field precision was achieved and no action was needed to qualify sample data.

2.4 Data Usability

All Aroclor data as reported by Pace was acceptable for use without qualification. Detected PCBs in sediment samples at concentrations greater than the LOD, but below the LOQ were qualified by Pace with a "Q" qualifier, and further qualified during validation as estimated with a J code, as they are within the region of quantitation associated with less precision.

3.0 AMMONIA, BOD and TSS DATA

Pace utilized EPA reference methods 160.2 and 350.1 as specified in their Standard Operating Procedure G2-WCM-01, Revision No. 2 dated January 1, 2003 and G2-WCM-58, Revision No. 0 dated January 16, 2004. No significant deviations from this SOP was apparent from the documentation reviewed. No action was needed to qualify sample data.

BOD analysis was not a requirement in the RAWP. Pace utilized Standard Methods 5210B for BOD analysis. No significant deviations from this reference method was apparent from the documentation reviewed. No action was needed to qualify sample data.

3.1 Completeness Assessment

The Pace data packages received were complete. All samples listed in Table 1 that were submitted and indicated for analysis were analyzed. The data packages received for ammonia, BOD and TSS analysis did not require any follow-up with Pace to enable data validation.

3.2 Compliance Assessment

3.2.1 Holding Time/Preservation

Documentation of adequate acid preservation for ammonia was present. All EPA recommended holding times for the methods cited above were met. All samples were received at Pace on ice. No notation of receipt temperature in exceedance of 2-6°C was noted for any samples analyzed for BOD, ammonia and TSS. None of the SDGs contained temperature blanks shipped with them, but as all samples were received "on ice", no action was needed to qualify sample data.

3.2.2 Calibration

All ammonia initial instrument calibrations for ammonia were properly performed using at least five standards and met the correlation coefficient criteria of greater than 0.995. Continuing calibration checks were performed at least once every 10 samples and all checks met performance criteria of 90-110%.

3.2.3 Laboratory Blanks

Laboratory blanks did not contain any BOD or TSS above the Limit of Detection (LOD). No action was needed to qualify sample data.

The method blanks analyzed with samples IRA-05-DEWT-EFF67, 69, 70, 79, 80, 81, 82 and 84 contained detectable ammonia at concentrations ranging from 0.201 - 0.245 mg/L, above the Pace LOD of 0.20 mg/L. Pace qualified sample results associated with these contaminated blanks with an "A" qualifier if the sample concentration was less than 20 X the lab blank. Action taken was to qualify the detected ammonia results in these samples as undetected with a "U" code, as the concentration reported is not significantly different ($> 5 X$) from lab background. Ammonia in samples IRA-05-DEWT-EF67, 82 and 84 were qualified as undetected.

3.2.4 Reference Standards/Lab Control Standards (LCS/LCSD)

Recovery of reference (EPA/ERA/APG) standards were all within Pace and RAWP accuracy limits, except for the glucose-glutamic acid standard analyzed for BOD with samples IRA-05-DEWT-EF85 and 86. Recovery was high at 119.7 %, outside the Pace limit and Pace qualified the associated sample data with a "6" qualifier. No further action was needed to qualify sample data, as the samples did not contain any detectable BOD and no high bias was possible.

3.2.5 Laboratory Duplicate Sample Analysis

All laboratory duplicate and LCS/LCSD RPD results were within the Pace and RAWP precision limits, except for the TSS LCS/LCSD duplicate analyzed with IRA-05-DEWT-EF76 (33.2 %, limit 10 %) and the ammonia lab duplicate analyzed with IRA-05-DEWT-EFDUP75 (35.1 %, limit 20 %). Pace qualified the sample data with a "*" qualifier. Action taken was to qualify TSS in IRA-05-DEWT-EF76 and ammonia in IRA-05-DEWT-EFDUP75 as estimated with a J code from laboratory imprecision.

3.2.6 Matrix Spike Samples

All matrix spike sample recoveries were within the Pace and RAWP accuracy limits, except for ammonia in the matrix spike of IRA-05-DEWTDUP-75. Recovery was 135.7 %, above the 110 % limit. Pace qualified the sample data with an "N" qualifier. Action taken was to qualify ammonia in IRA-05-DEWTDUP-75 as estimated with a J code from a high bias.

3.3 Field QC Results

Two field equipment rinsates associated with the project samples in Table 1 were collected with the project samples for TSS analysis. No TSS was present in the rinsates above the LOD. No action was needed to qualify sample data.

No field equipment rinsates associated with the project samples in Table 1 were analyzed for BOD or ammonia. No action was taken to qualify ammonia or BOD sample data.

Field duplicates for TSS were collected with the project samples listed in Table 1 and the Relative Percent Difference (RPD) calculated below:

Sample ID (IRA-05-)	TSS (mg/L)	TSS (mg/L) DUP	RPD
SW241-902	27	29	7 %
SW251-902	33	32	3 %
DEWT EF75	< 0.31	< 0.31	0 %

The RPD value for IRA-05-SW241-902/DUP exceeded the RAWP precision limit of 5 %. Action taken was to qualify TSS in IRA-05-SW241-902/DUP as estimated with a J code from this precision limit exceedance.

A field duplicate was collected with the project samples listed in Table 1 for ammonia and BOD for IRA-05-DEWT-EF75. No detectable BOD was present in these samples and ammonia was present at 0.22 mg/L and 0.31 mg/L, for a calculated RPD value of 34 % which exceeded the RAWP precision limit of 20 % for ammonia. Action taken was to qualify ammonia in IRA-05-DEWT-EF75./DUP as estimated with a J code from greater than expected field imprecision/matrix variability.

3.4 Data Usability

Ammonia in samples IRA-05-DEWT-EF67, 82 and 84 were qualified as undetected as the concentration reported is not significantly different from lab background. TSS in IRA-05-SW241-902/DUP was estimated from a laboratory precision limit exceedance. Ammonia in IRA-05-DEWT-EF75./DUP was estimated from greater than expected field imprecision/matrix variability.

Results greater than the LOD, but less than the LOQ were qualified by Pace with a "Q" qualifier. During the validation process, all "Q" qualified results were further qualified with a J code indicating estimated data. These concentrations should be considered estimated as they are within the region of quantitation associated with less precision.

4.0 MERCURY DATA

Pace utilized EPA method 1631E. No significant deviations from the EPA reference method was apparent from the documentation reviewed. No action was needed to qualify sample data.

4.1 Completeness Assessment

The data packages received for mercury analysis were complete. All samples submitted were digested and analyzed. No action was needed to qualify sample data.

4.2 Compliance Assessment

4.2.1 Holding Time/Preservation

All samples were analyzed within the 28 day holding time. No notation of storage or shipping temperature in exceedance of $4 \pm 2^{\circ}\text{C}$ was noted. No action was needed to qualify mercury sample data based on exceedance of holding time or preservation requirements.

4.2.2 Calibration

The initial instrument calibrations were five points ranging from 0.05 - 4 ng/L and correlation coefficients were all ≥ 0.995 . Continuing calibration checks were performed at least once every 10 samples and were within Pace's 80-120% limits. No action was needed to qualify sample data.

4.2.3 Laboratory Blanks

Mercury in most bottle blanks and method blanks were below the Pace LOD of 0.197 ng/L, except for method blanks associated with SDGs 861886, 862659 and 86247 with detectable mercury ranging from 0.201 to 0.4392. Action taken was to qualify mercury in samples at concentrations less than 5 X the associated method blank(s) as undetected with a "U" code as the concentration reported is not significantly different from lab background. Mercury in IRA-05-DEWT-EF66, IRA-05-DEWT-EF83 and IRA-05-DEWT-EF78 was qualified as undetected.

4.2.4 Ongoing Precision and Recovery (OPR) Standard

An OPR was prepared with each set of samples at 5 ng/L. Recoveries were all within Pace's limits of 79 - 121 %. No action was needed to qualify sample data.

4.2.5 Matrix Spike/Matrix Spike Duplicate

MS/MSD recoveries and RPD were all within Pace's limits of 75 - 125 % and < 24 % RPD. No action was needed to qualify sample data.

4.3 Field QC Results

A field blank was collected with each of the project samples. Mercury was detected in these blanks at concentrations ranging from 0.317 - 0.466 ng/L. Action taken was to qualify the detected sample concentration associated with the field blank if the concentration was not significantly different (< 5 X) from the field blank as undetected with a "U" code. Mercury in IRA-05-DEWT-EF72 and IRA-05-DEWT-EF83 was qualified as undetected.

No field duplicates were collected for mercury. No action was needed to qualify sample data.

4.4 Data Usability

Mercury in IRA-05-DEWT-EF66, IRA-05-DEWT-EF83 and IRA-05-DEWT-EF78 as undetected as the concentrations were not significantly different from lab background. Mercury in IRA-05-DEWT-EF72 and IRA-05-DEWT-EF83 was qualified as undetected as the concentration is not significantly different from field background.

Results greater than the LOD, but less than the LOQ were qualified by Pace with a "Q" qualifier. During the validation process, all "Q" qualified results were further qualified with a J code indicating estimated data. These concentrations should be considered estimated as they are within the region of quantitation associated with less precision.

If you have any questions regarding the qualification of data or the data validation process/criteria used, please contact me at (920) 469-9113.

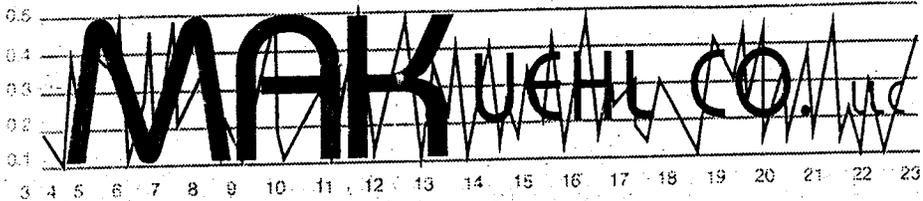
Attachments:

Table 1
Validated hard copy Data Sheets
Appendix A: Data Validation Checklist

Copy w/o attachments

Table 1 Data Validated - Lower Fox River Foth Van Dyke

LAB(S)	SDG#	Date Rec'd by	Field	Field	Collection Date	Lab sample ID	Analytes
		Kuehl	Matrix	Sample ID			
Pace	861989	23-Aug-05	water	IRA-05-DEWT-EF69	29-Jul-05	861989-001	TSS, BOD, NH3, PCBs
Pace	861989	23-Aug-05	water	IRA-05-DEWT-EF70	30-Jul-05	862061-001	TSS, BOD, NH3, PCBs
Pace	861886	23-Aug-05	water	IRA-05-OOOA-SW231-905	26-Jul-05	861886-001	TSS
Pace	861886	23-Aug-05	water	IRA-05-OOOA-SW232-902	26-Jul-05	861886-002	TSS
Pace	861886	23-Aug-05	water	IRA-05-OOOA-SW233-912	26-Jul-05	861886-003	TSS
Pace	861886	23-Aug-05	water	IRA-5-DEWT-RIVER2	26-Jul-05	861886-004	low level mercury
Pace	861886	23-Aug-05	field blank	IRA-05-DEWT-RIVER2-FB	26-Jul-05	861886-005	low level mercury
Pace	861886	23-Aug-05	water	IRA-05-DEWT-EF66	26-Jul-05	861886-006	low level mercury
Pace	861886	23-Aug-05	field blank	IRA-05-DEWT-EF66 FB	26-Jul-05	861886-007	low level mercury
Pace	861886	23-Aug-05	water	IRA-05-DEWT-EF67	26-Jul-05	861886-008	low level mercury
Pace	861886	23-Aug-05	field blank	IRA-05-DEWT-EF67 FB	26-Jul-05	861886-009	low level mercury
Pace	861886	23-Aug-05	water	IRA-05-DEWT-WEEP3	26-Jul-05	861886-010	TSS, BOD, NH3, PCBs
Pace	861886	23-Aug-05	field blank	IRA-05-DEWT-WEEP3 FB	26-Jul-05	861886-011	TSS, BOD, NH3, PCBs
Pace	861886	23-Aug-05	water	IRA-05-DEWT-EF 74	4-Aug-05	862253-001	TSS, BOD, NH3, PCBs
Pace	862253	30-Aug-05	water	IRA-05-DEWT-EF 74	5-Aug-05	862333-001	TSS, BOD, NH3, PCBs
Pace	862253	30-Aug-05	water	IRA-05-DEWT-EF 75	5-Aug-05	862333-002	TSS, BOD, NH3, PCBs
Pace	862253	30-Aug-05	field duplicate	IRA-05-DEWT-EF DUP 75	5-Aug-05	862333-003	TSS
Pace	862253	30-Aug-05	water	IRA-05-OOOA-SW244-905	5-Aug-05	862333-004	TSS
Pace	862253	30-Aug-05	water	IRA-05-OOOA-SW245-902	5-Aug-05	862333-005	TSS
Pace	862253	30-Aug-05	water	IRA-05-OOOA-SW246-912	5-Aug-05	862333-006	TSS, BOD, NH3, PCBs
Pace	862253	30-Aug-05	water	IRA-05-DEWT-EF 76	6-Aug-05	862360-001	TSS, BOD, NH3, PCBs
Pace	862253	30-Aug-05	water	IRA-05-OOOA-PS-95P	10-Aug-05	862512-001	PCBs
Pace	862512	30-Aug-05	sediment	IRA-05-OOOA-PS-95P	10-Aug-05	862494-001	TSS, BOD, NH3, PCBs
Pace	862494	30-Aug-05	water	IRA-05-DEWT-EF 79	10-Aug-05	862544-001	TSS, BOD, NH3, PCBs
Pace	862494	30-Aug-05	water	IRA-05-DEWT-EF 80	11-Aug-05	862544-002	TSS, BOD, NH3, PCBs
Pace	862122	30-Aug-05	water	IRA-05-DEWT-EF 71	2-Aug-05	862122-001	TSS, BOD, NH3, PCBs
Pace	862122	30-Aug-05	water	IRA-05-DEWT-EF 72	2-Aug-05	862122-002	low level mercury
Pace	862122	30-Aug-05	field blank	IRA-05-DEWT-EF 72 FB	2-Aug-05	862122-003	low level mercury
Pace	862122	30-Aug-05	water	IRA-05-DEWT-WEEP4	2-Aug-05	862122-004	low level mercury
Pace	862122	30-Aug-05	field blank	IRA-05-DEWT-WEEP4 FB	2-Aug-05	862122-005	low level mercury
Pace	862122	30-Aug-05	water	IRA-5-DEWT-RIVER3	2-Aug-05	862122-006	low level mercury
Pace	862122	30-Aug-05	field blank	IRA-05-DEWT-RIVER3-FB	2-Aug-05	862122-007	low level mercury
Pace	862122	30-Aug-05	water	IRA-05-OOOA-SW237-905	2-Aug-05	862122-008	TSS
Pace	862122	30-Aug-05	water	IRA-05-OOOA-SW238-902	2-Aug-05	862122-009	TSS
Pace	862122	30-Aug-05	water	IRA-05-OOOA-SW239-912	2-Aug-05	862122-010	TSS
Pace	862122	30-Aug-05	water	IRA-05-OOOA-SW240-905	3-Aug-05	862175-001	TSS
Pace	862122	30-Aug-05	water	IRA-05-OOOA-SW241-902	3-Aug-05	862175-002	TSS
Pace	862122	30-Aug-05	water	IRA-05-OOOA-SW242-912	3-Aug-05	862175-003	TSS
Pace	862122	30-Aug-05	field duplicate	IRA-05-OOOA-SW241 DUP-902	3-Aug-05	862175-004	TSS
Pace	862122	30-Aug-05	field blank	IRA-05-OOOA-SW243 RINSE-912	3-Aug-05	862175-005	TSS
Pace	862122	30-Aug-05	water	IRA-05-DEWT-EF 73	3-Aug-05	862175-006	TSS, BOD, NH3, PCBs
Pace	862437	6-Sep-05	water	IRA-05-DEWT-EF77	9-Aug-05	862437-001	TSS, BOD, NH3, PCBs
Pace	862437	6-Sep-05	water	IRA-05-DEWT-EF78	9-Aug-05	862437-002	low level mercury
Pace	862437	6-Sep-05	field blank	IRA-05-DEWT-EF78 FB	9-Aug-05	862437-003	low level mercury
Pace	862437	6-Sep-05	water	IRA-05-DEWT-WEEP 5	9-Aug-05	862437-004	low level mercury
Pace	862437	6-Sep-05	field blank	IRA-05-DEWT-WEEP 5 FB	9-Aug-05	862437-005	low level mercury
Pace	862437	6-Sep-05	water	IRA-05-DEWT-RIVER 4	9-Aug-05	862437-006	low level mercury
Pace	862437	6-Sep-05	field blank	IRA-05-DEWT-RIVER 4 FB	9-Aug-05	862437-007	low level mercury
Pace	862437	6-Sep-05	water	IRA-05-OOOA-SW247-905	9-Aug-05	862437-008	TSS
Pace	862437	6-Sep-05	water	IRA-05-OOOA-SW248-902	9-Aug-05	862437-009	TSS
Pace	862437	6-Sep-05	water	IRA-05-OOOA-SW249-912	9-Aug-05	862437-010	TSS
Pace	862261	6-Sep-05	water	IRA-05-DEWT-EF81	12-Aug-05	862261-001	TSS, BOD, NH3, PCBs
Pace	862261	6-Sep-05	water	IRA-05-OOOA-SW250-905	12-Aug-05	862261-002	TSS
Pace	862261	6-Sep-05	water	IRA-05-OOOA-SW251-902	12-Aug-05	862261-003	TSS
Pace	862261	6-Sep-05	field duplicate	IRA-05-OOOA-SW251 DUP-902	12-Aug-05	862261-004	TSS
Pace	862261	6-Sep-05	water	IRA-05-OOOA-SW252-912	12-Aug-05	862261-005	TSS
Pace	862261	6-Sep-05	field blank	IRA-05-OOOA-SW253 RINSE-912	12-Aug-05	862261-006	TSS
Pace	862261	6-Sep-05	water	IRA-05-DEWT-EF82	13-Aug-05	862637-001	TSS, BOD, NH3, PCBs
Pace	862727A	6-Sep-05	water	IRA-05-DEWT-EF84	16-Aug-05	862727-001	TSS, BOD, NH3, PCBs
Pace	862727A	6-Sep-05	water	IRA-05-DEWT-EF85	17-Aug-05	862786-001	TSS, BOD, NH3, PCBs
Pace	862727A	6-Sep-05	water	IRA-05-DEWT-EF86	18-Aug-05	862834-001	TSS, BOD, NH3, PCBs
Pace	862659	9-Sep-05	water	IRA-05-OOOA-SW254-905	15-Aug-05	862659-001	TSS
Pace	862659	9-Sep-05	water	IRA-05-OOOA-SW255-902	15-Aug-05	862659-002	TSS
Pace	862659	9-Sep-05	water	IRA-05-OOOA-SW256-912	15-Aug-05	862659-003	TSS
Pace	862659	9-Sep-05	water	IRA-05-DEWT-EF 93	15-Aug-05	862659-004	low level mercury
Pace	862659	9-Sep-05	field blank	IRA-05-DEWT-EF 93 FB	15-Aug-05	862659-005	low level mercury
Pace	862659	9-Sep-05	water	IRA-05-DEWT-WEEP6	15-Aug-05	862659-006	low level mercury
Pace	862659	9-Sep-05	field blank	IRA-05-DEWT-WEEP6 FB	15-Aug-05	862659-007	low level mercury
Pace	862659	9-Sep-05	water	IRA-5-DEWT-RIVER5	15-Aug-05	862659-008	low level mercury
Pace	862659	9-Sep-05	field blank	IRA-05-DEWT-RIVER5-FB	15-Aug-05	862659-009	low level mercury
Pace	862897A	9-Sep-05	water	IRA-05-DEWT-EF 87	19-Aug-05	862897-001	TSS, BOD, NH3, PCBs
Pace	862897A	9-Sep-05	water	IRA-05-OOOA-SW257-905	19-Aug-05	862897-002	TSS
Pace	862897A	9-Sep-05	water	IRA-05-OOOA-SW258-902	19-Aug-05	862897-003	TSS
Pace	862897A	9-Sep-05	water	IRA-05-OOOA-SW259-912	19-Aug-05	862897-004	TSS
Pace	862897A	9-Sep-05	water	IRA-05-DEWT-EF 88	20-Aug-05	862906-001	TSS, BOD, NH3, PCBs
Pace	862897B	9-Sep-05	sediment	IRA-05-OOOA-PS-82P	17-Aug-05	862897-005	PCBs
Pace	862897B	9-Sep-05	sediment	IRA-05-OOOA-PS-89P	17-Aug-05	862897-006	PCBs
Pace	862897B	9-Sep-05	sediment	IRA-05-OOOA-PS-88P	17-Aug-05	862897-007	PCBs
Pace	862897B	9-Sep-05	sediment	IRA-05-OOOA-PS-94P	17-Aug-05	862897-008	PCBs
Pace	862897B	9-Sep-05	sediment	IRA-05-OOOA-PS-105P	17-Aug-05	862897-009	PCBs
Pace	862727B	9-Sep-05	sediment	IRA-05-T1-DS50	16-Aug-05	862727-002	PCBs
Pace	862727B	9-Sep-05	sediment	IRA-05-T2-DS51	16-Aug-05	862727-003	PCBs
Pace	862727B	9-Sep-05	sediment	IRA-05-T2.5-DS52	16-Aug-05	862727-004	PCBs
Pace	862727B	9-Sep-05	sediment	IRA-05-T3-DS53	16-Aug-05	862727-005	PCBs
Pace	862727B	9-Sep-05	sediment	IRA-05-T4-DS54	16-Aug-05	862727-006	PCBs



Data Validation
Lab/Field Audits
QA Plans

TECHNICAL MEMORANDUM

DATE: September 30, 2005

TO: Janis Kesy
Project Manager
Foth & Van Dyke

FROM: Marcia A. Kuehl *MAK*
President/Owner
MAKuehl Company

SUBJECT: Data Validation for Lower Fox River OU 1 2005 Remedial Action
Sampling Events of August 23-September 1, 2005
Foth & Van Dyke Project # : 04G007, 02G005

1.0 OVERVIEW

Analytical results for samples listed in Table 1 and their associated laboratory QC samples collected from the Lower Fox River OU 1 have been evaluated using the EPA guidance documents "National Functional Guidelines for Organic Data Review", dated October 1999, EPA-540/R-99/008, and the "National Functional Guidelines for Inorganic Data Review", dated July, 2002, EPA-540/R-01-008.

The specific calibration and laboratory QC check requirements contained in the "Lower Fox River Operable Unit 1 Remedial Action-2004 Remedial Action Work Plan" dated May, 2004 (RAWP) were the primary criteria used in the assessment of the data for compliance with the project data quality objectives. The review was based on the data packages supplied by the analytical laboratory, Pace, located in Kimberly, Wisconsin.

All Aroclor data as reported by Pace was acceptable for use without qualification.

BOD in sample IRA-05-DEWT-EF-91 was estimated from a holding time exceedance. Ammonia in samples IRA-05-DEWT-EF99, 100 and 100 were qualified as undetected as the concentration reported is not significantly different from lab background. TSS in IRA-05-DEWT-EF100/DUP was estimated from a field precision limit exceedance. Ammonia in IRA-05-DEWT-EF100/DUP was estimated from greater than expected field imprecision/matrix variability.

Mercury in IRA-05-DEWT-WEEP 7 was qualified as undetected as the concentration is not significantly different from field background.

All qualifiers assigned during the data validation process are discussed in detail below. The validated data sheets are attached, and the checklist used during the validation are in Appendix A.

2.0 PCB AS AROCLORS DATA

Pace utilized the EPA SW846 reference methods 3510C and 8082 as specified in their Standard Operating Procedure SVO-52, Revision No. 3 dated January, 2000 for water samples. No significant deviations from this SOP were apparent from the documentation reviewed. No action was needed to qualify sample data.

2.1 Completeness Assessment

The Pace data packages received were complete. All samples listed in Table 1 that were submitted and indicated for analysis were analyzed. The data packages received for PCB analysis did not require any follow-up with Pace to enable data validation.

2.2 Compliance Assessment

2.2.1 Holding Times/Preservation

All samples for PCBs were received on ice. No notation of receipt temperature in exceedance of 2-6°C and no intact ice was noted for any samples analyzed for PCBs. None of the SDGs contained temperature blanks shipped with them, but as all samples were received "on ice", no action was needed to qualify sample data.

Water samples were extracted within 7 days after collection and analyzed within 14 days. No action was needed to qualify sample data.

2.2.2 Initial Calibration (ICAL)

Five point initial calibration curves ranging from 0.1-1.0 ug/ml for Aroclor 1016/1260, 1242 and 1254 were analyzed on both columns, RTX-CLP (primary quantitation column) and RTX-CLP2 (confirmation column) on 8/15/05 and 8/16/05. The rsd values measured for each peak were less than the 20 % data validation criteria. No action was taken to qualify sample data based on initial calibration results.

2.2.3 Calibration Verification (CCAL)

The required method frequency of calibration verification was every 10 samples and at the end of the instrument run was met for every SDG. In all of the SDGs reviewed in Table 1, the CCALs consisted of a 0.3 ug/ml solution of Aroclor 1242 alternating with a 0.3 ug/ml solution of Aroclor 1254. The mean percent difference between the CCAL and ICAL calibration factors for the 5-10 peaks used for identification and quantitation were all less than the 15 % data validation criteria on the primary quantitation column. No action was needed to qualify sample data.

2.2.4 Laboratory Blanks

At least one laboratory blank was prepared and extracted with every 20 project samples or less analyzed. No laboratory blanks contained detectable Aroclors above the Limit of Detection (LOD).

2.2.5 Surrogate Recoveries

Decachlorobiphenyl (DCB) and tetrachloro-m-xylene (TCX) recoveries in all project water samples were within the Pace limits of 7 - 113 % (DCB) and 49 - 112 % (TCX). No action was needed to qualify sample data.

2.2.6 Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD)

At least one Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) at 5 ug/L Aroclor 1242 was prepared and analyzed with each SDG, or 20 water samples. All recoveries measured in the LCS were within the Pace limits of 47 - 138 % and < 20 % RPD. No action was needed to qualify sample data based on LCS recoveries.

2.2.7 Detection Limit Attainment

The RAWP Reporting Limit of 1.0 ug/L was attained in all samples when accounting for the actual sample volume extracted or the percent solids of the sample. No action was needed to qualify sample data.

2.2.8 Verification of Reported Results

No detectable Aroclors were present in the project water samples analyzed. No discrepancies or false negatives were detected. QC sample results such as RPD, recovery and % difference were also recalculated, but at a 10 % frequency. No discrepancies that were not due to differences in lab instrument software and the validator's calculator significant figure/rounding protocols were found in QC sample results. All detected Aroclor values reported for QC sample results are from the primary column. The analysis on the secondary column was reviewed to assess if the Aroclor pattern(s) were confirmed, and all were.

All reported Aroclors in QC samples were quantified on at least an 4 peak match. Peaks with obvious interferences were not included in the quantitation. The method retention time window criteria of ± 0.03 minutes for a minimum of a 4 peak match for Aroclor identification was met in all QC samples.

2.3 Field QC Results

No field equipment rinsates associated with the project samples in Table 1 were analyzed for PCBs. No action was needed to qualify sample data.

Field duplicates for PCB analysis were collected for samples IRA-05-DEWT-EF89 and IRA-05-DEWT-EF100. No PCBs were detected in these samples, resulting in RPD values of 0 %, within the RAWP < 30 % RPD limit. Acceptable field precision was achieved and no action was needed to qualify sample data.

2.4 Data Usability

All Aroclor data as reported by Pace was acceptable for use without qualification.

3.0 AMMONIA, BOD and TSS DATA

Pace utilized EPA reference methods 160.2 and 350.1 as specified in their Standard Operating Procedure G2-WCM-01, Revision No. 2 dated January 1, 2003 and G2-WCM-58, Revision No. 0 dated January 16, 2004. No significant deviations from this SOP was apparent from the documentation reviewed. No action was needed to qualify sample data.

BOD analysis was not a requirement in the RAWP. Pace utilized Standard Methods 5210B for BOD analysis. No significant deviations from this reference method was apparent from the documentation reviewed. No action was needed to qualify sample data.

3.1 Completeness Assessment

The Pace data packages received were complete. All samples listed in Table 1 that were submitted and indicated for analysis were analyzed. The data packages received for ammonia, BOD and TSS analysis did not require any follow-up with Pace to enable data validation.

3.2 Compliance Assessment

3.2.1 Holding Time/Preservation

Documentation of adequate acid preservation for ammonia was present. All EPA recommended holding times for the methods cited above were met, except for the 48 hour BOD holding time for sample IRA-05-DEWT-EF-91. The holding time was exceeded by 6 hours. Pace qualified the BOD result for this sample with an "H" qualifier. Action taken was to qualify the BOD result for sample IRA-05-DEWT-EF-91 as estimated with a J code from this holding time exceedance.

All samples were received at Pace on ice. No notation of receipt temperature in exceedance of 2-6°C was noted for any samples analyzed for BOD, ammonia and TSS. None of the SDGs contained temperature blanks shipped with them, but as all samples were received "on ice", no action was needed to qualify sample data.

3.2.2 Calibration

All ammonia initial instrument calibrations for ammonia were properly performed using at least five standards and met the correlation coefficient criteria of greater than 0.995. Continuing calibration checks were performed at least once every 10 samples and all checks met performance criteria of 90-110%.

3.2.3 Laboratory Blanks

Laboratory blanks did not contain any BOD or TSS above the Limit of Detection (LOD). No action was needed to qualify sample data.

The method blank analyzed with samples IRA-05-DEWT-EFF99, 100 and 100 DUP contained detectable ammonia at a concentration of 0.25 mg/L, above the Pace LOD of 0.20 mg/L. Pace qualified sample results associated with these contaminated blanks with an "A" qualifier if the sample concentration was less than 20 X the lab blank. Action taken was to qualify the detected ammonia results in these samples as undetected with a "U" code, as the concentration reported is

not significantly different (> 5 X) from lab background. Ammonia in samples IRA-05-DEWT-EF99, 100 and 100 DUP were qualified as undetected.

3.2.4 Reference Standards/Lab Control Standards (LCS/LCSD)

Recovery of reference (EPA/ERA/APG) standards were all within Pace and RAWP accuracy limits. No action was needed to qualify sample data.

3.2.5 Laboratory Duplicate Sample Analysis

All laboratory duplicate and LCS/LCSD RPD results were within the Pace and RAWP precision limits. No action was needed to qualify sample data.

3.2.6 Matrix Spike Samples

All matrix spike sample recoveries were within the Pace and RAWP accuracy limits. No action was needed to qualify sample data.

3.3 Field QC Results

One field equipment rinsate associated with the project samples in Table 1 were collected with the project samples for TSS analysis. TSS was present in the rinsate above the LOD at 0.62 mg/L. No action was needed to qualify sample data, as all sample concentrations exceeded the rinsate by more than a factor of 5.

No field equipment rinsates associated with the project samples in Table 1 were analyzed for BOD or ammonia. No action was taken to qualify ammonia or BOD sample data.

Field duplicates for TSS were collected with the project samples listed in Table 1 and the Relative Percent Difference (RPD) calculated below:

Sample ID (IRA-05-)	TSS (mg/L)	TSS (mg/L) DUP	RPD
SW2601-905	57	57	0 %
DEWT EF100	1.5	1.2	22 %
DEWT EF89	2.6	2.6	0 %

The RPD value for IRA-05-DEWT-EF100 exceeded the RAWP precision limit of 5 %. Action taken was to qualify TSS in IRA-05-DEWT-EF100/DUP as estimated with a J code from this precision limit exceedance.

A field duplicate was collected with the project samples listed in Table 1 for ammonia and BOD for IRA-05-DEWT-EF89 and 100. No detectable BOD was present in these samples. Ammonia was present at 0.45 mg/L and 0.43 mg/L in EF89/DUP, for a calculated RPD value of 4 %. Ammonia was present at 0.59 mg/L and 0.96 mg/L in EF100/DUP, for a calculated RPD value of 91 % which exceeded the RAWP precision limit of 20 % for ammonia. Action taken was to qualify ammonia in IRA-05-DEWT-EF100./DUP as estimated with a J code from greater than expected field

imprecision/matrix variability.

3.4 Data Usability

BOD in sample IRA-05-DEWT-EF-91 was estimated from a holding time exceedance. Ammonia in samples IRA-05-DEWT-EF99, 100 and 100 were qualified as undetected as the concentration reported is not significantly different from lab background. TSS in IRA-05-DEWT-EF100/DUP was estimated from a field precision limit exceedance. Ammonia in IRA-05-DEWT-EF100/DUP was estimated from greater than expected field imprecision/matrix variability.

Results greater than the LOD, but less than the LOQ were qualified by Pace with a "Q" qualifier. During the validation process, all "Q" qualified results were further qualified with a J code indicating estimated data. These concentrations should be considered estimated as they are within the region of quantitation associated with less precision.

4.0 MERCURY DATA

Pace utilized EPA method 1631E. No significant deviations from the EPA reference method was apparent from the documentation reviewed. No action was needed to qualify sample data.

4.1 Completeness Assessment

The data package received for mercury analysis was complete. All samples submitted were digested and analyzed. No action was needed to qualify sample data.

4.2 Compliance Assessment

4.2.1 Holding Time/Preservation

All samples were analyzed within the 28 day holding time. No notation of storage or shipping temperature in exceedance of $4 \pm 2^{\circ}\text{C}$ was noted. No action was needed to qualify mercury sample data based on exceedance of holding time or preservation requirements.

4.2.2 Calibration

The initial instrument calibrations were five points ranging from 0.05 - 4 ng/L and correlation coefficients were all ≥ 0.995 . Continuing calibration checks were performed at least once every 10 samples and were within Pace's 80-120% limits. No action was needed to qualify sample data.

4.2.3 Laboratory Blanks

Mercury in all bottle blanks and method blanks were below the Pace LOD of 0.197 ng/L. No action was needed to qualify sample data.

4.2.4 Ongoing Precision and Recovery (OPR) Standard

An OPR was prepared with each set of samples at 5 ng/L. Recoveries were all within Pace's limits of 79 - 121 %. No action was needed to qualify sample data.

4.2.5 Matrix Spike/Matrix Spike Duplicate

MS/MSD recoveries and RPD were all within Pace's limits of 75 - 125 % and < 24 % RPD. No action was needed to qualify sample data.

4.3 Field QC Results

A field blank was collected with each of the project samples. Mercury was detected in these blanks at concentrations ranging from 0.187 - 0.263 ng/L. Action taken was to qualify the detected sample concentration associated with the field blank if the concentration was not significantly different (< 5 X) from the field blank as undetected with a "U" code. Mercury in IRA-05-DEWT-WEEP 7 was qualified as undetected.

No field duplicates were collected for mercury. No action was needed to qualify sample data.

4.4 Data Usability

Mercury in IRA-05-DEWT-WEEP 7 was qualified as undetected as the concentration is not significantly different from field background.

Results greater than the LOD, but less than the LOQ were qualified by Pace with a "Q" qualifier. During the validation process, all "Q" qualified results were further qualified with a J code indicating estimated data. These concentrations should be considered estimated as they are within the region of quantitation associated with less precision.

If you have any questions regarding the qualification of data or the data validation process/criteria used, please contact me at (920) 469-9113.

Attachments:

Table 1

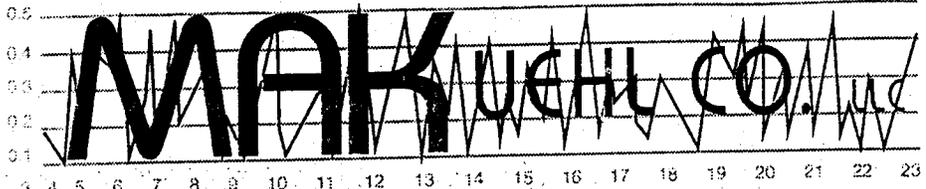
Validated hard copy Data Sheets

Appendix A: Data Validation Checklist

Copy w/o attachments

Table 1 Data Validated - Lower Fox River Foth Van Dyke

LAB(S)	SDG#	Date Rec'd by		Field		Field		Collection Date	Lab sample ID	Analytes
		Kuehl		Matrix	Sample ID					
Pace	863046	14-Sep-05		water	IRA-05-DEWT-EF92			24-Aug-05	863046-001	TSS, BOD, NH3, PCBs
Pace	863046	14-Sep-05		water	IRA-05-DEWT-EF93			25-Aug-05	863086-001	TSS, BOD, NH3, PCBs
Pace	863046	14-Sep-05		water	IRA-05-OOOA-SW264-905			25-Aug-05	863086-002	TSS
Pace	863046	14-Sep-05		water	IRA-05-OOOA-SW265-902			25-Aug-05	863086-003	TSS
Pace	863046	14-Sep-05		water	IRA-05-OOOA-SW266-912			25-Aug-05	863086-004	TSS
Pace	862943	15-Sep-05		water	IRA-05-DEWT-EF90			23-Aug-05	862990-001	low level mercury
Pace	862943	15-Sep-05		field blank	IRA-05-DEWT-EF90FB			23-Aug-05	862990-002	low level mercury
Pace	862943	15-Sep-05		water	IRA-05-DEWT-WEEP 7			23-Aug-05	862990-003	low level mercury
Pace	862943	15-Sep-05		field blank	IRA-05-DEWT-WEEP 7 FB			23-Aug-05	862990-004	low level mercury
Pace	862943	15-Sep-05		water	IRA-05-DEWT-RIVER 6			23-Aug-05	862990-005	low level mercury
Pace	862943	15-Sep-05		field blank	IRA-05-DEWT-RIVER 6 FB			23-Aug-05	862990-006	low level mercury
Pace	862943	15-Sep-05		water	IRA-05-DEWT-EF89			23-Aug-05	862943-001	TSS, BOD, NH3, PCBs
Pace	862943	15-Sep-05		field duplicate	IRA-05-DEWT-EF89 DUP			23-Aug-05	862943-002	TSS, BOD, NH3, PCBs
Pace	862943	15-Sep-05		water	IRA-05-OOOA-SW260-905			23-Aug-05	862990-007	TSS
Pace	862943	15-Sep-05		water	IRA-05-OOOA-SW261-902			23-Aug-05	862990-008	TSS
Pace	862943	15-Sep-05		water	IRA-05-OOOA-SW262-912			23-Aug-05	862990-009	TSS
Pace	862943	15-Sep-05		field duplicate	IRA-05-OOOA-SW260DUP-905			23-Aug-05	862990-010	TSS
Pace	862943	15-Sep-05		field blank	IRA-05-OOOA-SW263RINSE-912			23-Aug-05	862990-011	TSS
Pace	862943	15-Sep-05		water	IRA-05-DEWT-EF91			22-Aug-05	862990-012	TSS, BOD, NH3, PCBs
Pace	863118	15-Sep-05		water	IRA-05-DEWT-EF94			26-Aug-05	863118-001	TSS, BOD, NH3, PCBs
Pace	863118	15-Sep-05		water	IRA-05-OOOA-SW267-905			26-Aug-05	863118-002	TSS
Pace	863118	15-Sep-05		water	IRA-05-OOOA-SW268-902			26-Aug-05	863118-003	TSS
Pace	863118	15-Sep-05		water	IRA-05-OOOA-SW269-912			26-Aug-05	863118-004	TSS
Pace	863118	15-Sep-05		water	IRA-05-DEWT-EF95			27-Aug-05	863155-001	TSS, BOD, NH3, PCBs
Pace	863280	20-Sep-05		water	IRA-05-DEWT-EF99			31-Aug-05	863280-001	TSS, BOD, NH3, PCBs
Pace	863280	20-Sep-05		water	IRA-05-DEWT-EF100			1-Sep-05	863340-001	TSS, BOD, NH3, PCBs
Pace	863280	20-Sep-05		field duplicate	IRA-05-DEWT-EF100 DUP			1-Sep-05	863340-002	TSS, BOD, NH3, PCBs
Pace	863280	20-Sep-05		water	IRA-05-OOOA-SW274-905			1-Sep-05	863340-003	TSS, BOD, NH3, PCBs
Pace	863280	20-Sep-05		water	IRA-05-OOOA-SW275-902			1-Sep-05	863340-004	TSS
Pace	863280	20-Sep-05		water	IRA-05-OOOA-SW276-912			1-Sep-05	863340-005	TSS



Data Validation
Lab/Field Audits
QA Plans

TECHNICAL MEMORANDUM

DATE: November 1, 2005

TO: Janis Kesy
Project Manager
Foth & Van Dyke

FROM: Marcia A. Kuehl *MAK*
President/Owner
MAKuehl Company

SUBJECT: Data Validation for Lower Fox River OU 1 2005 Remedial Action
Sampling Events of September 19 - October 12, 2005
Foth & Van Dyke Project # : 04G007, 02G005

1.0 OVERVIEW

Analytical results for samples listed in Table 1 and their associated laboratory QC samples collected from the Lower Fox River OU 1 have been evaluated using the EPA guidance documents "National Functional Guidelines for Organic Data Review", dated October 1999, EPA-540/R-99/008, and the "National Functional Guidelines for Inorganic Data Review", dated July, 2002, EPA-540/R-01-008.

The specific calibration and laboratory QC check requirements contained in the "Lower Fox River Operable Unit 1 Remedial Action-2004 Remedial Action Work Plan" dated May, 2004 (RAWP) were the primary criteria used in the assessment of the data for compliance with the project data quality objectives. The review was based on the data packages supplied by the analytical laboratory, Pace, located in Kimberly, Wisconsin.

All Aroclor data as reported by Pace was acceptable for use, or qualified as estimated. Aroclor 1260 and 1268 results quantified against the single point calibration standard in samples PS 92A-D COMP, T14-DS64 and T16-DS66 were qualified as estimated. Aroclor 1242 in T21-DS-93 was estimated from a possible high bias. Aroclor 1254 and Aroclor 1260 in T20DS-92, Aroclor 1242, 1254, 1260 and total PCBs in PS99, Aroclor 1254 and 1260 in T10DS-62 and Aroclor 1242, 1254 and total PCBs in PS67A-D COMP was estimated from greater field imprecision than the DQO. Detected PCBs in sediment samples at concentrations greater than the LOD, but below the LOQ were qualified by Pace with a "Q" qualifier, and further qualified during validation as estimated with a J code, as they are within the region of quantitation associated with less precision.

Ammonia in IRA-05-DEWT-EF119 and IRA-05-DEWT-EF118 was qualified as estimated from a high matrix spike recovery bias.

Mercury in IRA-05-DEWT-EF127, WEEP 13, WEEP 13FB, RIVER 12FB, EF 115, EF 115 FB, WEEP 11 FB, EF 121 FB, WEEP 12 FB, RIVER 11 FB, and EF 121 was qualified as undetected as the concentration is not significantly different from lab background. Mercury in IRA-05-

WEEP 13, EF 121 and EF 115 was qualified as undetected as the concentration reported is not significantly different from field background.

All qualifiers assigned during the data validation process are discussed in detail below. The validated data sheets are attached, and the checklist used during the validation are in Appendix A.

2.0 PCB AS AROCLORS DATA

Pace utilized the EPA SW846 reference methods 3510C and 8082 as specified in their Standard Operating Procedure SVO-52, Revision No. 3 dated January, 2000 for water samples and EPA SW846 reference methods 35141 and 8082, automated soxhlet extraction on the air dried sample, acid clean-up and sulfur clean-up using copper for solid samples as specified in their Standard Operating Procedure K-SVO-77, Revision No. 3 dated June 24, 2004. No significant deviations from these SOPs were apparent from the documentation reviewed. No action was needed to qualify sample data.

2.1 Completeness Assessment

The Pace data packages received were complete. All samples listed in Table 1 that were submitted and indicated for analysis were analyzed. The data packages received for PCB analysis did not require any follow-up with Pace to enable data validation.

2.2 Compliance Assessment

2.2.1 Holding Times/Preservation

All samples for PCBs were received on ice. No notation of receipt temperature in exceedance of 2-6°C and no intact ice was noted for any samples analyzed for PCBs. None of the SDGs contained temperature blanks shipped with them, but as all samples were received "on ice", no action was needed to qualify sample data.

Water samples were extracted within 7 days after collection and sediment and soil samples within 14 days after collection. After extraction all samples were analyzed within 14 days. No action was needed to qualify sample data.

2.2.2 Initial Calibration (ICAL)

Five point initial calibration curves ranging from 0.1-1.0 ug/ml for Aroclor 1016/1260, 1242 and 1254 were analyzed on both columns, RTX-CLP (primary quantitation column) and RTX-CLP2 (confirmation column) on 9/14/05, 9/27/05 and 9/30/05. The rsd values measured for each peak were less than the 20 % data validation criteria. No action was taken to qualify sample data based on initial calibration results.

Aroclor 1268 was reported in three samples, PS 92A-D COMP, T14-DS64 and T16-DS66. Aroclor 1268 was quantified based on a one point calibration standard at 0.5 ug/mL analyzed 9/30/05, 10/1/05 and 10/8/05. Pace qualified the Aroclor 1268 results quantified against the single point standard of Aroclor 1268 with an "X" qualifier. These samples contained both Aroclor 1260 and

1268. Aroclor 1260 was quantified against peaks in the Aroclor 1268 standard that are indicative of Aroclor 1260. Pace qualified the Aroclor 1260 and Aroclor 1268 results quantified against Aroclor 1268 with an "X" qualifier. Aroclor 1260 and 1268 results quantified against the single point calibration standard in samples PS 92A-D COMP, T14-DS64 and T16-DS66 were qualified as estimated with a J code from this less than multiple point calibration curve.

2.2.3 Calibration Verification (CCAL)

The required method frequency of calibration verification was every 10 samples and at the end of the instrument run was met for every SDG. In all of the SDGs reviewed in Table 1, the CCALs consisted of a 0.3 ug/ml solution of Aroclor 1242 alternating with a 0.3 ug/ml solution of Aroclor 1254. The mean percent difference between the CCAL and ICAL calibration factors for the 5-10 peaks used for identification and quantitation were all less than the 15 % data validation criteria on the primary quantitation column, except for the CCAL solutions analyzed on 10/1/05 (mean percent difference 15.16 - 22.56 %) No action was needed to qualify sample data, as no evidence of Aroclor 1242 was present in the associated samples.

2.2.4 Laboratory Blanks

At least one laboratory blank was prepared and extracted with every 20 project samples or less analyzed. No laboratory blanks contained detectable Aroclors above the Limit of Detection (LOD).

2.2.5 Surrogate Recoveries

Decachlorobiphenyl (DCB) and tetrachloro-m-xylene (TCX) recoveries in all project water samples were within the Pace limits of 7 - 113 % (DCB) and 49 - 112 % (TCX). No action was needed to qualify sample data.

Decachlorobiphenyl (DCB) and tetrachloro-m-xylene (TCX) recoveries in many sediment samples were not useful (i.e. 0 %), as these samples required dilution. Dilution factors greater than ten result in the surrogate concentration being too low to be detected. No action was taken to qualify sample data in samples with dilution factors greater than or equal to ten.

For sediment samples with dilution factors of less than ten, all surrogate recoveries were within the data validation limits of 60 -140 %. No action was needed to qualify sample data.

2.2.6 Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD)

At least one Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) at 5 ug/L Aroclor 1242 was prepared and analyzed with each SDG, or 20 water samples. All recoveries measured in the LCS were within the Pace limits of 47 - 138 % and < 20 % RPD. No action was needed to qualify sample data based on LCS recoveries.

At least one Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) at 500 ug/kg Aroclor 1242 was prepared and analyzed with each SDG, or 20 sediment samples. All recoveries measured in the LCS were within the RAWP 65 - 135 % and < 20 % RPD. No action was needed to qualify sample data based on LCS recoveries.

Spiking errors occurred for sample SVK1119-058MB and the LCS/LCSD associated with it. Aroclor

1260 was used in the LCS/LCSD instead of Aroclor 1242 and double the amount of spiking solution of Aroclor 1242 was added to the blank spike. Pace qualified the affected sample data with a "8" qualifier. No action was taken to qualify sample data, as the errors were isolated to the QC samples and did not affect the project samples.

2.2.7 Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery

Aroclor 1242 recovery of a 2 ppm spike in sediment sample T21-DS-93 was 138 % and 138 %, in exceedance of the 135 % limit. Pace qualified the sample result with an "N" qualifier. Action taken was to qualify Aroclor 1242 in T21-DS-93 as estimated with a J code from a possible high bias.

2.2.8 Detection Limit Attainment

The RAWP Reporting Limits of 1.0 ug/L and 50 ug/kg were attained in all samples when accounting for the actual sample volume extracted or the percent solids of the sample. No action was needed to qualify sample data.

2.2.9 Verification of Reported Results

No detectable Aroclors were present in the project water samples analyzed. No discrepancies or false negatives were detected. QC sample results such as RPD, recovery and % difference were also recalculated, but at a 10 % frequency. No discrepancies that were not due to differences in lab instrument software and the validator's calculator significant figure/rounding protocols were found in QC sample results. All detected Aroclor values reported for QC and sediment sample results are from the primary column. The analysis on the secondary column was reviewed to assess if the Aroclor pattern(s) were confirmed, and all were.

All reported Aroclors in QC and the sediment samples were quantified on at least an 4 peak match. Peaks with obvious interferences were not included in the quantitation. The method retention time window criteria of ± 0.03 minutes for a minimum of a 4 peak match for Aroclor identification was met in all QC and sediment samples.

2.3 Field QC Results

No field equipment rinsates associated with the project samples in Table 1 were analyzed for PCBs. No action was needed to qualify sample data.

RPD values for the field duplicates collected in Table 1 were as follows:

IRA-05-DEWT-EF 114/D: No Aroclors detected

IRA-05-DEWT- EF 124/D: No Aroclors detected

IRA-05-T20DS-92: Aroclor 1242 0 % RPD, Aroclor 1254 32 % RPD, Aroclor 1260 35 % RPD, total PCBs 6 % RPD

IRA-05-PS99: Aroclor 1242 44 % RPD, Aroclor 1254 33 % RPD, Aroclor 1260 40 % RPD, total PCBs 38 % RPD

IRA-05-T10DS-62: Aroclor 1242 11 % RPD, Aroclor 1254 69 % RPD, Aroclor 1260 32 % RPD, total PCBs 19 % RPD

IRA-05-PS79A-D COMP: Aroclor 1242 38 % RPD, Aroclor 1254 48 % RPD, Aroclor 1260 27 % RPD, total PCBs 32 % RPD

The SAP data quality objective (DQO) of < 30 % RPD was not met for Aroclor 1254 and Aroclor 1260 in T20DS-92, Aroclor 1242, 1254, 1260 and total PCBs in PS99, Aroclor 1254 and 1260 in T10DS-62 and Aroclor 1242, 1254 and total PCBs in PS67A-D COMP. Action taken was to qualify Aroclor 1254 and Aroclor 1260 in T20DS-92, Aroclor 1242, 1254, 1260 and total PCBs in PS99, Aroclor 1254 and 1260 in T10DS-62 and Aroclor 1242, 1254 and total PCBs in PS67A-D COMP as estimated with a J code indicating greater imprecision than the DQO.

2.4 Data Usability

All Aroclor data as reported by Pace was acceptable for use, or qualified as estimated. Aroclor 1260 and 1268 results quantified against the single point calibration standard in samples PS 92A-D COMP, T14-DS64 and T16-DS66 were qualified as estimated. Aroclor 1242 in T21-DS-93 was estimated from a possible high bias. Aroclor 1254 and Aroclor 1260 in T20DS-92, Aroclor 1242, 1254, 1260 and total PCBs in PS99, Aroclor 1254 and 1260 in T10DS-62 and Aroclor 1242, 1254 and total PCBs in PS67A-D COMP was estimated from greater field imprecision than the DQO.

Detected PCBs in sediment samples at concentrations greater than the LOD, but below the LOQ were qualified by Pace with a "Q" qualifier, and further qualified during validation as estimated with a J code, as they are within the region of quantitation associated with less precision.

3.0 AMMONIA, BOD and TSS DATA

Pace utilized EPA reference methods 160.2 and 350.1 as specified in their Standard Operating Procedure G2-WCM-01, Revision No. 2 dated January 1, 2003 and G2-WCM-58, Revision No. 0 dated January 16, 2004. No significant deviations from this SOP was apparent from the documentation reviewed. No action was needed to qualify sample data.

BOD analysis was not a requirement in the RAWP. Pace utilized Standard Methods 5210B for BOD analysis. No significant deviations from this reference method was apparent from the documentation reviewed. No action was needed to qualify sample data.

3.1 Completeness Assessment

The Pace data packages received were complete. All samples listed in Table 1 that were submitted and indicated for analysis were analyzed. The data packages received for ammonia, BOD and TSS analysis did not require any follow-up with Pace to enable data validation.

3.2 Compliance Assessment

3.2.1 Holding Time/Preservation

Documentation of adequate acid preservation for ammonia was present, except for samples EF123, EF124 and EF 124D. The pH was 6, and additional acid was added by Pace within 24 hours of collection. No action was taken to qualify sample data. All EPA recommended holding times for the methods cited above were met. No action was needed to qualify sample data.

None of the SDGs contained temperature blanks shipped with them, but as all samples were received "on ice", no action was needed to qualify sample data.

3.2.2 Calibration

All ammonia initial instrument calibrations for ammonia were properly performed using at least five standards and met the correlation coefficient criteria of greater than 0.995. Continuing calibration checks were performed at least once every 10 samples and all checks met performance criteria of 90-110%.

3.2.3 Laboratory Blanks

Laboratory blanks did not contain any TSS above the Limit of Detection (LOD). BOD was present in the lab blank analyzed with DEWT-EF120. Pace qualified the result with a "3" qualifier. No action was needed to qualify sample data, as no BOD was detected.

Ammonia was detected at 0.26 mg/L in the lab blank analyzed with DEWT-EF 120, 122, 122, 124, 124 DUP and 128. Pace qualified these results with an "A" qualifier. No action was needed to qualify sample data, as no ammonia was detected in these project samples.

3.2.4 Reference Standards/Lab Control Standards (LCS/LCSD)

Recovery of reference (EPA/ERA/APG) standards were all within Pace and RAWP accuracy limits. No action was needed to qualify sample data.

3.2.5 Laboratory Duplicate Sample Analysis

All laboratory duplicate and LCS/LCSD RPD results were within the Pace and RAWP precision limits. No action was needed to qualify sample data.

3.2.6 Matrix Spike Samples

All matrix spike sample recoveries were within the Pace and RAWP accuracy limits of 90 - 110 %, except for ammonia in the spikes of EF 113 (112.8 %, 112.8 %), EF 118 (113.6 %), EF 119 (113.6 %), EF120 (130 %, 123.8 %), EF 124 (120.4 %, 122 %). Action taken was to qualify detected ammonia in these project samples as estimated with a J code from a high bias. Ammonia in IRA-05-DEWT-EF119 and IRA-05-DEWT-EF118 was qualified as estimated.

3.3 Field QC Results

Field equipment rinsates were collected for TSS with the project samples in Table 1. No TSS was detected in any of the rinsates. No action was needed to qualify sample data.

No field equipment rinsates associated with the project samples in Table 1 were analyzed for BOD or ammonia. No action was taken to qualify ammonia or BOD sample data.

Field duplicates for TSS were collected with the project samples listed in Table 1 and the Relative Percent Difference (RPD) calculated below:

Sample ID (IRA-05-)	TSS (mg/L)	TSS (mg/L) DUP	RPD
SW306-905	64	64	0 %
SW313-905	55	54	2 %

The RPD values were within the RAWP precision limit of 5 %. No action was needed to qualify sample data.

No field duplicate was collected with the project samples listed in Table 1 for ammonia and BOD. No action was needed to qualify sample data.

3.4 Data Usability

Ammonia in IRA-05-DEWT-EF119 and IRA-05-DEWT-EF118 was qualified as estimated from a high matrix spike recovery bias.

Results greater than the LOD, but less than the LOQ were qualified by Pace with a "Q" qualifier. During the validation process, all "Q" qualified results were further qualified with a J code indicating estimated data. These concentrations should be considered estimated as they are within the region of quantitation associated with less precision.

4.0 MERCURY DATA

Pace utilized EPA method 1631E. No significant deviations from the EPA reference method was apparent from the documentation reviewed. No action was needed to qualify sample data.

4.1 Completeness Assessment

The data packages received for mercury analysis were complete. All samples submitted were digested and analyzed. No action was needed to qualify sample data.

4.2 Compliance Assessment

4.2.1 Holding Time/Preservation

All samples were analyzed within the 28 day holding time. No notation of storage or shipping temperature in exceedance of $4 \pm 2^\circ\text{C}$ was noted. No action was needed to qualify mercury sample data based on exceedance of holding time or preservation requirements.

4.2.2 Calibration

The initial instrument calibrations were five points ranging from 0.05 - 4 ng/L and correlation coefficients were all ≥ 0.995 . Continuing calibration checks were performed at least once every 10 samples and were within Pace's 80-120% limits. No action was needed to qualify sample data.

4.2.3 Laboratory Blanks

Mercury in most bottle blanks and method blanks were below the Pace LOD of 0.197 ng/L, except for some method blanks associated with the SDGs with detectable mercury ranging from 0.2089 to 0.3629 ng/L. Action taken was to qualify mercury in samples at concentrations less than 5 X the associated method blank(s) as undetected with a "U" code as the concentration reported is not significantly different from lab background. Mercury in IRA-05-DEWT-EF127, WEEP 13, WEEP 13FB, RIVER 12FB, EF 115, EF 115 FB, WEEP 11 FB, EF 121 FB, WEEP 12 FB, RIVER 11 FB, and EF 121 was qualified as undetected as the concentration is not significantly different from lab background.

4.2.4 Ongoing Precision and Recovery (OPR) Standard

An OPR was prepared with each set of samples at 5 ng/L. Recoveries were all within Pace's limits of 79 - 121 %. No action was needed to qualify sample data.

4.2.5 Matrix Spike/Matrix Spike Duplicate

MS/MSD recoveries and RPD were all within Pace's limits of 75 - 125 % and < 24 % RPD. No action was needed to qualify sample data.

4.3 Field QC Results

A field blank was collected with each of the project samples. Mercury was detected in these blanks at concentrations ranging from 0.239 to 0.397 ng/L. Action taken was to qualify the detected sample concentration associated with the field blank if the concentration was not significantly different (< 5 X) from the field blank as undetected with a "U" code. Mercury in IRA-05-WEEP 13, EF 121 and EF 115 was qualified as undetected as the concentration reported is not significantly different from field background.

No field duplicates were collected for mercury. No action was taken to qualify sample data.

4.4 Data Usability

Mercury in IRA-05-DEWT-EF127, WEEP 13, WEEP 13FB, RIVER 12FB, EF 115, EF 115 FB, WEEP 11 FB, EF 121 FB, WEEP 12 FB, RIVER 11 FB, and EF 121 was qualified as undetected as the concentration is not significantly different from lab background. Mercury in IRA-05-WEEP 13, EF 121 and EF 115 was qualified as undetected as the concentration reported is not significantly different from field background.

Results greater than the LOD, but less than the LOQ were qualified by Pace with a "Q" qualifier. During the validation process, all "Q" qualified results were further qualified with a J code indicating estimated data. These concentrations should be considered estimated as they are within the region of quantitation associated with less precision.

If you have any questions regarding the qualification of data or the data validation process/criteria used, please contact me at (920) 469-9113.

Attachments:

Table 1
Validated hard copy Data Sheets
Appendix A: Data Validation Checklist

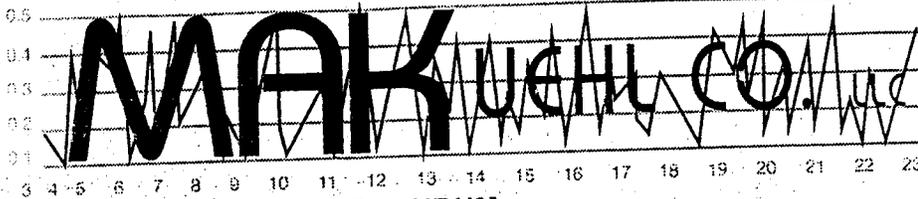
copy w/o attachments

Table 1 Data Validated - Lower Fox River Foth Van Dyke

LAB(S)	SDG#	Date Rec'd by	Field	Field	Field	Lab sample ID	Analytes
		Kuehl	Matrix	Sample ID	Collection Date		
Pace	863983	13-Oct-05	water	IRA-DEWT-EF 113	19-Sep-05	863983-001	TSS, BOD, NH3, PCBs
Pace	863983	13-Oct-05	water	IRA-05-OOOA-SW290-905	19-Sep-05	863983-002	TSS
Pace	863983	13-Oct-05	water	IRA-05-OOOA-SW291-902	19-Sep-05	863983-003	TSS
Pace	863983	13-Oct-05	water	IRA-05-OOOA-SW292-912	19-Sep-05	863983-004	TSS
Pace	863983	13-Oct-05	water	IRA-DEWT-EF 114	20-Sep-05	864073-001	TSS, BOD, NH3, PCBs
Pace	863983	13-Oct-05	water	IRA-DEWT-EF 115	20-Sep-05	864073-002	low level mercury
Pace	863983	13-Oct-05	field blank	IRA-DEWT-EF 115-FB	20-Sep-05	864073-003	low level mercury
Pace	863983	13-Oct-05	water	IRA-05-DEWT-WEEP 11	20-Sep-05	864073-004	low level mercury
Pace	863983	13-Oct-05	field blank	IRA-05-DEWT-WEEP 11 FB	20-Sep-05	864073-005	low level mercury
Pace	863983	13-Oct-05	water	IRA-05-DEWT-RIVER 10	20-Sep-05	864073-006	low level mercury
Pace	863983	13-Oct-05	field blank	IRA-05-DEWT-RIVER 10 FB	20-Sep-05	864073-007	low level mercury
Pace	863983	13-Oct-05	water	IRA-05-OOOA-SW293-905	20-Sep-05	864073-008	TSS
Pace	863983	13-Oct-05	field duplicate	IRA-05-OOOA-SW293DUP-905	20-Sep-05	864073-009	TSS
Pace	863983	13-Oct-05	water	IRA-05-OOOA-SW294-902	20-Sep-05	864073-010	TSS
Pace	863983	13-Oct-05	water	IRA-05-OOOA-SW295-912	20-Sep-05	864073-011	TSS
Pace	863983	13-Oct-05	field blank	IRA-05-OOOA-SW296RINSE-912	20-Sep-05	864073-012	TSS
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C1, 0-4"	21-Sep-05	864177-001	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C1, 4-8"	21-Sep-05	864177-002	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C1, 8-12"	21-Sep-05	864177-003	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C1, 12-16"	21-Sep-05	864177-004	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C1, 16-18"	21-Sep-05	864177-005	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C2, 0-4"	21-Sep-05	864177-006	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C2, 4-8"	21-Sep-05	864177-007	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C2, 8-12"	21-Sep-05	864177-008	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C3, 0-4"	21-Sep-05	864177-009	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C3, 4-8"	21-Sep-05	864177-010	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C3, 8-12"	21-Sep-05	864177-011	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C3, 12-16"	21-Sep-05	864177-012	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C4, 0-4"	21-Sep-05	864177-013	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C4, 4-8"	21-Sep-05	864177-014	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C4, 8-12"	21-Sep-05	864177-015	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C4, 12-16"	21-Sep-05	864177-016	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C5, 0-4"	21-Sep-05	864177-017	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C5, 4-8"	21-Sep-05	864177-018	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C5, 8-12"	21-Sep-05	864177-019	PCBs
Pace	864177A	13-Oct-05	sediment	IRA-05-OOOA-4A-C6, 0-4"	21-Sep-05	864177-020	PCBs
Pace	864177B	13-Oct-05	sediment	IRA-05-OOOA-4A-C6, 4-8"	21-Sep-05	864177-021	PCBs
Pace	864177B	13-Oct-05	sediment	IRA-05-OOOA-4A-C7, 0-4"	21-Sep-05	864177-022	PCBs
Pace	864177B	13-Oct-05	sediment	IRA-05-OOOA-4A-C7, 4-8"	21-Sep-05	864177-023	PCBs
Pace	864177B	13-Oct-05	sediment	IRA-05-OOOA-4A-C7, 8-12"	21-Sep-05	864177-024	PCBs
Pace	864177B	13-Oct-05	sediment	IRA-05-OOOA-4A-C8, 0-4"	21-Sep-05	864177-025	PCBs
Pace	864177B	13-Oct-05	sediment	IRA-05-OOOA-4A-C8, 4-8"	21-Sep-05	864177-026	PCBs
Pace	864177B	13-Oct-05	sediment	IRA-05-OOOA-4A-C9, 0-4"	21-Sep-05	864177-027	PCBs
Pace	864177B	13-Oct-05	sediment	IRA-05-OOOA-4A-C9, 4-8"	21-Sep-05	864177-028	PCBs
Pace	864177B	13-Oct-05	sediment	IRA-05-OOOA-4A-C9, 8-12"	21-Sep-05	864177-029	PCBs
Pace	864295	24-Oct-05	water	IRA-DEWT-EF 120	26-Sep-05	864295-001	TSS, BOD, NH3, PCBs
Pace	864295	24-Oct-05	water	IRA-05-OOOA-SW300-905	26-Sep-05	864295-002	TSS
Pace	864295	24-Oct-05	water	IRA-05-OOOA-SW301-902	26-Sep-05	864295-003	TSS
Pace	864295	24-Oct-05	water	IRA-05-OOOA-SW302-912	26-Sep-05	864295-004	TSS
Pace	864295	24-Oct-05	water	IRA-DEWT-EF 122	28-Sep-05	864413-001	TSS, BOD, NH3, PCBs
Pace	864295	24-Oct-05	water	IRA-05-OOOA-SW303-905	28-Sep-05	864413-002	TSS
Pace	864295	24-Oct-05	water	IRA-05-OOOA-SW304-902	28-Sep-05	864413-003	TSS
Pace	864295	24-Oct-05	water	IRA-05-OOOA-SW305-912	28-Sep-05	864413-004	TSS
Pace	864295	24-Oct-05	water	IRA-05-DEWT-EF 121	27-Sep-05	864387-001	low level mercury
Pace	864295	24-Oct-05	field blank	IRA-05-DEWT-EF 121 FB	27-Sep-05	864387-002	low level mercury
Pace	864295	24-Oct-05	water	IRA-05-DEWT-WEEP 12	27-Sep-05	864387-003	low level mercury
Pace	864295	24-Oct-05	field blank	IRA-05-DEWT-WEEP 12 FB	27-Sep-05	864387-004	low level mercury
Pace	864295	24-Oct-05	water	IRA-05-DEWT-RIVER 11	27-Sep-05	864387-005	low level mercury
Pace	864295	24-Oct-05	field blank	IRA-05-DEWT-RIVER 11 FB	27-Sep-05	864387-006	low level mercury
Pace	864478	24-Oct-05	water	IRA-05-DEWT-EF 123	29-Sep-05	864478-001	TSS, BOD, NH3, PCBs
Pace	864478	24-Oct-05	water	IRA-05-DEWT-EF 124	30-Sep-05	864478-002	TSS, BOD, NH3, PCBs
Pace	864478	24-Oct-05	water	IRA-05-DEWT-EF 124 DUP	30-Sep-05	864478-003	TSS, BOD, NH3, PCBs
Pace	864538	24-Oct-05	sediment	IRA-05-PS 67P	27-Sep-05	864538-001	PCBs
Pace	864538	24-Oct-05	sediment	IRA-05-PS 78P	27-Sep-05	864538-002	PCBs
Pace	864538	24-Oct-05	sediment	IRA-05-PS 79P	27-Sep-05	864538-003	PCBs
Pace	864538	24-Oct-05	sediment	IRA-05-PS 80P	27-Sep-05	864538-004	PCBs
Pace	864538	24-Oct-05	sediment	IRA-05-PS 91P	27-Sep-05	864538-005	PCBs
Pace	864538	24-Oct-05	sediment	IRA-05-PS 92P	27-Sep-05	864538-006	PCBs
Pace	864538	24-Oct-05	sediment	IRA-05-PS 102P	28-Sep-05	864538-007	PCBs
Pace	864538	24-Oct-05	sediment	IRA-05-PS 92A-D COMP	30-Sep-05	864538-008	PCBs
Pace	864538	24-Oct-05	sediment	IRA-05-PS 80A-D COMP	30-Sep-05	864538-009	PCBs
Pace	864538	24-Oct-05	sediment	IRA-05-PS 103A-D COMP	30-Sep-05	864538-010	PCBs

Table 1 Data Validated - Lower Fox River Foth Van Dyke

Pace	864538	24-Oct-05	sediment	IRA-05-PS 93A-D COMP	30-Sep-05	864538-011	PCBs
Pace	864538	24-Oct-05	sediment	IRA-05-PS 79A-D COMP	30-Sep-05	864538-012	PCBs
Pace	864538	24-Oct-05	sediment	IRA-05-PS 67A-D COMP	30-Sep-05	864538-013	PCBs
Pace	864538	24-Oct-05	field duplicate	IRA-05-PS 79A-D COMP DUP	30-Sep-05	864538-014	PCBs
Pace	863736	26-Oct-05	sediment	IRA-05-T10DS-62	13-Sep-05	863736-001	PCBs
Pace	863736	26-Oct-05	sediment	IRA-05-T11DS-63	13-Sep-05	863736-002	PCBs
Pace	863736	26-Oct-05	field duplicate	IRA-05-T10DS-62 DUP	13-Sep-05	863736-003	PCBs
Pace	863942	26-Oct-05	sediment	IRA-05-PS 75 P	15-Sep-05	863942-001	PCBs
Pace	863942	26-Oct-05	sediment	IRA-05-PS 87P	15-Sep-05	863942-002	PCBs
Pace	863942	26-Oct-05	sediment	IRA-05-PS 99P	15-Sep-05	863942-003	PCBs
Pace	863942	26-Oct-05	sediment	IRA-05-PS 110P	15-Sep-05	863942-004	PCBs
Pace	863942	26-Oct-05	field duplicate	IRA-05-PS 99P (D)	15-Sep-05	863942-005	PCBs
Pace	863942	26-Oct-05	sediment	IRA-05-PS 109 C + D	15-Sep-05	863942-006	PCBs
Pace	863942	26-Oct-05	sediment	IRA-05-T15DS-65	15-Sep-05	863943-001	PCBs
Pace	863942	26-Oct-05	sediment	IRA-05-T14DS-64	15-Sep-05	863943-002	PCBs
Pace	863942	26-Oct-05	sediment	IRA-05-T18DS-68	16-Sep-05	863943-003	PCBs
Pace	863942	26-Oct-05	sediment	IRA-05-T17DS-67	16-Sep-05	863943-004	PCBs
Pace	863942	26-Oct-05	sediment	IRA-05-T16DS-66	16-Sep-05	863943-005	PCBs
Pace	864152	26-Oct-05	water	IRA-DEWT-EF 116	21-Sep-05	864152-001	TSS, BOD, NH3, PCBs
Pace	864152	26-Oct-05	field duplicate	IRA-DEWT-EF 116 DUP	21-Sep-05	864152-002	TSS, BOD, NH3, PCBs
Pace	864152	26-Oct-05	water	IRA-DEWT-EF 117	22-Sep-05	864187-001	TSS, BOD, NH3, PCBs
Pace	864152	26-Oct-05	water	IRA-05-OOOA-SW297-905	23-Sep-05	864263-001	TSS
Pace	864152	26-Oct-05	water	IRA-05-OOOA-SW298-902	23-Sep-05	864263-002	TSS
Pace	864152	26-Oct-05	water	IRA-05-OOOA-SW299-912	23-Sep-05	864263-003	TSS
Pace	864152	26-Oct-05	water	IRA-DEWT-EF 118	23-Sep-05	864263-004	TSS, BOD, NH3, PCBs
Pace	864152	26-Oct-05	water	IRA-DEWT-EF 119	24-Sep-05	864263-005	TSS, BOD, NH3, PCBs
Pace	864294	26-Oct-05	sediment	IRA-05-T19DS-91	26-Sep-05	864294-001	PCBs
Pace	864294	26-Oct-05	sediment	IRA-05-T20DS-92	26-Sep-05	864294-002	PCBs
Pace	864294	26-Oct-05	field duplicate	IRA-05-T20DS-92 DUP	26-Sep-05	864294-003	PCBs
Pace	864294	26-Oct-05	sediment	IRA-05-T21DS-93	26-Sep-05	864294-004	PCBs
Pace	865068	27-Oct-05	sediment	IRA-05-POG1-29 (3)	12-Oct-05	865068-001	PCBs
Pace	865068	27-Oct-05	sediment	IRA-05-POG1-30 (3)	12-Oct-05	865068-002	PCBs
Pace	865068	27-Oct-05	sediment	IRA-05-POG1-31 (22.5)	12-Oct-05	865068-003	PCBs
Pace	865068	27-Oct-05	sediment	IRA-05-POG1-32 (4)	12-Oct-05	865068-004	PCBs
Pace	864664	27-Oct-05	water	IRA-05-DEWT-EF 126	4-Oct-05	864664-001	TSS, BOD, NH3, PCBs
Pace	864664	27-Oct-05	water	IRA-05-DEWT-EF 128	5-Oct-05	864730-001	TSS, BOD, NH3, PCBs
Pace	864664	27-Oct-05	water	IRA-05-OOOA-SW313-905	5-Oct-05	864730-002	TSS
Pace	864664	27-Oct-05	field duplicate	IRA-05-OOOA-SW313-905 DUP	5-Oct-05	864730-003	TSS
Pace	864664	27-Oct-05	water	IRA-05-OOOA-SW314-902	5-Oct-05	864730-004	TSS
Pace	864664	27-Oct-05	water	IRA-05-OOOA-SW315-912	5-Oct-05	864730-005	TSS
Pace	864664	27-Oct-05	field blank	IRA-05-DEWT-SW316 RINSE-912	5-Oct-05	864730-006	TSS
Pace	864664	27-Oct-05	water	IRA-05-DEWT-EF 127	4-Oct-05	864664-002	low level mercury
Pace	864664	27-Oct-05	field blank	IRA-05-DEWT-EF 127 FB	4-Oct-05	864664-003	low level mercury
Pace	864664	27-Oct-05	water	IRA-05-DEWT-WEEP 13	4-Oct-05	864664-004	low level mercury
Pace	864664	27-Oct-05	water	IRA-05-DEWT-WEEP 13 FB	4-Oct-05	864664-005	low level mercury
Pace	864664	27-Oct-05	field blank	IRA-05-DEWT-WEEP 12	4-Oct-05	864664-006	low level mercury
Pace	864664	27-Oct-05	water	IRA-05-DEWT-RIVER 12 FB	4-Oct-05	864664-007	low level mercury
Pace	864555	27-Oct-05	water	IRA-05-OOOA-SW306-905	30-Sep-05	864555-001	TSS
Pace	864555	27-Oct-05	field duplicate	IRA-05-OOOA-SW306-905 DUP	30-Sep-05	864555-002	TSS
Pace	864555	27-Oct-05	water	IRA-05-OOOA-SW307-902	30-Sep-05	864555-003	TSS
Pace	864555	27-Oct-05	water	IRA-05-OOOA-SW308-912	30-Sep-05	864555-004	TSS
Pace	864555	27-Oct-05	field blank	IRA-05-DEWT-SW309 RINSE-912	30-Sep-05	864555-005	TSS
Pace	864555	27-Oct-05	water	IRA-05-DEWT- EF 125	1-Oct-05	864555-006	TSS, BOD, NH3, PCBs
Pace	864555	27-Oct-05	water	IRA-05-OOOA-SW310-905	3-Oct-05	864582-001	TSS
Pace	864555	27-Oct-05	water	IRA-05-OOOA-SW311-902	3-Oct-05	864582-002	TSS
Pace	864555	27-Oct-05	water	IRA-05-OOOA-SW312-912	3-Oct-05	864582-003	TSS

**TECHNICAL MEMORANDUM**

DATE: November 23, 2005

TO: Janis Kesy
Project Manager
Foth & Van Dyke

FROM: Marcia A. Kuehl *MAK*
President/Owner
MAKuehl Company

SUBJECT: Data Validation for Lower Fox River OU 1 2005 Remedial Action
Sampling Events of October 6 - 23, 2005
Foth & Van Dyke Project # : 04G007, 02G005

1.0 OVERVIEW

Analytical results for samples listed in Table 1 and their associated laboratory QC samples collected from the Lower Fox River OU 1 have been evaluated using the EPA guidance documents "National Functional Guidelines for Organic Data Review", dated October 1999, EPA-540/R-99/008, and the "National Functional Guidelines for Inorganic Data Review", dated July, 2002, EPA-540/R-01-008.

The specific calibration and laboratory QC check requirements contained in the "Lower Fox River Operable Unit 1 Remedial Action-2004 Remedial Action Work Plan" dated May, 2004 (RAWP) were the primary criteria used in the assessment of the data for compliance with the project data quality objectives. The review was based on the data packages supplied by the analytical laboratory, Pace, located in Kimberly, Wisconsin.

All Aroclor data as reported by Pace was acceptable for use without qualification, or qualified as estimated. Detected PCBs in sediment samples at concentrations greater than the LOD, but below the LOQ were qualified by Pace with a "Q" qualifier, and further qualified during validation as estimated with a J code, as they are within the region of quantitation associated with less precision.

The BOD result in IRA-05-DEWT-EF137 was estimated from a holding time exceedance.

Mercury in IRA-05-DEWT-EF141, EF134, EF141-FB, WEEP 14FB and RIVER 13FB was qualified as undetected as the concentration is not significantly different from lab background. Mercury in IRA-05-DEWT-EF134 was qualified as undetected as the concentration reported is not significantly different from field background.

All qualifiers assigned during the data validation process are discussed in detail below. The validated data sheets are attached, and the checklist used during the validation are in Appendix A.

2.0 PCB AS AROCLORS DATA

Pace utilized the EPA SW846 reference methods 3510C and 8082 as specified in their Standard Operating Procedure SVO-52, Revision No. 3 dated January, 2000 for water samples and EPA SW846 reference methods 35141 and 8082, automated soxhlet extraction on the air dried sample, acid clean-up and sulfur clean-up using copper for solid samples as specified in their Standard Operating Procedure K-SVO-77, Revision No. 3 dated June 24, 2004. No significant deviations from these SOPs were apparent from the documentation reviewed. No action was needed to qualify sample data.

2.1 Completeness Assessment

The Pace data packages received were complete. All samples listed in Table 1 that were submitted and indicated for analysis were analyzed. The data packages received for PCB analysis did not require any follow-up with Pace to enable data validation.

2.2 Compliance Assessment

2.2.1 Holding Times/Preservation

All samples for PCBs were received on ice. No notation of receipt temperature in exceedance of 2-6°C and no intact ice was noted for any samples analyzed for PCBs. None of the SDGs contained temperature blanks shipped with them, but as all samples were received "on ice", no action was needed to qualify sample data.

Water samples were extracted within 7 days after collection and sediment and soil samples within 14 days after collection. After extraction all samples were analyzed within 14 days. No action was needed to qualify sample data.

2.2.2 Initial Calibration (ICAL)

Five point initial calibration curves ranging from 0.1-1.0 ug/ml for Aroclor 1016/1260, 1242 and 1254 were analyzed on both columns, RTX-CLP (primary quantitation column) and RTX-CLP2 (confirmation column) on 9/27/05, 10/18/05, 10/21/05 and 11/3/05. The rsd values measured for each peak were less than the 20 % data validation criteria. No action was taken to qualify sample data based on initial calibration results.

2.2.3 Calibration Verification (CCAL)

The required method frequency of calibration verification was every 10 samples and at the end of the instrument run was met for every SDG. In all of the SDGs reviewed in Table 1, the CCALs consisted of a 0.3 ug/ml solution of Aroclor 1242 alternating with a 0.3 ug/ml solution of Aroclor 1254. The mean percent difference between the CCAL and ICAL calibration factors for the 5-10 peaks used for identification and quantitation were all less than the 15 % data validation criteria on the primary quantitation column. No action was needed to qualify sample data.

2.2.4 Laboratory Blanks

At least one laboratory blank was prepared and extracted with every 20 project samples or less

analyzed. No laboratory blanks contained detectable Aroclors above the Limit of Detection (LOD).

2.2.5 Surrogate Recoveries

Decachlorobiphenyl (DCB) and tetrachloro-m-xylene (TCX) recoveries in all project water samples were within the Pace limits of 7 - 113 % (DCB) and 49 - 112 % (TCX). No action was needed to qualify sample data.

Decachlorobiphenyl (DCB) and tetrachloro-m-xylene (TCX) recoveries in many sediment samples were not useful (i.e. 0 %), as these samples required dilution. Dilution factors greater than ten result in the surrogate concentration being too low to be detected. No action was taken to qualify sample data in samples with dilution factors greater than or equal to ten.

For sediment samples with dilution factors of less than ten, surrogate recoveries were within the data validation limits of 60 - 140 %, except for DCB recovery in IRA-05-POG1-49 (1-8'). Recovery of DCB was 58 %. Pace qualified this recovery in the Analytical Report with a "F" code. In accordance with EPA National Functional Guidelines for Organic Data Validation PEST Section VI. E 1(a), no action was taken to qualify detected and undetected Aroclor results in this sample.

2.2.6 Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD)

At least one Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) at 5 ug/L Aroclor 1242 was prepared and analyzed with each SDG, or 20 water samples. All recoveries measured in the LCS were within the Pace limits of 47 - 138 % and < 20 % RPD, except for 139 % and 145 % recoveries of Aroclor 1242 in the LCS extracted and analyzed with SDG 865234. Pace qualified the sample results associated with this out of control LCS with a "&" qualifier. No action was needed to qualify sample data based on these high LCS recoveries, as no detectable PCBs were present in the associated samples and no high bias was possible.

At least one Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) at 500 ug/kg Aroclor 1242 was prepared and analyzed with each SDG, or 20 sediment samples. All recoveries measured in the LCS were within the RAWP 65 - 135 % and < 20 % RPD. No action was needed to qualify sample data based on LCS recoveries.

2.2.7 Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery

Aroclor 1242 recovery of a 2 ppm spike in project sediment samples were all within the 65 - 135 % recovery limits. No action was needed to qualify sample data.

2.2.8 Detection Limit Attainment

The RAWP Reporting Limits of 1.0 ug/L and 50 ug/kg were attained in all samples when accounting for the actual sample volume extracted or the percent solids of the sample. No action was needed to qualify sample data.

2.2.9 Verification of Reported Results

No detectable Aroclors were present in the project water samples analyzed. No discrepancies or false negatives were detected. QC sample results such as RPD, recovery and % difference were

also recalculated, but at a 10 % frequency. No discrepancies that were not due to differences in lab instrument software and the validator's calculator significant figure/rounding protocols were found in QC sample results. All detected Aroclor values reported for QC and sediment sample results are from the primary column. The analysis on the secondary column was reviewed to assess if the Aroclor pattern(s) were confirmed, and all were.

All reported Aroclors in QC and the sediment samples were quantified on at least an 4 peak match. Peaks with obvious interferences were not included in the quantitation. The method retention time window criteria of ± 0.03 minutes for a minimum of a 4 peak match for Aroclor identification was met in all QC and sediment samples.

2.3 Field QC Results

No field equipment rinsates associated with the project samples in Table 1 were analyzed for PCBs. No action was needed to qualify sample data.

RPD values for the field duplicates collected in Table 1 were as follows:

IRA-05-DEWT-EF 135/D: No Aroclors detected

The SAP data quality objective (DQO) of < 30 % RPD was met for PCBs, as none were detected in the field sample and its duplicate. No action was needed to qualify sample data.

2.4 Data Usability

All Aroclor data as reported by Pace was acceptable for use without qualification, or qualified as estimated.

Detected PCBs in sediment samples at concentrations greater than the LOD, but below the LOQ were qualified by Pace with a "Q" qualifier, and further qualified during validation as estimated with a J code, as they are within the region of quantitation associated with less precision.

3.0 AMMONIA, BOD and TSS DATA

Pace utilized EPA reference methods 160.2 and 350.1 as specified in their Standard Operating Procedure G2-WCM-01, Revision No. 2 dated January 1, 2003 and G2-WCM-58, Revision No. 0 dated January 16, 2004. No significant deviations from this SOP was apparent from the documentation reviewed. No action was needed to qualify sample data.

BOD analysis was not a requirement in the RAWP. Pace utilized Standard Methods 5210B for BOD analysis. No significant deviations from this reference method was apparent from the documentation reviewed. No action was needed to qualify sample data.

3.1 Completeness Assessment

The Pace data packages received were complete. All samples listed in Table 1 that were submitted and indicated for analysis were analyzed. The data packages received for ammonia, BOD and TSS analysis did not require any follow-up with Pace to enable data validation.

3.2 Compliance Assessment

3.2.1 Holding Time/Preservation

Documentation of adequate acid preservation for ammonia was present, except for samples EF129, 130, 131, 134, 137, 138 and 139. The pH was 7, and additional acid was added by Pace within 24 hours of collection. No action was taken to qualify sample data. All EPA recommended holding times for the methods cited above were met, except for the BOD holding time for sample IRA-05-DEWT-EF137, which was exceeded by an hour upon receipt at the lab. Pace qualified the result with an "H" qualifier. Action taken was to qualify the BOD result in IRA-05-DEWT-EF137 as estimated with a J code from this holding time exceedance.

None of the SDGs contained temperature blanks shipped with them, but as all samples were received "on ice", no action was needed to qualify sample data.

3.2.2 Calibration

All ammonia initial instrument calibrations for ammonia were properly performed using at least five standards and met the correlation coefficient criteria of greater than 0.995. Continuing calibration checks were performed at least once every 10 samples and all checks met performance criteria of 90-110%.

3.2.3 Laboratory Blanks

Laboratory blanks did not contain any TSS or BOD above the Limit of Detection (LOD). No action was needed to qualify sample data.

Ammonia was detected at -0.23 mg/L in the lab blank analyzed with DEWT-EF 120, 122, 122, 124, 124 DUP and 128. Pace qualified these results with an "A" qualifier. No action was needed to qualify sample data, as no ammonia was detected in these project samples.

3.2.4 Reference Standards/Lab Control Standards (LCS/LCSD)

Recovery of reference (EPA/ERA/APG) standards were all within Pace and RAWP accuracy limits. No action was needed to qualify sample data.

3.2.5 Laboratory Duplicate Sample Analysis

All laboratory duplicate and LCS/LCSD RPD results were within the Pace and RAWP precision limits. No action was needed to qualify sample data.

Due to limited sample volume, no lab duplicate was prepared and analyzed for BOD for sample IRA-05-DEWT-EF131. Pace qualified the sample data with an "X" qualifier. No further action was taken to qualify sample data based on this missing precision indicator, as all other batch QC was within limit.

3.2.6 Matrix Spike Samples

All matrix spike sample recoveries were within the Pace and RAWP accuracy limits of 90 - 110 %.

No action was needed to qualify sample data.

3.3 Field QC Results

Field equipment rinsates were collected for TSS with the project samples in Table 1. No TSS was detected in any of the rinsates. No action was needed to qualify sample data.

No field equipment rinsates associated with the project samples in Table 1 were analyzed for BOD or ammonia. No action was taken to qualify ammonia or BOD sample data.

Field duplicates for TSS were collected with the project samples listed in Table 1 and the Relative Percent Difference (RPD) calculated below:

Sample ID (IRA-05-)	TSS (mg/L)	TSS (mg/L) DUP	RPD
POG1-SW320-905	27	27	0 %
POG1-SW333-905	27	27	0 %
DEWT-EF135	1.1	1.1	0 %

The RPD values were within the RAWP precision limit of 5 %. No action was needed to qualify sample data.

A field duplicate was collected with the project samples listed in Table 1 for ammonia and BOD for IRA-05-DEWT-EF135. No detectable BOD was present in these samples. Ammonia was present at 0.60 mg/L and 0.57 mg/L for a calculated RPD value of 5 %. As this RPD value was within the RAWP precision limit of 20 % for ammonia, no action was needed to qualify sample data.

3.4 Data Usability

The BOD result in IRA-05-DEWT-EF137 was estimated from a holding time exceedance.

Results greater than the LOD, but less than the LOQ were qualified by Pace with a "Q" qualifier. During the validation process, all "Q" qualified results were further qualified with a J code indicating estimated data. These concentrations should be considered estimated as they are within the region of quantitation associated with less precision.

4.0 MERCURY DATA

Pace utilized EPA method 1631E. No significant deviations from the EPA reference method was apparent from the documentation reviewed. No action was needed to qualify sample data.

4.1 Completeness Assessment

The data packages received for mercury analysis were complete. All samples submitted were digested and analyzed. No action was needed to qualify sample data.

4.2 Compliance Assessment

4.2.1 Holding Time/Preservation

All samples were analyzed within the 28 day holding time. No notation of storage or shipping temperature in exceedance of $4 \pm 2^{\circ}\text{C}$ was noted. No action was needed to qualify mercury sample data based on exceedance of holding time or preservation requirements.

4.2.2 Calibration

The initial instrument calibrations were five points ranging from 0.05 - 4 ng/L and correlation coefficients were all ≥ 0.995 . Continuing calibration checks were performed at least once every 10 samples and were within Pace's 80-120% limits. No action was needed to qualify sample data.

4.2.3 Laboratory Blanks

Mercury in most bottle blanks and method blanks were below the Pace LOD of 0.197 ng/L, except for some method blanks associated with the SDGs with detectable mercury ranging from 0.2093 to 0.3717 ng/L. Action taken was to qualify mercury in samples at concentrations less than 5 X the associated method blank(s) as undetected with a "U" code as the concentration reported is not significantly different from lab background. Mercury in IRA-05-DEWT-EF141, EF134, EF141-FB, WEEP 14FB and RIVER 13FB was qualified as undetected as the concentration is not significantly different from lab background.

4.2.4 Ongoing Precision and Recovery (OPR) Standard

An OPR was prepared with each set of samples at 5 ng/L. Recoveries were all within Pace's limits of 79 - 121 %. No action was needed to qualify sample data.

4.2.5 Matrix Spike/Matrix Spike Duplicate

MS/MSD recoveries and RPD were all within Pace's limits of 75 - 125 % and < 24 % RPD. No action was needed to qualify sample data.

4.3 Field QC Results

A field blank was collected with each of the project samples. Mercury was detected in these blanks at concentrations ranging from 0.193 to 1.63 ng/L. Action taken was to qualify the detected sample concentration associated with the field blank if the concentration was not significantly different (< 5 X) from the field blank as undetected with a "U" code. Mercury in IRA-05-DEWT-EF134 was qualified as undetected as the concentration reported is not significantly different from field background.

No field duplicates were collected for mercury. No action was taken to qualify sample data.

4.4 Data Usability

Mercury in IRA-05-DEWT-EF141, EF134, EF141-FB, WEEP 14FB and RIVER 13FB was qualified as undetected as the concentration is not significantly different from lab background. Mercury in

IRA-05-DEWT-EF134 was qualified as undetected as the concentration reported is not significantly different from field background.

Results greater than the LOD, but less than the LOQ were qualified by Pace with a "Q" qualifier. During the validation process, all "Q" qualified results were further qualified with a J code indicating estimated data. These concentrations should be considered estimated as they are within the region of quantitation associated with less precision.

If you have any questions regarding the qualification of data or the data validation process/criteria used, please contact me at (920) 469-9113.

Attachments:

Table 1

Validated hard copy Data Sheets

Appendix A: Data Validation Checklist

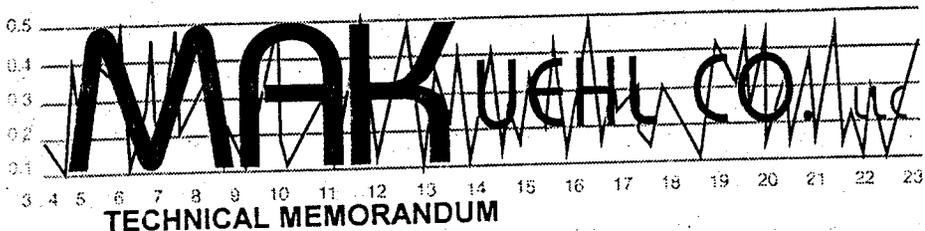
Copy w/o attachments

Table 1 Data Validated - Lower Fox River Foth Van Dyke

LAB(S)	SDG#	Date Rec'd by Kuehl	Matrix	Field Sample ID	Field Collection Date	Lab sample ID	Analytes
Pace	865139	1-Nov-05	sediment	IRA-05-POG1-33 (0-6")	13-Oct-05	865139-001	PCBs
Pace	865139	1-Nov-05	sediment	IRA-05-POG1-34 (0-6")	13-Oct-05	865139-002	PCBs
Pace	865139	1-Nov-05	sediment	IRA-05-POG1-35 (0-6")	13-Oct-05	865139-003	PCBs
Pace	865139	1-Nov-05	sediment	IRA-05-POG1-36 (0-6")	13-Oct-05	865139-004	PCBs
Pace	865139	1-Nov-05	sediment	IRA-05-POG1-37 (0-6")	13-Oct-05	865139-005	PCBs
Pace	865139	1-Nov-05	sediment	IRA-05-POG1-38 (0-6")	13-Oct-05	865139-006	PCBs
Pace	864801	1-Nov-05	water	IRA-05-DEWT-EF129	6-Oct-05	864801-001	TSS, BOD, NH3, PCBs
Pace	864801	1-Nov-05	water	IRA-05-DEWT-EF130	7-Oct-05	864861-001	TSS, BOD, NH3, PCBs
Pace	864801	1-Nov-05	water	IRA-05-OOOA-SW317-905	7-Oct-05	864861-002	TSS
Pace	864801	1-Nov-05	water	IRA-05-OOOA-SW318-902	7-Oct-05	864861-003	TSS
Pace	864801	1-Nov-05	water	IRA-05-OOOA-SW319-912	7-Oct-05	864861-004	TSS
Pace	864801	1-Nov-05	water	IRA-05-DEWT-EF131	8-Oct-05	864897-001	TSS, BOD, NH3, PCBs
Pace	864921	7-Nov-05	water	IRA-05-DEWT-EF134	11-Oct-05	865003-002	low level mercury
Pace	864921	7-Nov-05	field blank	IRA-05-DEWT-EF134 FB	11-Oct-05	865003-003	low level mercury
Pace	864921	7-Nov-05	water	IRA-05-DEWT-WEEP14	11-Oct-05	865003-004	low level mercury
Pace	864921	7-Nov-05	field blank	IRA-05-DEWT-WEEP14 FB	11-Oct-05	865003-005	low level mercury
Pace	864921	7-Nov-05	water	IRA-05-DEWT-RIVER13	11-Oct-05	865003-006	low level mercury
Pace	864921	7-Nov-05	field blank	IRA-05-DEWT-RIVER13 FB	11-Oct-05	865003-007	low level mercury
Pace	864921	7-Nov-05	water	IRA-05-DEWT-EF132	11-Oct-05	865003-001	TSS, BOD, NH3, PCBs
Pace	864921	7-Nov-05	water	IRA-05-DEWT-EF132	10-Oct-05	864921-001	TSS, BOD, NH3, PCBs
Pace	864921	7-Nov-05	water	IRA-05-OOOA-SW320-905	10-Oct-05	864921-002	TSS
Pace	864921	7-Nov-05	water	IRA-05-OOOA-SW320-905	10-Oct-05	864921-003	TSS
Pace	864921	7-Nov-05	water	IRA-05-OOOA-SW321-902	10-Oct-05	864921-004	TSS
Pace	864921	7-Nov-05	water	IRA-05-OOOA-SW322-912	10-Oct-05	864921-005	TSS
Pace	864921	7-Nov-05	field blank	IRA-05-OOOA-SW322-912 RINSE	10-Oct-05	864921-006	TSS
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-39 (2-3')	19-Oct-05	865379-001	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-39 (3-4')	19-Oct-05	865379-002	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-39 (4-5')	19-Oct-05	865379-003	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-40 (3.5-4')	19-Oct-05	865379-005	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-41 (2-3')	19-Oct-05	865379-007	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-42 (3-4")	19-Oct-05	865379-010	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-43 (2-3.5')	19-Oct-05	865379-012	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-44 (1.5-2')	19-Oct-05	865379-014	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-45 (1-2.5')	19-Oct-05	865379-016	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-46 (1.5-2')	19-Oct-05	865379-017	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-47 (2-2.5')	19-Oct-05	865379-019	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-48 (1')	19-Oct-05	865379-020	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-49 (0-2')	19-Oct-05	865379-022	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-49 (.5-1.5')	19-Oct-05	865379-023	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-50 (.5-2')	19-Oct-05	865379-025	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-51 (.5-1.5')	19-Oct-05	865379-027	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-52 (1-2')	19-Oct-05	865379-029	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-53 (1-2')	19-Oct-05	865379-031	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-54 (2-3')	19-Oct-05	865379-037	PCBs
Pace	865379A	7-Nov-05	sediment	IRA-05-POG1-55 (2-3.25')	19-Oct-05	865379-039	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-39 (5-6')	19-Oct-05	865379-004	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-40 (4-5')	19-Oct-05	865379-006	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-41 (3-4')	19-Oct-05	865379-008	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-41 (4-4.2')	19-Oct-05	865379-009	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-42 (4-5')	19-Oct-05	865379-011	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-43 (3.5-5')	19-Oct-05	865379-013	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-44 (2-3')	19-Oct-05	865379-015	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-46 (2-2.7')	19-Oct-05	865379-018	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-48 (2')	19-Oct-05	865379-021	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-49 (1.8')	19-Oct-05	865379-024	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-50 (2-3')	19-Oct-05	865379-026	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-51 (2-3')	19-Oct-05	865379-028	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-52 (2-3')	19-Oct-05	865379-030	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-53 (2-3')	19-Oct-05	865379-032	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-53 (3-4')	19-Oct-05	865379-033	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-53 (4-5')	19-Oct-05	865379-034	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-53 (5-6')	19-Oct-05	865379-035	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-53 (6-7')	19-Oct-05	865379-036	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-POG1-54 (3-4')	19-Oct-05	865379-038	PCBs
Pace	865379B	7-Nov-05	sediment	IRA-05-T11.5DS164	18-Oct-05	865380-001	PCBs
Pace	865069	15-Nov-05	water	IRA-05-DEWT-EF134	12-Oct-05	865069-001	TSS, BOD, NH3, PCBs
Pace	865069	15-Nov-05	water	IRA-05-OOOA-SW324-905	12-Oct-05	865069-002	TSS

Table 1 Data Validated - Lower Fox River Foth Van Dyke

Pace	865069	15-Nov-05	water	IRA-05-OOOA-SW325-902	12-Oct-05	865069-003	TSS
Pace	865069	15-Nov-05	water	IRA-05-COOA-SW326-912	12-Oct-05	865069-004	TSS
Pace	865069	15-Nov-05	water	IRA-05-DEWT-EF135	13-Oct-05	865137-001	TSS, BOD, NH3, PCBs
Pace	865069	15-Nov-05	field duplicate	IRA-05-DEWT-EF135 DUP	13-Oct-05	865137-002	TSS, BOD, NH3, PCBs
Pace	865069	15-Nov-05	water	IRA-05-OOOA-SW324-905	14-Oct-05	865199-001	TSS
Pace	865069	15-Nov-05	water	IRA-05-OOOA-SW325-902	14-Oct-05	865199-002	TSS
Pace	865069	15-Nov-05	water	IRA-05-OOOA-SW326-912	14-Oct-05	865199-003	TSS
Pace	865069	15-Nov-05	water	IRA-05-DEWT-EF136	14-Oct-05	865199-004	TSS, BOD, NH3, PCBs
Pace	865234	16-Nov-05	water	IRA-05-DEWT-EF137	15-Oct-05	865234-001	TSS, BOD, NH3, PCBs
Pace	865234	16-Nov-05	water	IRA-05-OOOA-EF138	18-Oct-05	865292-001	TSS, BOD, NH3, PCBs
Pace	865234	16-Nov-05	water	IRA-05-OOOA-SW330-905	18-Oct-05	865292-002	TSS
Pace	865234	16-Nov-05	water	IRA-05-OOOA-SW331-902	18-Oct-05	865292-003	TSS
Pace	865234	16-Nov-05	water	IRA-05-OOOA-SW332-912	18-Oct-05	865292-004	TSS
Pace	865234	16-Nov-05	water	IRA-05-DEWT-EF139	19-Oct-05	865374-001	TSS, BOD, NH3, PCBs
Pace	865446	16-Nov-05	water	IRA-05-DEWT-EF141	21-Oct-05	865498-002	low level mercury
Pace	865446	16-Nov-05	field blank	IRA-05-DEWT-EF141 FB	21-Oct-05	865498-003	low level mercury
Pace	865446	16-Nov-05	water	IRA-05-DEWT-WEEP15	21-Oct-05	865498-004	low level mercury
Pace	865446	16-Nov-05	field blank	IRA-05-DEWT-WEEP15 FB	21-Oct-05	865498-005	low level mercury
Pace	865446	16-Nov-05	water	IRA-05-DEWT-RIVER14	21-Oct-05	865498-006	low level mercury
Pace	865446	16-Nov-05	field blank	IRA-05-DEWT-RIVER14 FB	21-Oct-05	865498-007	low level mercury
Pace	865446	16-Nov-05	water	IRA-05-POG1-SW333-905	20-Oct-05	865446-001	TSS
Pace	865446	16-Nov-05	field duplicate	IRA-05-POG1-SW333-905DUP	20-Oct-05	865446-002	TSS
Pace	865446	16-Nov-05	water	IRA-05-POG1-SW334-902	20-Oct-05	865446-003	TSS
Pace	865446	16-Nov-05	water	IRA-05-POG1-SW335-912	20-Oct-05	865446-004	TSS
Pace	865446	16-Nov-05	field blank	IRA-05-POG1-SW336 RINSE-912	20-Oct-05	865446-005	TSS
Pace	865446	16-Nov-05	water	IRA-05-DEWT-EF140	21-Oct-05	865498-001	TSS, BOD, NH3, PCBs
Pace	865446	16-Nov-05	water	IRA-05-DEWT-EF142	22-Oct-05	865507-001	TSS, BOD, NH3, PCBs
Pace	865446	16-Nov-05	water	IRA-05-DEWT-EF143	23-Oct-05	865529-001	TSS, BOD, NH3, PCBs



Data Validation
Lab/Field Audits
QA Plans

TECHNICAL MEMORANDUM

DATE: December 19, 2005
TO: Janis Kesy
Project Manager
Foth & Van Dyke
FROM: Marcia A. Kuehl *MAK*
President/Owner
MAKuehl Company
SUBJECT: Data Validation for Lower Fox River OU 1 2005 Remedial Action
Sampling Events of October 13 - November 14, 2005
Foth & Van Dyke Project # : 04G007, 02G005

1.0 OVERVIEW

Analytical results for samples listed in Table 1 and their associated laboratory QC samples collected from the Lower Fox River OU 1 have been evaluated using the EPA guidance documents "National Functional Guidelines for Organic Data Review", dated October 1999, EPA-540/R-99/008, and the "National Functional Guidelines for Inorganic Data Review", dated July, 2002, EPA-540/R-01-008.

The specific calibration and laboratory QC check requirements contained in the "Lower Fox River Operable Unit 1 Remedial Action-2004 Remedial Action Work Plan" dated May, 2004 (RAWP) were the primary criteria used in the assessment of the data for compliance with the project data quality objectives. The review was based on the data packages supplied by the analytical laboratory, Pace, located in Kimberly, Wisconsin.

All Aroclor data as reported by Pace was acceptable for use without qualification, or qualified as estimated due to field duplicate imprecision (Aroclor 1242 in PS107-P, PS86A-D, PS73A-d, Aroclor 1254 in PS107-P, PS86A-D, PS-13P, Aroclor 1260 in PS83-P, PS-13P, PS86A-D, Aroclor 1268 in PS83-P, PS86A-D and total PCBs in PS73A-D, PS86A-D and PS107-P). Aroclor 1260 and 1268 results quantified against the single point calibration standard in P22A-D, PS-28P, PS99A-D, PS-72P, PS-83P, PS83-P DUP, TB5-DS162, PS-98P, PS108A-D, PS-86P, PS98A-D, PS45A-D and PS-35P were qualified as estimated. Detected PCBs in sediment samples at concentrations greater than the LOD, but below the LOQ were qualified by Pace with a "Q" qualifier, and further qualified during validation as estimated with a J code, as they are within the region of quantitation associated with less precision.

The BOD results in IRA-05-DEWT-EF147 and EF-147 DUP were estimated from a holding time exceedance. TSS results in samples DEWT EF-147 and DEWT EF-162 and their field duplicates were estimated from matrix variability. Ammonia in EF-147 and its field duplicate was estimated from matrix variability.

Mercury in IRA-05-DEWT-CARRIAGE2 FB and EF159 was qualified as undetected as the concentration is not significantly different from lab background.

All qualifiers assigned during the data validation process are discussed in detail below. The validated data sheets are attached, and the checklist used during the validation are in Appendix A.

2.0 PCB AS AROCLORS DATA

Pace utilized the EPA SW846 reference methods 3510C and 8082 as specified in their Standard Operating Procedure SVO-52, Revision No. 3 dated January, 2000 for water samples and EPA SW846 reference methods 35141 and 8082, automated soxhlet extraction on the air dried sample, acid clean-up and sulfur clean-up using copper for solid samples as specified in their Standard Operating Procedure K-SVO-77, Revision No. 3 dated June 24, 2004. No significant deviations from these SOPs were apparent from the documentation reviewed. No action was needed to qualify sample data.

2.1 Completeness Assessment

The Pace data packages received were complete. All samples listed in Table 1 that were submitted and indicated for analysis were analyzed. The data packages received for PCB analysis did not require any follow-up with Pace to enable data validation.

2.2 Compliance Assessment

2.2.1 Holding Times/Preservation

All samples for PCBs were received on ice. No notation of receipt temperature in exceedance of 2-6°C and no intact ice was noted for any samples analyzed for PCBs. None of the SDGs contained temperature blanks shipped with them, but as all samples were received "on ice", no action was needed to qualify sample data.

Water samples were extracted within 7 days after collection and sediment and soil samples within 14 days after collection. After extraction all samples were analyzed within 14 days. No action was needed to qualify sample data.

2.2.2 Initial Calibration (ICAL)

Five point initial calibration curves ranging from 0.1-1.0 ug/ml for Aroclor 1016/1260, 1242 and 1254 were analyzed on both columns, RTX-CLP (primary quantitation column) and RTX-CLP2 (confirmation column) on 10/22-23/05, 10/24/05 and 11/3/05. The rsd values measured for each peak were less than the 20 % data validation criteria. No action was taken to qualify sample data based on initial calibration results.

Aroclor 1268 was reported in thirteen samples, P22A-D, PS-28P, PS99A-D, PS-72P, PS-83P, PS83-P DUP, TB5-DS162, PS-98P, PS108A-D, PS-86P, PS98A-D, PS45A-D and PS-35P. Aroclor 1268 was quantified based on a one point calibration standard at 0.5 ug/mL analyzed on 10/22-23/05, 10/24/05 and 11/3/05. Pace qualified the Aroclor 1268 results quantified against the single

standard of Aroclor 1268 with an "X" qualifier. These samples contained both Aroclor 1260 and 1268. Aroclor 1260 was quantified against peaks in the Aroclor 1268 standard that are indicative of Aroclor 1260. Pace qualified the Aroclor 1260 and Aroclor 1268 results quantified against Aroclor 1268 with an "X" qualifier. Aroclor 1260 and 1268 results quantified against the single point calibration standard in P22A-D, PS-28P, PS99A-D, PS-72P, PS-83P, PS83-P DUP, TB5-DS162, PS-98P, PS108A-D, PS-86P, PS98A-D, PS45A-D and PS-35P were qualified as estimated with a J code from this less than multiple point calibration curve.

2.2.3 Calibration Verification (CCAL)

The required method frequency of calibration verification was every 10 samples and at the end of the instrument run was met for every SDG. In all of the SDGs reviewed in Table 1, the CCALs consisted of a 0.3 ug/ml solution of Aroclor 1242 alternating with a 0.3 ug/ml solution of Aroclor 1254. The mean percent difference between the CCAL and ICAL calibration factors for the 5-10 peaks used for identification and quantitation were all less than the 15 % data validation criteria on the primary quantitation column. No action was needed to qualify sample data.

2.2.4 Laboratory Blanks

At least one laboratory blank was prepared and extracted with every 20 project samples or less analyzed. No laboratory blanks contained detectable Aroclors above the Limit of Detection (LOD).

2.2.5 Surrogate Recoveries

Decachlorobiphenyl (DCB) and tetrachloro-m-xylene (TCX) recoveries in all project water samples were within the Pace limits of 7 - 113 % (DCB) and 49 - 112 % (TCX). No action was needed to qualify sample data.

Decachlorobiphenyl (DCB) and tetrachloro-m-xylene (TCX) recoveries in many sediment samples were not useful (i.e. 0 %), as these samples required dilution. Dilution factors greater than ten result in the surrogate concentration being too low to be detected. No action was taken to qualify sample data in samples with dilution factors greater than or equal to ten.

For sediment samples with dilution factors of less than ten, surrogate recoveries were within the data validation limits of 60 -140 %, except for sample PS71A-D. Decachlorobiphenyl recovery in PS71A-D was 59 %. In accordance with EPA National Functional Guidelines for Organic Data Validation PEST Section VI. E 1(a), no action was taken was to qualify detected and undetected Aroclor results in this sample.

Surrogate recovery in a Laboratory Control Standard Duplicate (LCSD) was extremely low at 0-1%. No action was taken to qualify sample data, as the LCS was within limit, and it appears that a random spiking error occurred that was confined to the LCSD.

2.2.6 Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD)

At least one Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) at 5 ug/L Aroclor 1242 was prepared and analyzed with each SDG, or 20 water samples. All recoveries measured in the LCS were within the Pace limits of 47 - 138 % and < 20 % RPD. No action was needed to qualify sample data.

At least one Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) at 500 ug/kg Aroclor 1242 was prepared and analyzed with each SDG, or 20 sediment samples. All recoveries measured in the LCS were within the RAWP 65 - 135 % and < 20 % RPD. No action was needed to qualify sample data based on LCS recoveries.

2.2.7 Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery

Aroclor 1242 recovery of a 2 ppm spike in project sediment samples were all within the 65 - 135 % recovery limits, except for PS98A-D (56 %). Pace qualified the result with an "N" qualifier. No further action was taken to qualify sample data, as the MSD was within limit, and no consistent bias was present.

2.2.8 Detection Limit Attainment

The RAWP Reporting Limits of 1.0 ug/L and 50 ug/kg were attained in all samples when accounting for the actual sample volume extracted or the percent solids of the sample. No action was needed to qualify sample data.

2.2.9 Verification of Reported Results

No detectable Aroclors were present in the project water samples analyzed. No discrepancies or false negatives were detected. QC sample results such as RPD, recovery and % difference were also recalculated, but at a 10 % frequency. No discrepancies that were not due to differences in lab instrument software and the validator's calculator significant figure/rounding protocols were found in QC sample results. All detected Aroclor values reported for QC and sediment sample results are from the primary column. The analysis on the secondary column was reviewed to assess if the Aroclor pattern(s) were confirmed, and all were.

All reported Aroclors in QC and the sediment samples were quantified on at least an 4 peak match. Peaks with obvious interferences were not included in the quantitation. The method retention time window criteria of ± 0.03 minutes for a minimum of a 4 peak match for Aroclor identification was met in all QC and sediment samples.

2.3 Field QC Results

No field equipment rinsates associated with the project samples in Table 1 were analyzed for PCBs. No action was needed to qualify sample data.

RPD values for the field duplicates collected in Table 1 were as follows:

IRA-05-DEWT-EF 147/D: No Aroclors detected

IRA-05-DEWT-EF 162/D: No Aroclors detected

IRA-05-PS 66P: Aroclor 1242 23 % RPD, Aroclor 1254 21 % RPD, total PCBs 23 % RPD

IRA-05-TB6-DS-188: Aroclor 1242 17 % RPD, Aroclor 1254 21 % RPD, Aroclor 1260 28 % RPD,
total PCBs 5 % RPD

IRA-05-OOOA-PS107P: Aroclor 1242 47 % RPD, Aroclor 1254 95 % RPD, total PCBs 57 % RPD

IRA-05-OOOA-PS86A-D: Aroclor 1242 161 % RPD, Aroclor 1254 108 % RPD, Aroclor 1260 147
%, RPD, Aroclor 1268 182 %, total PCBs 178 % RPD

IRA-05-OOOA-PS71A-D: Aroclor 1242 14 % RPD, Aroclor 1254 25 % RPD, total PCBs 7 % RPD

IRA-05-OOOA-PS73A-D: Aroclor 1242 42 % RPD, Aroclor 1254 24 % RPD, total PCBs 39 % RPD
IRA-05-OOOA-PS13-P: Aroclor 1242 9 % RPD, Aroclor 1254 42 % RPD, Aroclor 1260 77 % RPD,
total PCBs 28 % RPD
IRA-05-OOOA-PS83-P: Aroclor 1242 15 % RPD, Aroclor 1254 6 % RPD, Aroclor 1260 82 %, RPD,
Aroclor 1268 82 %, total PCBs 29 % RPD

The SAP data quality objective (DQO) of < 30 % RPD was met for PCBs in water, as none were detected in the field sample and its duplicate. No action was needed to qualify water sample data.

The SAP data quality objective (DQO) of < 30 % RPD was not met for Aroclor 1242 in PS107-P, PS86A-D, PS73A-d, Aroclor 1254 in PS107-P, PS86A-D, PS-13P, Aroclor 1260 in PS83-P, PS-13P, PS86A-D, Aroclor 1268 in PS83-P, PS86A-D and total PCBs in PS73A-D, PS86A-D and PS107-P. Action taken was to qualify Aroclor 1242 in PS107-P, PS86A-D, PS73A-d, Aroclor 1254 in PS107-P, PS86A-D, PS-13P, Aroclor 1260 in PS83-P, PS-13P, PS86A-D, Aroclor 1268 in PS83-P, PS86A-D and total PCBs in PS73A-D, PS86A-D and PS107-P as estimated with a J code indicating greater imprecision than the DQO.

2.4 Data Usability

All Aroclor data as reported by Pace was acceptable for use without qualification, or qualified as estimated due to field duplicate imprecision (Aroclor 1242 in PS107-P, PS86A-D, PS73A-d, Aroclor 1254 in PS107-P, PS86A-D, PS-13P, Aroclor 1260 in PS83-P, PS-13P, PS86A-D, Aroclor 1268 in PS83-P, PS86A-D and total PCBs in PS73A-D, PS86A-D and PS107-P). Aroclor 1260 and 1268 results quantified against the single point calibration standard in P22A-D, PS-28P, PS99A-D, PS-72P, PS-83P, PS83-P DUP, TB5-DS162, PS-98P, PS108A-D, PS-86P, PS98A-D, PS45A-D and PS-35P were qualified as estimated from use of a less than multiple point calibration curve.

Detected PCBs in sediment samples at concentrations greater than the LOD, but below the LOQ were qualified by Pace with a "Q" qualifier, and further qualified during validation as estimated with a J code, as they are within the region of quantitation associated with less precision.

3.0 AMMONIA, BOD and TSS DATA

Pace utilized EPA reference methods 160.2 and 350.1 as specified in their Standard Operating Procedure G2-WCM-01, Revision No. 2 dated January 1, 2003 and G2-WCM-58, Revision No. 0 dated January 16, 2004. No significant deviations from this SOP was apparent from the documentation reviewed. No action was needed to qualify sample data.

BOD analysis was not a requirement in the RAWP. Pace utilized Standard Methods 5210B for BOD analysis. No significant deviations from this reference method was apparent from the documentation reviewed. No action was needed to qualify sample data.

3.1 Completeness Assessment

The Pace data packages received were complete. All samples listed in Table 1 that were submitted and indicated for analysis were analyzed. The data packages received for ammonia, BOD and TSS analysis did not require any follow-up with Pace to enable data validation.

3.2 Compliance Assessment

3.2.1 Holding Time/Preservation

Documentation of adequate acid preservation for ammonia was present, except for several DEWT samples. The pH was 7, and additional acid was added by Pace within 24 hours of collection. No action was taken to qualify sample data. All EPA recommended holding times for the methods cited above were met, except for the BOD holding time for sample IRA-05-DEWT-EF147 and EF-147 DUP which was exceeded by an hour upon receipt at the lab. Pace qualified the result with an "H" qualifier. Action taken was to qualify the BOD result in IRA-05-DEWT-EF147 and EF-147 DUP as estimated with a J code from this holding time exceedance.

None of the SDGs contained temperature blanks shipped with them, but as all samples were received "on ice", no action was needed to qualify sample data.

3.2.2 Calibration

All ammonia initial instrument calibrations for ammonia were properly performed using at least five standards and met the correlation coefficient criteria of greater than 0.995. Continuing calibration checks were performed at least once every 10 samples and all checks met performance criteria of 90-110%.

3.2.3 Laboratory Blanks

Laboratory blanks did not contain any TSS or BOD above the Limit of Detection (LOD). No action was needed to qualify sample data.

Ammonia was detected at 0.219 mg/L in the lab blank analyzed with DEWT-EF 157, EF 158 and EF 160. Pace qualified these results with an "A" qualifier. Action taken was to qualify the detected ammonia in sample DEWT-EF 157, EF158 and EF 160 as undetected with a U code as the concentration reported is not significantly different ($> 5 X$) from lab background.

3.2.4 Reference Standards/Lab Control Standards (LCS/LCSD)

Recovery of reference (EPA/ERA/APG) standards were all within Pace and RAWP accuracy limits. No action was needed to qualify sample data.

3.2.5 Laboratory Duplicate Sample Analysis

All laboratory duplicate and LCS/LCSD RPD results were within the Pace and RAWP precision limits. No action was needed to qualify sample data.

3.2.6 Matrix Spike Samples

All matrix spike sample recoveries were within the Pace and RAWP accuracy limits of 90 - 110 %, except for ammonia recoveries in samples EF -144 and EF-149. Recoveries measured ranged from 110.6 - 113.2 %. Pace qualified the sample results with an "N" qualifier. No further action was needed to qualify sample data, as these samples were undetected for ammonia and no high bias was possible.

3.3 Field QC Results

One field equipment rinsate was collected for TSS with the project samples in Table 1. No TSS was detected in the rinsate. No action was needed to qualify sample data.

No field equipment rinsates associated with the project samples in Table 1 were analyzed for BOD or ammonia. No action was taken to qualify ammonia or BOD sample data.

Field duplicates for TSS were collected with the project samples listed in Table 1 and the Relative Percent Difference (RPD) calculated below:

Sample ID (IRA-05-)	TSS (mg/L)	TSS (mg/L) DUP	RPD
POG1-SW346-902	16	16	0 %
DEWT-EF162	1.2	0.75	46 %
DEWT-EF147	1.0	0.75	28 %

The RPD values were not within the RAWP precision limit of 5 % for DEWT EF-147 and DEWT EF-162. Action taken was to qualify TSS results in samples DEWT EF-147 and DEWT EF-162 and their field duplicates as estimated with a J code from this matrix variability.

Field duplicates were collected with the project samples listed in Table 1 for ammonia and BOD for IRA-05-DEWT-EF147 and EF-162. No detectable BOD was present in these samples. Ammonia was present at 0.48 mg/L and 0.46 mg/L in EF-162 for a calculated RPD value of 4 % and ammonia was present at 0.49 mg/L and 0.38 mg/L in EF-147 for a calculated RPD value of 25 %. As the RPD value for EF-147 exceeded the RAWP precision limit of 20 %, action taken was to qualify ammonia in EF-147 and its field duplicate as estimated with a J code from matrix variability.

3.4 Data Usability

The BOD results in IRA-05-DEWT-EF147 and EF-147 DUP were estimated from a holding time exceedance. TSS results in samples DEWT EF-147 and DEWT EF-162 and their field duplicates were estimated from matrix variability. Ammonia in EF-147 and its field duplicate was estimated from matrix variability.

Results greater than the LOD, but less than the LOQ were qualified by Pace with a "Q" qualifier. During the validation process, all "Q" qualified results were further qualified with a J code indicating estimated data. These concentrations should be considered estimated as they are within the region of quantitation associated with less precision.

4.0 MERCURY DATA

Pace utilized EPA method 1631E. No significant deviations from the EPA reference method was apparent from the documentation reviewed. No action was needed to qualify sample data.

4.1 Completeness Assessment

The data packages received for mercury analysis were complete. All samples submitted were digested and analyzed. No action was needed to qualify sample data.

4.2 Compliance Assessment

4.2.1 Holding Time/Preservation

All samples were analyzed within the 28 day holding time. No notation of storage or shipping temperature in exceedance of $4 \pm 2^{\circ}\text{C}$ was noted. No action was needed to qualify mercury sample data based on exceedance of holding time or preservation requirements.

4.2.2 Calibration

The initial instrument calibrations were five points ranging from 0.05 - 4 ng/L and correlation coefficients were all ≥ 0.995 . Continuing calibration checks were performed at least once every 10 samples and were within Pace's 80-120% limits. No action was needed to qualify sample data.

4.2.3 Laboratory Blanks

Mercury in most bottle blanks and method blanks were below the Pace LOD of 0.197 ng/L, except for one method blank associated with SDG 866270 with detectable mercury at 0.2253 ng/L. Action taken was to qualify mercury in samples at concentrations less than 5 X the associated method blank(s) as undetected with a "U" code as the concentration reported is not significantly different from lab background. Mercury in IRA-05-DEWT-CARRIAGE2 FB and EF159 was qualified as undetected as the concentration is not significantly different from lab background.

4.2.4 Ongoing Precision and Recovery (OPR) Standard

An OPR was prepared with each set of samples at 5 ng/L. Recoveries were all within Pace's limits of 79 - 121 %. No action was needed to qualify sample data.

4.2.5 Matrix Spike/Matrix Spike Duplicate

MS/MSD recoveries and RPD were all within Pace's limits of 75 - 125 % and < 24 % RPD. No action was needed to qualify sample data.

4.3 Field QC Results

A field blank was collected with each of the project samples. Mercury was detected in one of these blanks at a concentration of 0.281 ng/L. No action was needed to qualify sample data, as the concentration exceeded 5 X the field blank concentration.

No field duplicates were collected for mercury. No action was taken to qualify sample data.

4.4 Data Usability

Mercury in IRA-05-DEWT-CARRIAGE2 FB and EF159 was qualified as undetected as the

concentration is not significantly different from lab background.

Results greater than the LOD, but less than the LOQ were qualified by Pace with a "Q" qualifier. During the validation process, all "Q" qualified results were further qualified with a J code indicating estimated data. These concentrations should be considered estimated as they are within the region of quantitation associated with less precision.

If you have any questions regarding the qualification of data or the data validation process/criteria used, please contact me at (920) 469-9113.

Attachments:

Table 1

Validated hard copy Data Sheets

Appendix A: Data Validation Checklist

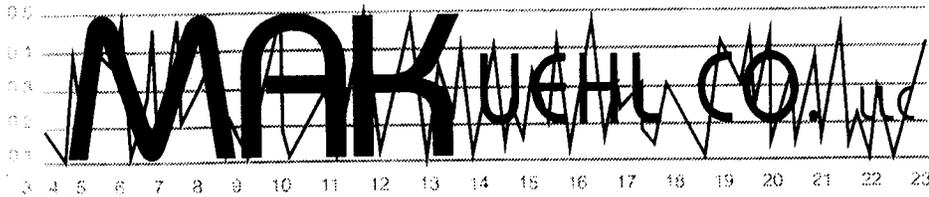
copy w/ attachments

Table 1 Data Validated - Lower Fox River Foth Van Dyke

LAB(S)	SDG#	Date Rec'd by	Field	Field	Field	Analyses	
		Kuehl	Matrix	Sample ID	Collection Date	Lab sample ID	
Pace	865552	21-Nov-05	water	IRA-05-POG1-337-905	24-Oct-05	865552-001	TSS
Pace	865552	21-Nov-05	water	IRA-05-OOOA-SW338-902	24-Oct-05	865552-002	TSS
Pace	865552	21-Nov-05	water	IRA-05-OOOA-SW339-912	24-Oct-05	865552-003	TSS
Pace	865552	21-Nov-05	water	IRA-05-DEWT-EF144	25-Oct-05	865622-001	TSS, BOD, NH3, PCBs
Pace	865552	21-Nov-05	water	IRA-05-DEWT-EF145	26-Oct-05	865684-001	TSS, BOD, NH3, PCBs
Pace	865552	21-Nov-05	water	IRA-05-DEWT-EF146	26-Nov-05	865684-002	low level mercury
Pace	865552	21-Nov-05	field blank	IRA-05-DEWT-EF146 FB	26-Nov-05	865684-003	low level mercury
Pace	865552	21-Nov-05	water	IRA-05-DEWT-WEEP16	26-Nov-05	865684-004	low level mercury
Pace	865552	21-Nov-05	field blank	IRA-05-DEWT-WEEP16 FB	26-Nov-05	865684-005	low level mercury
Pace	865552	21-Nov-05	water	IRA-05-DEWT-RIVER15	26-Nov-05	865684-006	low level mercury
Pace	865552	21-Nov-05	field blank	IRA-05-DEWT-RIVER15 FB	26-Nov-05	865684-007	low level mercury
Pace	865552	21-Nov-05	water	IRA-05-OOOA-SW340-905	26-Oct-05	865684-008	TSS
Pace	865552	21-Nov-05	water	IRA-05-OOOA-SW341-902	26-Oct-05	865684-009	TSS
Pace	865552	21-Nov-05	water	IRA-05-OOOA-SW342-912	26-Oct-05	865684-010	TSS
Pace	865791	21-Nov-05	water	IRA-05-DEWT-EF148	28-Oct-05	865791-001	TSS, BOD, NH3, PCBs
Pace	865791	21-Nov-05	water	IRA-05-POG1-SW343-905	28-Oct-05	865791-002	TSS
Pace	865791	21-Nov-05	water	IRA-05-OOOA-SW344-902	28-Oct-05	865791-003	TSS
Pace	865791	21-Nov-05	water	IRA-05-OOOA-SW345-912	28-Oct-05	865791-004	TSS
Pace	865791	21-Nov-05	water	IRA-05-DEWT-EF147	27-Oct-05	865800-001	TSS, BOD, NH3, PCBs
Pace	865791	21-Nov-05	water field duplicate	IRA-05-DEWT-EF147 DUP	27-Oct-05	865800-002	TSS, BOD, NH3, PCBs
Pace	865791	21-Nov-05	water	IRA-05-DEWT-EF149	31-Oct-05	865802-001	TSS, BOD, NH3, PCBs
Pace	865200	23-Nov-05	sediment	IRA-05-TB3-DS-161	13-Oct-05	865200-001	PCBs
Pace	865200	23-Nov-05	sediment	IRA-05-TB4-DS-162	13-Oct-05	865200-002	PCBs
Pace	865200	23-Nov-05	sediment	IRA-05-TB5-DS-163	13-Oct-05	865200-003	PCBs
Pace	865200	23-Nov-05	sediment	IRA-05-OOOA-PS-106P	14-Oct-05	865243-001	PCBs
Pace	865200	23-Nov-05	sediment	IRA-05-OOOA-PS-69P	14-Oct-05	865243-002	PCBs
Pace	865200	23-Nov-05	sediment	IRA-05-OOOA-PS-81P	14-Oct-05	865243-003	PCBs
Pace	865200	23-Nov-05	sediment	IRA-05-OOOA-PS-81A-D	17-Oct-05	865243-004	PCBs
Pace	865380	23-Nov-05	sediment	IRA-05-TB1-DS-165	18-Oct-05	865380-002	PCBs
Pace	865380	23-Nov-05	sediment	IRA-05-OOOA-PS-71A-D	21-Oct-05	865499-001	PCBs
Pace	865380	23-Nov-05	sediment field duplicate	IRA-05-OOOA-PS-71A-D DUP	21-Oct-05	865499-002	PCBs
Pace	865380	23-Nov-05	sediment	IRA-05-OOOA-PS-71P	20-Oct-05	865499-003	PCBs
Pace	865380	23-Nov-05	sediment	IRA-05-OOOA-PS-72P	20-Oct-05	865499-004	PCBs
Pace	865380	23-Nov-05	sediment	IRA-05-OOOA-PS-83P	20-Oct-05	865499-005	PCBs
Pace	865380	23-Nov-05	sediment field duplicate	IRA-05-OOOA-PS-83P DUP	20-Oct-05	865499-006	PCBs
Pace	865380	23-Nov-05	sediment	IRA-05-OOOA-PS-84P	20-Oct-05	865499-007	PCBs
Pace	865380	23-Nov-05	sediment	IRA-05-OOOA-PS-85P	20-Oct-05	865499-008	PCBs
Pace	865380	23-Nov-05	sediment	IRA-05-OOOA-PS-96P	20-Oct-05	865499-009	PCBs
Pace	865380	23-Nov-05	sediment	IRA-05-OOOA-PS-88A-D	21-Oct-05	865499-010	PCBs
Pace	865380	23-Nov-05	sediment	IRA-05-OOOA-PS-100A-D	21-Oct-05	865499-011	PCBs
Pace	865380	23-Nov-05	sediment	IRA-05-OOOA-PS-105A-D	21-Oct-05	865499-012	PCBs
Pace	865380	23-Nov-05	sediment	IRA-05-OOOA-PS-96A-D	21-Oct-05	865499-013	PCBs
Pace	865541	23-Nov-05	sediment	IRA-05-OOOA-PS-83A-D	24-Oct-05	865541-001	PCBs
Pace	865541	23-Nov-05	sediment	IRA-05-OOOA-PS-98P	24-Oct-05	865541-002	PCBs
Pace	865541	23-Nov-05	sediment	IRA-05-OOOA-PS-95A-D	24-Oct-05	865541-003	PCBs
Pace	865541	23-Nov-05	sediment	IRA-05-OOOA-PS-84A-D	24-Oct-05	865541-004	PCBs
Pace	865541	23-Nov-05	sediment	IRA-05-OOOA-PS-82A-D	24-Oct-05	865541-005	PCBs
Pace	865541	23-Nov-05	sediment	IRA-05-OOOA-PS-107P	21-Oct-05	865541-006	PCBs
Pace	865541	23-Nov-05	water field duplicate	IRA-05-OOOA-PS-107P DUP	21-Oct-05	865541-007	PCBs
Pace	865541	23-Nov-05	sediment	IRA-05-OOOA-PS-86P	21-Oct-05	865541-008	PCBs
Pace	865541	23-Nov-05	sediment	IRA-05-OOOA-PS-97P	21-Oct-05	865541-009	PCBs
Pace	865541	23-Nov-05	sediment	IRA-05-OOOA-PS-73P	21-Oct-05	865541-010	PCBs
Pace	865541	23-Nov-05	sediment	IRA-05-TB6-DS-188	24-Oct-05	865549-001	PCBs
Pace	865541	23-Nov-05	sediment	IRA-05-TB7-DS-189	24-Oct-05	865549-002	PCBs
Pace	865541	23-Nov-05	water field duplicate	IRA-05-TB6-DS-188-DUP	24-Oct-05	865549-003	PCBs
Pace	865809	23-Nov-05	sediment	IRA-05-OOOA-PS-16P	28-Oct-05	865809-001	PCBs
Pace	865809	23-Nov-05	sediment	IRA-05-OOOA-PS-17P	28-Oct-05	865809-002	PCBs
Pace	865809	23-Nov-05	sediment	IRA-05-OOOA-PS-22P	28-Oct-05	865809-003	PCBs
Pace	865809	23-Nov-05	sediment	IRA-05-OOOA-PS-23P	28-Oct-05	865809-004	PCBs
Pace	865809	23-Nov-05	sediment	IRA-05-OOOA-PS-17A-D	31-Oct-05	865809-005	PCBs
Pace	865809	23-Nov-05	sediment	IRA-05-OOOA-PS-22A-D	31-Oct-05	865809-006	PCBs
Pace	865809	23-Nov-05	sediment	IRA-05-OOOA-PS-27P	31-Oct-05	865838-001	PCBs
Pace	865809	23-Nov-05	sediment	IRA-05-OOOA-PS-28P	31-Oct-05	865838-002	PCBs
Pace	865809	23-Nov-05	sediment	IRA-05-OOOA-PS-13P	31-Oct-05	865932-001	PCBs
Pace	865809	23-Nov-05	sediment field duplicate	IRA-05-OOOA-PS-13P DUP	31-Oct-05	865932-002	PCBs
Pace	865809	23-Nov-05	sediment	IRA-05-OOOA-PS-19P	1-Nov-05	865932-003	PCBs
Pace	865809	23-Nov-05	sediment	IRA-05-OOOA-PS-20P	1-Nov-05	865932-004	PCBs
Pace	865809	23-Nov-05	sediment	IRA-05-OOOA-PS-64P	1-Nov-05	865932-005	PCBs
Pace	865809	23-Nov-05	sediment	IRA-05-OOOA-PS-65P	1-Nov-05	865932-006	PCBs
Pace	865809	23-Nov-05	sediment	IRA-05-OOOA-PS-73A-D	2-Nov-05	865932-007	PCBs
Pace	865809	23-Nov-05	sediment field duplicate	IRA-05-OOOA-PS-73A-D DUP	2-Nov-05	865932-008	PCBs
Pace	865809	23-Nov-05	sediment	IRA-05-OOOA-PS-74P	1-Nov-05	865932-009	PCBs

Table 1 Data Validated - Lower Fox River Foth Van Dyke

Pace	865809	23-Nov-05	sediment	IRA-05-OOOA-PS-99A-D	2-Nov-05	865932-010	PCBs
Pace	865662	30-Nov-05	sediment	IRA-05-OOOA-PS-108A-D	25-Oct-05	865662-001	PCBs
Pace	865662	30-Nov-05	sediment	IRA-05-OOOA-PS-86A-D	25-Oct-05	865662-002	PCBs
Pace	865662	30-Nov-05	sediment field duplicate	IRA-05-OOOA-PS-86A-D DUP	25-Oct-05	865662-003	PCBs
Pace	865662	30-Nov-05	sediment	IRA-05-OOOA-PS-97A-D	26-Oct-05	865662-004	PCBs
Pace	865662	30-Nov-05	sediment	IRA-05-OOOA-PS-98A-D	26-Oct-05	865662-005	PCBs
Pace	865662	30-Nov-05	sediment	IRA-05-OOOA-PS-106A-D	26-Oct-05	865662-006	PCBs
Pace	865662	30-Nov-05	sediment	IRA-05-OOOA-PS-107A-D	26-Oct-05	865662-007	PCBs
Pace	865662	30-Nov-05	sediment	IRA-05-OOOA-PS-108P	24-Oct-05	865662-008	PCBs
Pace	865662	30-Nov-05	sediment	IRA-05-OOOA-PS-85A-D	25-Oct-05	865662-009	PCBs
Pace	865662	30-Nov-05	sediment	IRA-05-OOOA-PS-110C	26-Oct-05	865662-010	PCBs
Pace	866093	30-Nov-05	sediment	IRA-05-GAC/GACKROFTA MEDIA-1	4-Nov-05	866093-029	PCBs
Pace	866197	30-Nov-05	sediment	IRA-05-TB8-DS238	7-Nov-05	866197-001	PCBs
Pace	866197	30-Nov-05	sediment	IRA-05-TB9-DS239	7-Nov-05	866197-002	PCBs
Pace	866197	30-Nov-05	sediment	IRA-05-T23-DS262	8-Nov-05	866197-003	PCBs
Pace	866261	30-Nov-05	sediment	IRA-05-OOOA-PS-44P	7-Nov-05	866261-001	PCBs
Pace	866261	30-Nov-05	sediment	IRA-05-OOOA-PS-45P	7-Nov-05	866261-002	PCBs
Pace	866261	30-Nov-05	sediment	IRA-05-OOOA-PS-44A-D	8-Nov-05	866261-003	PCBs
Pace	866261	30-Nov-05	sediment	IRA-05-OOOA-PS-45A-D	8-Nov-05	866261-004	PCBs
Pace	866261	30-Nov-05	sediment	IRA-05-TB2COMP-DS250	8-Nov-05	866271-012	PCBs
Pace	866270	6-Nov-05	water	IRA-05-DEWT-EF159	9-Nov-05	866270-002	low level mercury
Pace	866270	6-Nov-05	field blank	IRA-05-DEWT-EF159 FB	9-Nov-05	866270-003	low level mercury
Pace	866270	6-Nov-05	water	IRA-05-DEWT-CARRIAGE2	9-Nov-05	866270-004	low level mercury
Pace	866270	6-Nov-05	field blank	IRA-05-DEWT-CARRIAGE2 FB	9-Nov-05	866270-005	low level mercury
Pace	866270	6-Nov-05	water	IRA-05-DEWT-EF158	9-Nov-05	866270-001	TSS, BOD, NH3, PCBs
Pace	866270	6-Nov-05	water	IRA-05-DEWT-EF160	10-Nov-05	866333-001	TSS, BOD, NH3, PCBs
Pace	866270	6-Nov-05	water	IRA-05-POGI-SW356-905	10-Nov-05	866333-002	TSS
Pace	866270	6-Nov-05	water	IRA-05-C/D2S-SW357-902	10-Nov-05	866333-003	TSS
Pace	866270	6-Nov-05	water	IRA-05-OOOA-SW358-912	10-Nov-05	866333-004	TSS
Pace	866270	6-Nov-05	water	IRA-05-DEWT-EF161	11-Nov-05	866241-001	TSS, BOD, NH3, PCBs
Pace	866270	6-Nov-05	water	IRA-05-DEWT-EF162	12-Nov-05	866241-002	TSS, BOD, NH3, PCBs
Pace	866270	6-Nov-05	water field duplicate	IRA-05-DEWT-EF162 DUP	12-Nov-05	866241-003	TSS, BOD, NH3, PCBs
Pace	866503	6-Nov-05	sediment	IRA-05-OOOA-PS25P	14-Nov-05	866503-001	PCBs
Pace	866503	6-Nov-05	sediment	IRA-05-OOOA-PS26P	14-Nov-05	866503-002	PCBs
Pace	866503	6-Nov-05	sediment	IRA-05-OOOA-PS35P	14-Nov-05	866503-003	PCBs
Pace	866503	6-Nov-05	sediment	IRA-05-OOOA-PS57P	11-Nov-05	866503-004	PCBs
Pace	866503	6-Nov-05	sediment	IRA-05-OOOA-PS58P	11-Nov-05	866503-005	PCBs
Pace	866503	6-Nov-05	sediment	IRA-05-OOOA-PS66P	11-Nov-05	866503-006	PCBs
Pace	866503	6-Nov-05	sediment field duplicate	IRA-05-OOOA-PS66P DUP	11-Nov-05	866503-007	PCBs
Pace	866503	6-Nov-05	sediment	IRA-05-OOOA-PS68P	11-Nov-05	866503-008	PCBs
Pace	866503	6-Nov-05	sediment	IRA-05-OOOA-PS70P	11-Nov-05	866503-009	PCBs
Pace	866503	6-Nov-05	sediment	IRA-05-OOOA-PS115P	14-Nov-05	866503-010	PCBs
Pace	866503	6-Nov-05	sediment	IRA-05-OOOA-PS116P	14-Nov-05	866503-011	PCBs
Pace	866503	6-Nov-05	sediment	IRA-05-OOOA-PS117P	14-Nov-05	866503-012	PCBs
Pace	866092	6-Nov-05	water	IRA-05-DEWT-EF154	4-Nov-05	866092-001	TSS, BOD, NH3, PCBs
Pace	866092	6-Nov-05	water	IRA-05-DEWT-EF155	5-Nov-05	866092-002	TSS, BOD, NH3, PCBs
Pace	866092	6-Nov-05	water	IRA-05-DEWT-EF156	6-Nov-05	866142-001	TSS, BOD, NH3, PCBs
Pace	866092	6-Nov-05	water	IRA-05-DEWT-EF157	8-Nov-05	866142-001	TSS, BOD, NH3, PCBs
Pace	866092	6-Nov-05	water	IRA-05-POG1-SW353-905	7-Nov-05	866142-002	TSS
Pace	866092	6-Nov-05	water	IRA-05-C/D2-SW359-902	7-Nov-05	866142-003	TSS
Pace	866092	6-Nov-05	water	IRA-05-OOOA-SW355-912	7-Nov-05	866142-004	TSS
Pace	865836	6-Nov-05	water	IRA-05-DEWT-EF153	3-Nov-05	866000-002	low level mercury
Pace	865836	6-Nov-05	field blank	IRA-05-DEWT-EF153 FB	3-Nov-05	866000-003	low level mercury
Pace	865836	6-Nov-05	water	IRA-05-DEWT-CARRIAGE1	3-Nov-05	866000-004	low level mercury
Pace	865836	6-Nov-05	field blank	IRA-05-DEWT-CARRIAGE1 FB	3-Nov-05	866000-005	low level mercury
Pace	865836	6-Nov-05	water	IRA-05-OOOA-SW346-902	31-Oct-05	865836-001	TSS
Pace	865836	6-Nov-05	water field duplicate	IRA-05-OOOA-SW346-902 DUP	31-Oct-05	865836-002	TSS
Pace	865836	6-Nov-05	water	IRA-05-POG1-SW348-905	31-Oct-05	865836-003	TSS
Pace	865836	6-Nov-05	water	IRA-05-OOOA-SW348-912	31-Oct-05	865836-004	TSS
Pace	865836	6-Nov-05	water field blank	IRA-05-OOOA-SW349-912 RINSE	31-Oct-05	865836-005	TSS
Pace	865836	6-Nov-05	water	IRA-05-DEWT-EF150	1-Nov-05	865865-001	TSS, BOD, NH3, PCBs
Pace	865836	6-Nov-05	water	IRA-05-DEWT-EF151	2-Nov-05	865991-001	TSS, BOD, NH3, PCBs
Pace	865836	6-Nov-05	water	IRA-05-C/D2S-SW351-902	2-Nov-05	865991-002	TSS
Pace	865836	6-Nov-05	water	IRA-05-OOOA-SW350-905	2-Nov-05	865991-003	TSS
Pace	865836	6-Nov-05	water	IRA-05-OOOA-SW352-912	2-Nov-05	865991-004	TSS
Pace	865836	6-Nov-05	water	IRA-05-DEWT-EF152	3-Nov-05	866000-001	TSS, BOD, NH3, PCBs



Data Validation

Lab/Field Audits

QA Plans

TECHNICAL MEMORANDUM

DATE: February 27, 2006

TO: Janis Kesy
Project Manager
Foth & Van Dyke

FROM: Marcia A. Kuehl
President/Owner
MAKuehl Company 

SUBJECT: Data Validation for Lower Fox River OU 1 2005 Remedial Action
Sampling Events of January 12-February 2, 2006
Foth & Van Dyke Project # : 04G007, 02G005

1.0 OVERVIEW

Analytical results for samples listed in Table 1 and their associated laboratory QC samples collected from the Lower Fox River OU 1 have been evaluated using the EPA guidance documents "National Functional Guidelines for Organic Data Review", dated October 1999, EPA-540/R-99/008, and the "National Functional Guidelines for Inorganic Data Review", dated July, 2002, EPA-540/R-01-008.

The specific calibration and laboratory QC check requirements contained in the "Lower Fox River Operable Unit 1 Remedial Action-2004 Remedial Action Work Plan" dated May, 2004 (RAWP) were the primary criteria used in the assessment of the data for compliance with the project data quality objectives. The review was based on the data packages supplied by the analytical laboratory, Pace, located in Kimberly, Wisconsin.

All Aroclor data as reported by Pace was acceptable for use without qualification, or qualified as estimated. Aroclor 1260 and 1268 results quantified against the single point calibration standard in IRA-06-BM5-COMPDS-416 were qualified as estimated with a J code from a less than multiple point calibration curve. Aroclor 1242 in IRA-06-M8-COMPDS-566 was estimated from a possible low bias in the sample matrix. Detected PCBs in sediment samples at concentrations greater than the LOD, but below the LOQ were qualified by Pace with a "Q" qualifier, and further qualified during validation as estimated with a J code, as they are within the region of quantitation associated with less precision.

Ammonia in IRA-06-DEWT-EF187 was estimated from a possible low bias in the sample matrix.

Mercury in IRA-06-DEWT-EF188, 188 DUP and 188 FB was qualified as undetected as the concentration is not significantly different from lab background. Mercury in IRA-06-DEWT-EF188 and 188 DUP was qualified as undetected as the concentration is not significantly different from field background.

All qualifiers assigned during the data validation process are discussed in detail below. The validated data sheets are attached, and the checklist used during the validation are in Appendix A.

2.0 PCB AS AROCLORS DATA

Pace utilized the EPA SW846 reference methods 3510C and 8082 as specified in their Standard Operating Procedure SVO-52, Revision No. 3 dated January, 2000 for water samples and EPA SW846 reference methods 35141 and 8082, automated soxhlet extraction on the air dried sample, acid clean-up and sulfur clean-up using copper for solid samples as specified in their Standard Operating Procedure K-SVO-77, Revision No. 3 dated June 24, 2004. No significant deviations from these SOPs were apparent from the documentation reviewed. No action was needed to qualify sample data.

2.1 Completeness Assessment

The Pace data packages received were complete. All samples listed in Table 1 that were submitted and indicated for analysis were analyzed. The data packages received for PCB analysis did not require any follow-up with Pace to enable data validation.

2.2 Compliance Assessment

2.2.1 Holding Times/Preservation

All samples for PCBs were received on ice. No notation of receipt temperature in exceedance of 2-6°C and no intact ice was noted for any samples analyzed for PCBs. None of the SDGs contained temperature blanks shipped with them, but as all samples were received "on ice", no action was needed to qualify sample data.

Water samples were extracted within 7 days after collection and sediment and soil samples within 14 days after collection. After extraction all samples were analyzed within 14 days. No action was needed to qualify sample data.

2.2.2 Initial Calibration (ICAL)

Five point initial calibration curves ranging from 0.1-1.0 ug/ml for Aroclor 1016/1260, 1242 and 1254 were analyzed on both columns, RTX-CLP (primary quantitation column) and RTX-CLP2 (confirmation column) on 1/11-12/06 and 1/30-31/06. The rsd values measured for each peak were less than the 20 % data validation criteria. No action was taken to qualify sample data based on initial calibration results.

Aroclor 1268 was reported in one sample, IRA-06-BM5-COMPDS-416. Aroclor 1268 was quantified based on a one point calibration standard at 0.5 ug/mL analyzed on 1/11-12/06. Pace qualified the Aroclor 1268 results quantified against the single point standard of Aroclor 1268 with an "X" qualifier. This sample contained both Aroclor 1260 and 1268. Aroclor 1260 was quantified against peaks in the Aroclor 1268 standard that are indicative of Aroclor 1260. Pace qualified the Aroclor 1260 and Aroclor 1268 results quantified against Aroclor 1268 with an "X" qualifier. Aroclor 1260 and 1268 results quantified against the single point calibration standard in IRA-06-BM5-COMPDS-416 were

qualified as estimated with a J code from this less than multiple point calibration curve.

2.2.3 Calibration Verification (CCAL)

The required method frequency of calibration verification was every 10 samples and at the end of the instrument run was met for every SDG. In all of the SDGs reviewed in Table 1, the CCALs consisted of a 0.3 ug/ml solution of Aroclor 1242 alternating with a 0.3 ug/ml solution of Aroclor 1254. The mean percent difference between the CCAL and ICAL calibration factors for the 5-10 peaks used for identification and quantitation were all less than the 15 % data validation criteria on the primary quantitation column. No action was needed to qualify sample data.

2.2.4 Laboratory Blanks

At least one laboratory blank was prepared and extracted with every 20 project samples or less analyzed. No laboratory blanks contained detectable Aroclors above the Limit of Detection (LOD).

2.2.5 Surrogate Recoveries

Decachlorobiphenyl (DCB) and tetrachloro-m-xylene (TCX) recoveries in all project water samples were within the Pace limits of 7 - 113 % (DCB) and 49 - 112 % (TCX). No action was needed to qualify sample data.

Decachlorobiphenyl (DCB) and tetrachloro-m-xylene (TCX) recoveries in many sediment samples were not useful (i.e. 0 %), as these samples required dilution. Dilution factors greater than ten result in the surrogate concentration being too low to be detected. No action was taken to qualify sample data in samples with dilution factors greater than or equal to ten.

For sediment samples with dilution factors of less than ten, surrogate recoveries were all within the data validation limits of 60 - 140 %. No action was needed to qualify sample data.

2.2.6 Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD)

At least one Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) at 5 ug/L Aroclor 1242 was prepared and analyzed with each SDG, or 20 water samples. All recoveries measured in the LCS were within the Pace limits of 47 - 138 % and < 20 % RPD. No action was needed to qualify sample data.

At least one Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) at 500 ug/kg Aroclor 1242 was prepared and analyzed with each SDG, or 20 sediment samples. All recoveries measured in the LCS were within the RAWP 65 - 135 % and < 20 % RPD. No action was needed to qualify sample data based on LCS recoveries.

2.2.7 Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery

Aroclor 1242 recovery of a 2 ppm spike in project sediment samples were all within the 65 - 135 % recovery limits, except for TB10-COMPDS-566 (59 %) and IRA-06-M8-COMPDS-577 (52 %, 64 %). Pace qualified the associated sample results with an "N" qualifier. Action taken was to qualify Aroclor 1242 in IRA-06-M8-COMPDS-566 as estimated with a J code from a possible low bias in the sample matrix. No action was taken to qualify TB10-COMPDS-566 data, as the MSD recovery

was acceptable and no consistent out of limit low bias was present.

2.2.8 Detection Limit Attainment

The RAWP Reporting Limits of 1.0 ug/L and 50 ug/kg were attained in all samples when accounting for the actual sample volume extracted or the percent solids of the sample. No action was needed to qualify sample data.

2.2.9 Verification of Reported Results

No detectable Aroclors were present in the project water samples analyzed. No discrepancies or false negatives were detected. QC sample results such as RPD, recovery and % difference were also recalculated, but at a 10 % frequency. No discrepancies that were not due to differences in lab instrument software and the validator's calculator significant figure/rounding protocols were found in QC sample results. All detected Aroclor values reported for QC and sediment sample results are from the primary column. The analysis on the secondary column was reviewed to assess if the Aroclor pattern(s) were confirmed, and all were.

All reported Aroclors in QC and the sediment samples were quantified on at least an 4 peak match. Peaks with obvious interferences were not included in the quantitation. The method retention time window criteria of ± 0.03 minutes for a minimum of a 4 peak match for Aroclor identification was met in all QC and sediment samples.

2.3 Field QC Results

No field equipment rinsates or field duplicates associated with the project samples in Table 1 were analyzed for PCBs. No action was needed to qualify sample data.

2.4 Data Usability

Aroclor 1260 and 1268 results quantified against the single point calibration standard in IRA-06-BM5-COMPDS-416 were qualified as estimated with a J code from a less than multiple point calibration curve. Aroclor 1242 in IRA-06-M8-COMPDS-566 was estimated from a possible low bias in the sample matrix

Detected PCBs in sediment samples at concentrations greater than the LOD, but below the LOQ were qualified by Pace with a "Q" qualifier, and further qualified during validation as estimated with a J code, as they are within the region of quantitation associated with less precision.

3.0 AMMONIA, BOD and TSS DATA

Pace utilized EPA reference methods 160.2 and 350.1 as specified in their Standard Operating Procedure G2-WCM-01, Revision No. 2 dated January 1, 2003 and G2-WCM-58, Revision No. 0 dated January 16, 2004. No significant deviations from this SOP was apparent from the documentation reviewed. No action was needed to qualify sample data.

BOD analysis was not a requirement in the RAWP. Pace utilized Standard Methods 5210B for BOD analysis. No significant deviations from this reference method was apparent from the documentation reviewed. No action was needed to qualify sample data.

3.1 Completeness Assessment

The Pace data packages received were complete. All samples listed in Table 1 that were submitted and indicated for analysis were analyzed. The data packages received for ammonia, BOD and TSS analysis did not require any follow-up with Pace to enable data validation.

3.2 Compliance Assessment

3.2.1 Holding Time/Preservation

Documentation of adequate acid preservation for ammonia was present. All EPA recommended holding times for the methods cited above were met. No action was needed to qualify sample data.

None of the SDGs contained temperature blanks shipped with them, but as all samples were received "on ice", no action was needed to qualify sample data.

3.2.2 Calibration

All ammonia initial instrument calibrations for ammonia were properly performed using at least five standards and met the correlation coefficient criteria of greater than 0.995. Continuing calibration checks were performed at least once every 10 samples and all checks met performance criteria of 90-110%.

3.2.3 Laboratory Blanks

Laboratory blanks did not contain any TSS, ammonia or BOD above the Limit of Detection (LOD). No action was needed to qualify sample data.

3.2.4 Reference Standards/Lab Control Standards (LCS/LCSD)

Recovery of reference (EPA/ERA/APG) standards were all within Pace and RAWP accuracy limits. No action was needed to qualify sample data.

3.2.5 Laboratory Duplicate Sample Analysis

All laboratory duplicate and LCS/LCSD RPD results were within the Pace and RAWP precision limits. No action was needed to qualify sample data.

3.2.6 Matrix Spike Samples

All matrix spike sample recoveries were within the Pace and RAWP accuracy limits of 90 - 110 %, except for ammonia recovery in IRA-06-DEWT-EF187. Ammonia recoveries were 61.3 % and 59.8 %. Action taken was to qualify ammonia in IRA-06-DEWT-EF187 as estimated with a J code from a possible low bias in the sample matrix.

3.3 Field QC Results

No field equipment rinsates or field duplicates were collected with the project samples in Table 1. No action was taken to qualify sample data.

3.4 Data Usability

Ammonia in IRA-06-DEWT-EF187 was estimated from a possible low bias in the sample matrix.

Results greater than the LOD, but less than the LOQ were qualified by Pace with a "Q" qualifier. During the validation process, all "Q" qualified results were further qualified with a J code indicating estimated data. These concentrations should be considered estimated as they are within the region of quantitation associated with less precision.

4.0 MERCURY DATA

Pace utilized EPA method 1631E. No significant deviations from the EPA reference method was apparent from the documentation reviewed. No action was needed to qualify sample data.

4.1 Completeness Assessment

The data packages received for mercury analysis were complete. All samples submitted were digested and analyzed. No action was needed to qualify sample data.

4.2 Compliance Assessment

4.2.1 Holding Time/Preservation

All samples were analyzed within the 28 day holding time. No notation of storage or shipping temperature in exceedance of $4 \pm 2^{\circ}\text{C}$ was noted. No action was needed to qualify mercury sample data based on exceedance of holding time or preservation requirements.

4.2.2 Calibration

The initial instrument calibrations were five points ranging from 0.05 - 4 ng/L and correlation coefficients were all ≥ 0.995 . Continuing calibration checks were performed at least once every 10 samples and were within Pace's 80-120% limits. No action was needed to qualify sample data.

4.2.3 Laboratory Blanks

Mercury in all bottle blanks and method blanks were not below the Pace LOD of 0.197 ng/L. Method blanks contained 0.384, 0.424 and 0.474 ng/L. Action taken was to qualify mercury in samples at concentrations less than 5 X the associated method blank(s) as undetected with a "U" code as the concentration reported is not significantly different from lab background. Mercury in IRA-06-DEWT-EF188, 188 DUP and 188 FB was qualified as undetected as the concentration is not significantly different from lab background.

4.2.4 Ongoing Precision and Recovery (OPR) Standard

An OPR was prepared with each set of samples at 5 ng/L. Recoveries were all within Pace's limits of 79 - 121 %. No action was needed to qualify sample data.

4.2.5 Matrix Spike/Matrix Spike Duplicate

MS/MSD recoveries and RPD were all within Pace's limits of 75 - 125 % and < 24 % RPD. No action was needed to qualify sample data.

4.3 Field QC Results

A field blank was collected with the project sample DEWT EF 188. Mercury was detected in the field blank at 0.416 ng/L. Action taken was to qualify mercury in samples at concentrations less than 5 X the associated field blank as undetected with a "U" code as the concentration reported is not significantly different from field background. Mercury in IRA-06-DEWT-EF188 and 188 DUP was qualified as undetected as the concentration is not significantly different from field background.

A field duplicate was collected for mercury for sample DEWT EF 188. The detected mercury values of 2.12 and 1.85 ng/L resulted in an RPD value of 14 %. No action was needed to qualify sample data.

4.4 Data Usability

Mercury in IRA-06-DEWT-EF188, 188 DUP and 188 FB was qualified as undetected as the concentration is not significantly different from lab background. Mercury in IRA-06-DEWT-EF188 and 188 DUP was qualified as undetected as the concentration is not significantly different from field background.

Results greater than the LOD, but less than the LOQ were qualified by Pace with a "Q" qualifier. During the validation process, all "Q" qualified results were further qualified with a J code indicating estimated data. These concentrations should be considered estimated as they are within the region of quantitation associated with less precision.

If you have any questions regarding the qualification of data or the data validation process/criteria used, please contact me at (920) 469-9113.

Attachments:

Table 1
Validated hard copy Data Sheets
Appendix A: Data Validation Checklist

Table 1 Data Validated - Lower Fox River Foth Van Dyke

LAB(S)	SDG#	Date Rec'd by		Matrix	Sample ID	Field	Field		Analytes
		Kuehl					Collection Date	Lab sample ID	
Pace	868510	9-Feb-06		sediment	IRA-06-TC5-COMPDS-490		23-Jan-06	868510-029	PCBs
Pace	868510	9-Feb-06		sediment	IRA-06-TC6-COMPDS-496		23-Jan-06	868510-035	PCBs
Pace	868375	9-Feb-06		sediment	IRA-06-T24COMPDS-445		17-Jan-06	868375-001	PCBs
Pace	868375	9-Feb-06		sediment	IRA-06-B12COMPDS-446		17-Jan-06	868375-002	PCBs
Pace	868375	9-Feb-06		sediment	IRA-06-BM7DS-447		17-Jan-06	868375-003	PCBs
Pace	868375	9-Feb-06		sediment	IRA-06-BRAD10DS-448		17-Jan-06	868375-004	PCBs
Pace	868231	7-Feb-06		water	IRA-06-DEWT-EF-186		12-Jan-06	868231-001	TSS, BOD, NH3, PCBs
Pace	868321	7-Feb-06		sediment	IRA-06-TC4-COMPDS-444		16-Jan-06	868321-007	PCBs
Pace	868230	7-Feb-06		sediment	IRA-06-BRAD4-COMP-DS-414		12-Jan-06	868230-001	PCBs
Pace	868230	7-Feb-06		sediment	IRA-06-BM4-COMP-DS-415		12-Jan-06	868230-002	PCBs
Pace	868230	7-Feb-06		sediment	IRA-06-BM5-COMP-DS-416		12-Jan-06	868230-003	PCBs
Pace	868230	7-Feb-06		sediment	IRA-06-BM6-COMP-DS-418		12-Jan-06	868230-004	PCBs
Pace	868230	7-Feb-06		sediment	IRA-06-M7-COMP-DS-417		12-Jan-06	868230-005	PCBs
Pace	868547	15-Feb-06		sediment	IRA-06-TC7-COMPDS-502		24-Jan-06	868547-007	PCBs
Pace	868547	15-Feb-06		sediment	IRA-06-TC8-COMPDS-508		24-Jan-06	868547-013	PCBs
Pace	868547	15-Feb-06		sediment	IRA-06-TB11-COMPDS-517		24-Jan-06	868547-023	PCBs
Pace	868659	23-Feb-06		water	IRA-06-DEWT-EF187		30-Jan-06	868659-004	TSS, BOD, NH3, PCBs
Pace	868659	23-Feb-06		water	IRA-06-DEWT-EF188		30-Jan-06	868659-001	low level mercury
Pace	868659	23-Feb-06		field blank	IRA-06-DEWT-EF188 FB		30-Jan-06	868659-002	low level mercury
Pace	868659	23-Feb-06		field duplicate	IRA-06-DEWT-EF188 DUP		30-Jan-06	868659-003	low level mercury
Pace	868694	23-Feb-06		sediment	IRA-06-TB10-COMPDS-566		31-Jan-06	868694-020	PCBs
Pace	868769	23-Feb-06		sediment	IRA-06-M8-COMPDS-577		2-Feb-06	868769-012	PCBs
Pace	868769	23-Feb-06		sediment	IRA-06-BRAD9-COMPDS-586		2-Feb-06	868769-022	PCBs