



2012 DATA SUMMARY REPORT MISSISSIPPI RIVER – POOL 2 AND ADJACENT LOCATIONS

Prepared for

Brewer Attorneys and Counselors
Dallas, Texas

Prepared by

Anchor QEA, LLC
4300 Route 50, Suite 202
Saratoga Springs, New York 12866

April 2016

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ACRONYMS AND ABBREVIATIONS

Anchor QEA	Anchor QEA, LLC
cfs	cubic feet per second
DSR	Data Summary Report
PFAS	perfluoroalkyl substance
PFBA	Perfluorobutanoate
PFBS	Perfluorobutanesulfonate
PFDA	Perfluorodecanoate
PFDoA	Perfluorododecanoate
PFHpA	Perfluoroheptanoate
PFHxA	Perfluorohexanoate
PFHxS	Perfluorohexanesulfonate
PFNA	Perfluorononanoate
PFOA	Perfluorooctanoate
PFOS	Perfluorooctanesulfonate
PFOSA	Perfluorooctane sulfonamide
PFPeA	Perfluoropentanoate
PFUnA	Perfluoroundecanoate
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
SAP	Sampling and Analysis Plan
USGS	United States Geological Survey

1 INTRODUCTION

This Data Summary Report (DSR) has been developed by Anchor QEA, LLC, on behalf of Brewer Attorneys and Counselors, to present the results of sampling and analysis activities performed to measure the water concentrations of perfluoroalkyl substances (PFASs) in Pool 2 of the Mississippi River in 2012 and additional nearby locations as documented in the 2012 *Sampling and Analysis Plan* (SAP; Anchor QEA 2012).

The objective of this DSR is to describe the methods, summarize the data, and present the results of the applicable data quality assessments associated with the 2012 sampling and analysis activities.

2 METHODS

2.1 Water Sample Locations

A total of 19 sampling locations were identified in the SAP. In the Mississippi River, seven locations were sampled from the centroid of the river. Cross-channel transects containing between three to five sampling nodes were sampled at five locations. An additional seven samples were collected from the Minnehaha Creek (1 sample), Minnesota River (1 sample), Lake Calhoun (2 samples), and Pigs Eye Lake (3 samples). Three rounds of sampling were conducted targeting a low, moderate, and high flow to the extent possible. Accordingly, the targeted flow regimes were the 25, 50, and 75 percentile flow for the historical record (5,900 cubic feet per second [cfs], 10,400 cfs, and 20,400 cfs, respectively), as measured at the United States Geological Survey (USGS) Mississippi River gaging station (station number – 5331000) located in Saint Paul, Minnesota (Figure 1). A summary of the sampling locations is provided in Table 1.

2.2 Water Sampling

2.2.1 Water Sampling Procedures

Sampling was performed at all locations specified in Table 1 and shown in Figure 1. Each location was sampled three times to capture a range of flow conditions. The sampling methods are presented in detail in Standard Operating Procedure for Water Sampling, included as Attachment 1 of the SAP (Anchor QEA 2012), and described below.

Water sampling was conducted using a stainless steel Kemmerer sampler. At locations where the water depth was greater than or equal to 10 feet, subsamples were collected at 20% and 80% of the water depth and combined to form a single sample. At locations where the water depth was less than 10 feet, the samples were collected at 60% of the water depth. Samples were transferred from the stainless steel sampler to sample bottles supplied by the laboratory. The samples were kept on ice prior to shipment to the analytical laboratories.

Water quality parameters, including temperature, pH, turbidity, and conductivity, were measured in the field at each sampling station using a YSI 6920 multiparameter probe. In

addition, the actual field coordinates of the locations occupied during sample collection were recorded using a Trimble GeoXT GPS unit.

2.2.2 Laboratory Analyses

Water samples collected during the program were submitted to AXYS Analytical Laboratory for PFAS analysis including the following compounds:

- Perfluorobutanesulfonate (PFBS)
- Perfluorobutanoate (PFBA)
- Perfluorodecanoate (PFDA)
- Perfluorododecanoate (PFDoA)
- Perfluoroheptanoate (PFHpA)
- Perfluorohexanesulfonate (PFHxS)
- Perfluorohexanoate (PFHxA)
- Perfluorononanoate (PFNA)
- Perfluorooctane sulfonamide (PFOSA)
- Perfluorooctanesulfonate (PFOS)
- Perfluorooctanoate (PFOA)
- Perfluoropentanoate (PFPeA)
- Perfluoroundecanoate (PFUnA)

Samples were also submitted to Pace Analytical for total organic carbon, total dissolved solids, and total suspended solids analysis.

2.3 Quality Assurance/Quality Control

Quality assurance/quality control (QA/QC) procedures presented in a quality assurance project plan (QAPP) for an earlier study (2011 Cardno ENTRIX Quality Assurance Project Plan; [Cardno ENTRIX 2011]) were adopted and followed for this sampling effort. Sampling and analytical activities were consistent with the methodologies presented in the QAPP, and included the collection of appropriate additional QA/QC samples, including equipment rinse blanks, matrix spike samples, and duplicate samples. A summary of field QA/QC samples collected is presented in the QAPP.

3 RESULTS

3.1 Mississippi River Flow

Three rounds of sampling were conducted during July and August 2012. The first sampling round was conducted during July 11 through 14, 2012, to capture the high flow regime. The average daily flow as measured at the Mississippi River gaging station located in Saint Paul (USGS gage 5331000) was 24,200 cfs. The second round of sampling was conducted from July 30 through August 1, 2012, when the average daily flow was 14,600 cfs. The low flow event was conducted when the river flows were averaging 5,500 cfs from August 27 through August 28, 2012 (Figure 2). The observed flows were relatively close to those targeted and referenced in Section 2.1.

3.2 Analytical Results

A total of 108 environmental samples were submitted for analysis for PFASs, total organic carbon, total dissolved solids, and total suspended solids. In addition, five field blanks and six field duplicates were submitted as QA/QC samples. The results for the sampling are presented in Table 2.

3.3 Data Validation

A United States Environmental Protection Agency Stage 2A data validation review of the analytical results was conducted for each sampling round. The final validation reports for the surface water samples are included as Appendix A.

3.4 Laboratory Data Reports

Due to the file size, the laboratory data reports are not included in this electronic data summary report. The laboratory data reports can be provided upon request.

4 REFERENCES

Anchor QEA, 2012. *Sampling and Analysis Plan – Mississippi Pool 2*. Prepared for Faegre, Baker and Daniels, LLP. July 2012.

Cardno ENTRIX, 2011. *Quality Assurance Project Plan*. Prepared by Cardno ENTRIX for the 3M Company. June 2011.

TABLES

Table 1
Summary of Sampling Locations

River Mile	Type	Location
Mississippi River RM 847.3	Centroid	Upstream Section of Pool 2
Lake Calhoun and	2 Locations	North end of Lake Calhoun South end of Lake Calhoun
Minnehaha Creek (approximate RM 847)	Centroid	Confluence with Mississippi River
Mississippi River RM 844.1	Centroid	Near Minneapolis-Saint Paul Airport, upstream of confluence with Minnesota River
Minnesota River RM 0	Centroid	Minnesota River above confluence
Mississippi River RM 841	Centroid	Downstream of confluence of Mississippi River and Minnesota Rivers
Mississippi River RM 836.3	Centroid	Upstream of Metropolitan Council Environmental Services Metro treatment plant
Mississippi River RM 835.2	4 Node Transect	Downstream of Metropolitan Council Environmental Services Metro treatment plant
Pigs Eye Lake (approximate RM 833.4)	3 Locations	North end of Pigs Eye Lake South end of Pigs Eye Lake Outfall of Pigs Eye Lake at Mississippi confluence
Mississippi River RM 831	Centroid	Upstream of Northern Tier Energy's Saint Paul Park Refinery
Mississippi River RM 829	Centroid	Downstream of Northern Tier Energy's Saint Paul Park Refinery
Mississippi River RM 826	Centroid	Upstream of Spring Lake
Mississippi River RM 818.5	5 Node Transect	Upstream of 3M Cottage Grove facility
Mississippi River RM 817.2	5 Node Transect	Downstream of East Cove
Mississippi River RM 815.8	5 Node Transect	End of Pool 2
Mississippi River RM814	3 Node Transect	Downstream of Lock and Dam No. 2 (Pool 3)

Note:
RM = river mile

Table 2
2012 Surface Water Results

Sample Name	Sample Date	Sample Time	Parent Location	Sample Type	PFBA (ng/L)	PFBS (ng/L)	PFDA (ng/L)	PFDaA (ng/L)	PFHpA (ng/L)	PFHxA (ng/L)	PFHxS (ng/L)	PFNA (ng/L)	PFOA (ng/L)	PFOS (ng/L)	PFOSA (ng/L)	PFPeA (ng/L)	PFUnA (ng/L)	TDS (mg/L)	TOC (mg/L)	TSS (mg/L)
LKCALHOUN-N-201207140945	7/14/2012	9:45:00 AM	LKCALHOUN-N	N	16.3	<2.53	<1.27	<1.27	3.88	5.38	3.85	<1.27	14.5	42.5	<1.27	3.99	<1.27	316	1.9	<10
LKCALHOUN-N-201208010841	8/1/2012	8:41:00 AM	LKCALHOUN-N	N	21	<1.94	<0.969	<0.969	3.99	6.33	2.06	<0.969	14.2	32	<0.969	3.75	<0.969	321	2.3	<10
LKCALHOUN-N-201208291121	8/29/2012	11:21:00 AM	LKCALHOUN-N	N	20.7	<1.91	1.04	<0.957	4.62	10.9	3.09	1.64	19.2	46.8	<0.957	8.92	<0.957	320	4.0	<10
LKCALHOUN-S-201207141017	7/14/2012	10:17:00 AM	LKCALHOUN-S	N	16.2	<2.48	1.86	<1.24	4.47	6.1	3.49	1.64	13.9	77.8	<1.24	3.41	<1.24	298	1.4	11.6
LKCALHOUN-S-201208010821	8/1/2012	8:21:00 AM	LKCALHOUN-S	N	20.4	<1.96	<0.981	<0.981	4.3	6.11	2.38	1.16	14.3	42.4	<0.981	<3.05	<0.981	294	3.0	<10
LKCALHOUN-S-201208291224	8/29/2012	12:24:00 PM	LKCALHOUN-S	N	18.4	<2.1	1.17	<0.897	4.44	7.79	2.41	1.35	15.9	49.8	<0.897	3.91	<0.897	320	1.6	<10
MINNE-RM847.0-C-201207111323	7/11/2012	1:23:00 PM	MINNE-RM847.0-C	N	23.7	<1.8	<0.902	<0.902	2.25	2.23	1.99	<0.902	5.62	6.68	<0.902	<1.53	<0.902	287	6.4	10.1
MINNE-RM847.0-C-201207301237	7/30/2012	12:37:00 PM	MINNE-RM847.0-C	N	16.6	<1.78	<0.889	<0.889	2.38	2.31	<1.78	<0.889	6.8	9.31	<0.889	<3.39	<0.889	241	4.4	<10
MINNE-RM847.0-C-201208271213	8/27/2012	12:13:00 PM	MINNE-RM847.0-C	N	22.1	<2.11	<0.974	<0.974	2.62	5.87	3.72	1.55	7.29	8.82	<0.974	<1.97	<0.974	313	2.7	<10
MIN-RM0.0-C-201207111444	7/11/2012	2:44:00 PM	MIN-RM0.0-C	N	9.05	<1.87	<0.933	<0.933	<0.933	<0.947	<1.87	<0.933	1.58	<1.87 J	<0.933	<1.45	<0.933	456	10.6	39.3
MIN-RM0.0-C-201207301321	7/30/2012	1:21:00 PM	MIN-RM0.0-C	N	9.37	<1.92	<0.96	<0.96	1.35	1.89	<1.92	<0.96	3.05	1.733 J	<0.96	3.09	<0.96	465	6.7	31.4
MIN-RM0.0-C-201208271234	8/27/2012	12:34:00 PM	MIN-RM0.0-C	N	8.38	<2.01	<1	<1	2.26	5.31	<2.01	<1	4.59	1.995 J	<1	3.32	<1	534	3.3	23.2
MISS-RM814.3-1-201207130838	7/13/2012	8:38:00 AM	MISS-RM814.3-1	N	18.2	<1.94	<0.972	<0.972	<1.12	1.36	<1.94	<0.972	2.69	2.12	<0.972	<1.88	<0.972	230	16.5	41.2
MISS-RM814.3-1-201207311537	7/31/2012	3:37:00 PM	MISS-RM814.3-1	N	22.4	<1.94 J	<0.968	<0.968	<2.9	<2.9	<1.94	<0.968	3.99	2.64	<0.968	<3.03	<0.968	214	19.0	30.8
MISS-RM814.3-1-201207311537DUP	7/31/2012	3:37:00 PM	MISS-RM814.3-1	LR	20.6	<1.83	<0.915	<0.915	<2.75	<2.75	<1.83	<1.27	4.42	1.84	<0.915	<4.15	<0.915	--	--	--
MISS-RM814.3-1-201207311537MS	7/31/2012	3:37:00 PM	--	MS	600	684	552	514	832	632	1050	536	538	1050	610	429	580	--	--	--
MISS-RM814.3-1-201208281339	8/28/2012	1:39:00 PM	MISS-RM814.3-1	N	64.1	21.8	<0.962	<0.962	3.98	7.07	5.06	<0.962	16.6	5.32	<0.962	9.31	<0.962	292	10.4	31.8
MISS-RM814.3-2-201207130848	7/13/2012	8:48:00 AM	MISS-RM814.3-2	N	36.2	<2.05	<1.03	<1.03	<1.36	<1.41	<2.05	<1.03	6.86	3.87	<1.03	<2.01	<1.03	230	16.7	38.4
MISS-RM814.3-2-201207311544	7/31/2012	3:44:00 PM	MISS-RM814.3-2	N	44.2	3.55	<0.979	<0.979	<1.95	2.72	<2.24	<0.979	9.88	5.69	<0.979	3.38	<0.979	211	14.5	20.7
MISS-RM814.3-2-201208281344	8/28/2012	1:44:00 PM	MISS-RM814.3-2	N	70.2	26.9	<1.02	<1.02	4.67	10	7.08	<1.02	20.4	8.3	<1.02	10.4	<1.02	334	10.5	26.0
MISS-RM814.3-3-201207130900	7/13/2012	9:00:00 AM	MISS-RM814.3-3	N	37.7	3.2	<1.01	<1.01	<1.3	3.19	<2.01	<1.01	7.59	4.16	<1.01	<1.9	<1.01	230	17.1	25.6
MISS-RM814.3-3-201207130900DUP	7/13/2012	9:00:00 AM	MISS-RM814.3-3	LR	33.6	3.75	<0.987	<0.987	<1.68	2.45	2.54	<0.987	7.22	5.19	<0.987	3.1	<0.987	214	--	27.5
MISS-RM814.3-3-201207130900MS	7/13/2012	9:00:00 AM	--	MS	426	727	475	454	665	536	952	472	456	960	515	416	463	--	--	--
MISS-RM814.3-3-201207130900MSD	7/13/2012	9:00:00 AM	--	MSD	475	734	584	473	676	556	974	530	519	1050	558	428	571	--	--	--
MISS-RM814.3-3-201207311720	7/31/2012	5:20:00 PM	MISS-RM814.3-3	N	43.5	2.57	<1.03	<1.03	<3.08	3.34	<2.05	<1.03	11.2	5.73	<1.03	4.19	<1.03	226	14.0	21.7
MISS-RM814.3-3-201208281352	8/28/2012	1:52:00 PM	MISS-RM814.3-3	N	68.6	15.7	<0.965	<0.965	4.97	8.25	4.32	<0.965	18.7	8.75	<0.965	8.42	<0.965	327	10.6	32.1
MISS-RM815.8-1-201207131043	7/13/2012	10:43:00 AM	MISS-RM815.8-1	N	29.8	<1.98	<0.989	<0.989	<1.42	<1.11	<1.98	<0.989	1.3	<1.98 J	<0.989	<1.39	<0.989	232	16.2	45.6
MISS-RM815.8-1-201207311443	7/31/2012	2:43:00 PM	MISS-RM815.8-1	N	19.2	<1.99	<0.994	<0.994	3.25	<2.98	<1.99	<0.994	2.95	1.347 J	<0.994	<2.98	<0.994	214	13.7	29.2
MISS-RM815.8-1-201208281200	8/28/2012	12:00:00 PM	MISS-RM815.8-1	N	34	<1.93	<0.966	<0.966	4.2	4.31	2.37	<0.966	6.07	2.25	<0.966	4.29	<0.966	335	10.2	43.2
MISS-RM815.8-2-201207131028	7/13/2012	10:28:00 AM	MISS-RM815.8-2	N	19.9	<2	<1	<1	<2.02	<1	<2	<1	1.73	<2 J	<1	<1.42	<1	--	--	--
MISS-RM815.8-2-201207311430	7/31/2012	2:30:00 PM	MISS-RM815.8-2	N	15.6	<2	<0.999	<0.999	<3	<3	<2	<0.999	2.35	1.821 J	<0.999	<3.51	<0.999	--	--	--
MISS-RM815.8-2-201208281216	8/28/2012	12:16:00 PM	MISS-RM815.8-2	N	30.3	<1.91	<0.955	<0.955	3.98	4.43	2.15	<0.955	5.61	2.53	<0.955	3.47	<0.955	--	--	--
MISS-RM815.8-3-201207131014	7/13/2012	10:14:00 AM	MISS-RM815.8-3	N	19.8	<2.26	<1.13	<1.13	<1.69	<1.13	<2.26	<1.13	2.15	1.061 J	<1.13	<1.54	<1.13	240	16.2	58.0
MISS-RM815.8-3-201207311412	7/31/2012	2:12:00 PM	MISS-RM815.8-3	N	17.8	<2.15 J	<1.07	<1.07	<1.24	<1.07	<2.15 J	<1.07	2.22	1.415 J	<1.07	<2.7 J	<1.07	221	14.2	43.3
MISS-RM815.8-3-201207311412DUP	7/31/2012	2:12:00 PM	MISS-RM815.8-3	LR	19.9	<1.94	<0.969	<0.969	<1.86	<0.969	<1.94	<0.969	3.12	1.002	<0.969	<1.11	<0.969	--	--	--
MISS-RM815.8-3-201207311412MS	7/31/2012	2:12:00 PM	--	MS	372	533	396	413	535	427	794	452	390	797	463	322	431	--	--	--
MISS-RM815.8-3-201208281230	8/28/2012	12:30:00 PM	MISS-RM815.8-3	N	28.5	<2.05	<1.02	<1.02	2.94	3.74	<2.05	<1.02	6.45	2.9	<1.02	4.58	<1.02	327	10.5	46.0
MISS-RM815.8-4-201207130945	7/13/2012	9:45:00 AM	MISS-RM815.8-4	N	18.4	<2.14	<1.07	<1.07	<1.15	<1.08	<2.14	<1.07	1.4	<2.14 J	<1.07	<2.31	<1.07	230	16.3	48.8
MISS-RM815.8-4-201207311403	7/31/2012	2:03:00 PM	MISS-RM815.8-4	N	17.9	<1.98	<0.988	<0.988	<2.97	<2.97	<1.98	<0.988	1.8	<1.98 J	<0.988	3.71	<0.988	218	13.6	47.2
MISS-RM815.8-4-201208281237	8/28/2012	12:37:00 PM	MISS-RM815.8-4	N	27	<2.1	<1.05	<1.05	<3.08	5.11	2.28	<1.05	6.12	2.22	<1.05	4.61	<1.05	335	10	41.1
MISS-RM815.8-5-201207131000	7/13/2012	10:00:00 AM	MISS-RM815.8-5	N	16.9	<2.17	<1.08	<1.08	<1.59	<1.08	<2.17	<1.08	2.49	1.537 J	<1.08	<1.67	<1.08	248	16.9	28.7
MISS-RM815.8-5-201207311352	7/31/2012	1:52:00 PM	MISS-RM815.8-5	N	19.1	<2.03	<1.01	<1.01	<3.04	<3.04	<2.03	<1.01	3.04	1.506 J	<1.01	3.24	<1.01	232	14.1	24.7
MISS-RM815.8-5-201208281245	8/28/2012	12:45:00 PM	MISS-RM815.8-5	N	53.3	22.7	<0.966	<0.966	4.69	6.53	3.3	<0.966	15.7	8.94	<0.966	7.14	<0.966	336	10.3	23.2
MISS-RM817.2-1-201207121340	7/12/2012	1:40:00 PM	MISS-RM817.2-1	N	20.6	<1.97	<0.985	<0.985	<1.52	<0.985	<1.97	<0.985	2.17	<1.97 J	<0.985	<1.85	<0.985	250	16.3	37.3
MISS-RM817.2-1-201207311246	7/31/2012	12:46:00 PM	MISS-RM817.2-1	N	18.2	<1.9	<0.949	<0.949	2.33	2.31	<1.9	<0.949	1.5	1.646 J	<0.949	<1.73	<0.949	222	14.0	24.9
MISS-RM817.2-1-201208281137	8/28/2012	11:37:00 AM	MISS-RM817.2-1	N	31.9	2.19	<1	<1	3.43	3.61	<2	<1	4.87	2.03	<1	3.03	<1	322	11.1	27.5
MISS-RM817.2-1-201208281137DUP	8/28/2012	11:37:00 AM	MISS-RM817.2-1	LR	31.1	2.74	<1.05	<1.05	2.94	4.05	<2.11	<1.05	5.12	1.989 J	<1.05	3.92	<1.05	323	--	30.4
MISS-RM817.2-1-201208281137MS	8/28/2012	11:37:00 AM	--	MS	447	726	451	449	622	480	951	486	506	874	503	368	470	--	--	--
MISS-RM817.2-2-201207121400	7/12/2012	2:00:00 PM	MISS-RM817.2-2	N	19.1 J	<2.03	<1.01	<1.01	<1.45	<1.3	<2.03	<1.01	2.03	1.653 J	<1.01	<1.74	<1.01	254	16.2	30.2
MISS-RM817.2-2-201207311236	7/31/2012	12:36:00 PM	MISS-RM817.2-2	N	17.7	<1.98	<0.989	<0.989	1.97	<1.57	<1.98	<0.989	2.1	<1.98 J	<0.989	<2.26	<0.989	241	14.8	27.5
MISS-RM817.2-2-201208281126	8/28/2012	11:26:00 AM	MISS-RM817.2-2	N	26.9	2.58	<1.03	<1.03	4.16	5.12	<2.06	<1.03	4.93	2.83	<1.03	4.54	<1.03	318	10.4	20.5
MISS-RM817.2-3-201207121416	7/12/2012	2:16:00 PM	MISS-RM817.2-3	N	19.7 J	<1.95	<0.975	<0.975	<2.03	<0.975	<1.95	<0.975	1.87	<1.95 J	<					

Table 2
2012 Surface Water Results

Sample Name	Sample Date	Sample Time	Parent Location	Sample Type	PFBA (ng/L)	PFBS (ng/L)	PFDA (ng/L)	PFDaA (ng/L)	PFHpA (ng/L)	PFHxA (ng/L)	PFHxS (ng/L)	PFNA (ng/L)	PFOA (ng/L)	PFOS (ng/L)	PFOSA (ng/L)	PFPeA (ng/L)	PFUnA (ng/L)	TDS (mg/L)	TOC (mg/L)	TSS (mg/L)
MISS-RM818.5-1-201208280915	8/28/2012	9:15:00 AM	MISS-RM818.5-1	N	27.8	<1.93	<0.964	<0.964	3	4.38	4.26	<0.964	5.58	2.93	<0.964	5.06	<0.964	321	10.3	19.1
MISS-RM818.5-2-201207121311	7/12/2012	1:11:00 PM	MISS-RM818.5-2	N	R	<1.88	<0.939	<0.939	<0.939	<1.24	<1.88	<0.939	1.82	<1.88 J	<0.939	<2.57	<0.939	255	16.1	29.6
MISS-RM818.5-2-201207311313	7/31/2012	1:13:00 PM	MISS-RM818.5-2	N	16.9	<1.94	<0.972	<0.972	<2.06	<0.972	<1.94 J	<0.972	0.919 J	<0.972	<2.16	<0.972	<0.972	230	13.6	33.1
MISS-RM818.5-2-201208280932	8/28/2012	9:32:00 AM	MISS-RM818.5-2	N	21.2	<1.89	<0.943	<0.943	3.14	3.04	2.1	<0.943	4.65	2.7	<0.943	4.37	<0.943	305	11.1	18.0
MISS-RM818.5-3-201207121225	7/12/2012	12:25:00 PM	MISS-RM818.5-3	N	19 J	<2.12	<1.06	<1.06	<1.79	<1.23	<2.12	<1.06	1.98	1.482 J	<1.06	<1.95	<1.06	247	16.1	67.8
MISS-RM818.5-3-201207311325	7/31/2012	1:25:00 PM	MISS-RM818.5-3	N	16.2	<2.05	<1.03	<1.03	<2.07	<1.03	<2.05 J	<1.03	2.07	1.096 J	<1.03	<1.81	<1.03	240	13.8	34.2
MISS-RM818.5-3-201208280939	8/28/2012	9:39:00 AM	MISS-RM818.5-3	N	21.9	2.22	<0.966	<0.966	4.22	3.43	2.9	<0.966	5.02	4	<0.966	2.71	<0.966	309	11.4	16.8
MISS-RM818.5-4-201207121242	7/12/2012	12:42:00 PM	MISS-RM818.5-4	N	R	<1.98	<0.991	<0.991	<1.9	<0.991	<1.98	<0.991	1.59	<1.98 J	<0.991	<1.23	<0.991	240	16.2	24.2
MISS-RM818.5-4-201207311342	7/31/2012	1:42:00 PM	MISS-RM818.5-4	N	13.7	<2.01	<1.01	<1.01	<1.24	<1.01	<2.01 J	<1.01	2.42	1.807 J	<1.01	<2.06	<1.01	226	13.7	16.1
MISS-RM818.5-4-201208280952	8/28/2012	9:52:00 AM	MISS-RM818.5-4	N	22.3	<1.94	<0.971	<0.971	3.19	2.49	<1.94	<0.971	4.95	1.446 J	<0.971	2.53	<0.971	307	9.8 J	14.8
MISS-RM818.5-5-201207121258	7/12/2012	12:58:00 PM	MISS-RM818.5-5	N	R	2.01 J	<0.996	<0.996	<1.04	1.16	<1.99	<0.996	3.16	1.374 J	<0.996	<2.39 J	<0.996	251	16.7	29.3
MISS-RM818.5-5-201207121258MS	7/12/2012	12:58:00 PM	--	MS	--	590	419	438	518	417	786	412	397	828	467	301	425	--	--	--
MISS-RM818.5-5-201207311047	7/31/2012	10:47:00 AM	MISS-RM818.5-5	N	24.2	<1.97 J	<0.985	<0.985	<2.95	<3.38	<1.97	<0.985	3.96	2.03	<0.985	<2.95	<0.985	238	14.1	23.7
MISS-RM818.5-5-201207311047DUP	7/31/2012	10:47:00 AM	MISS-RM818.5-5	LR	20.5	<1.93	<0.966	<0.966	<2.9	<2.9	<1.93	<0.996	4.04	1.97	<0.966	<2.9	<0.966	--	--	--
MISS-RM818.5-5-201207311047MS	7/31/2012	10:47:00 AM	--	MS	544	597	559	478	640	528	917	460	503	878	533	384	609	--	--	--
MISS-RM818.5-5-201208281015	8/28/2012	10:15:00 AM	MISS-RM818.5-5	N	21	<2.24	<1.12	<1.12	1.77	3.08	<2.24	<1.12	5.03	2.088 J	<1.12	2.67	<1.12	307	9.9 J	26.3
MISS-RM826.0-C-201207121120	7/12/2012	11:20:00 AM	MISS-RM826.0-C	N	14 J	<1.73	<0.863	<0.863	<0.909	<0.863	<1.73	<0.863	1.88	<1.73 J	<0.863	<2.41	<0.863	246	16.3	32.3
MISS-RM826.0-C-201207311002	7/31/2012	10:02:00 AM	MISS-RM826.0-C	N	21.6	<1.81	<0.907	<0.907	<1.28	<0.907	<1.81 J	<0.907	1.97	1.549 J	<0.907	<1.45	<0.907	245	14.7 J	26.2
MISS-RM826.0-C-201208280842	8/28/2012	8:42:00 AM	MISS-RM826.0-C	N	14.8	<2.24	<1.12	<1.12	2.13	2.46	<2.24	<1.12	4.18	1.091 J	<1.12	2.61	<1.12	313	11.3 J	15.8
MISS-RM829.0-C-201207121058	7/12/2012	10:58:00 AM	MISS-RM829.0-C	N	R	<1.88	<0.942	<0.942	<2.02	<0.942	<1.88	<0.942	1.62	<1.88 J	<0.942	<1.59	<0.942	248	16.4	35.6
MISS-RM829.0-C-201207310938	7/31/2012	9:38:00 AM	MISS-RM829.0-C	N	18.2	<1.85	<0.927	<0.927	<1.8	<0.927	<1.85 J	<0.927	2.45	<1.85 J	<0.927	1.61	<0.927	235	14.9	25.7
MISS-RM829.0-C-201208280818	8/28/2012	8:18:00 AM	MISS-RM829.0-C	N	14.7	<1.99	<0.996	<0.996	1.86	2.1	<1.99	<0.996	4.15	1.593 J	<0.996	1.79	<0.996	302	9.4 J	15.9
MISS-RM831.0-C-201207121030	7/12/2012	10:30:00 AM	MISS-RM831.0-C	N	18 J	<1.82	<0.911	<0.911	<1.27	<0.911	<1.82	<0.911	1.69	0.993 J	<0.911	<2.33	<0.911	238	17.5	29.1
MISS-RM831.0-C-201207301603	7/30/2012	4:03:00 PM	MISS-RM831.0-C	N	16.8	<2.21	<1.1	<1.1	<1.48	<1.34	<2.21 J	<1.1	2.68	<2.21 J	<1.1	<2.63	<1.1	223	14.8	19.2
MISS-RM831.0-C-201208271545	8/27/2012	3:45:00 PM	MISS-RM831.0-C	N	14.1	<2.18	<1.09	<1.09	2.01	2.3	<2.18	<1.09	4.62	<2.18 J	<1.09	<1.56	<1.09	327	10.6 J	14.8
MISS-RM835.2-1-201207111639	7/11/2012	4:39:00 PM	MISS-RM835.2-1	N	13.4 J	<2.09	<1.05	<1.05	<1.05	<1.05	<2.09	<1.05	<1.05	<2.09 J	<1.05	<1.6	<1.05	261	17.1	28.6
MISS-RM835.2-1-201207301438	7/30/2012	2:38:00 PM	MISS-RM835.2-1	N	10.9	<2.1	<1.05	<1.05	<2.47	<1.05	<2.1 J	<1.05	<2.1 J	<1.05	<2.89	<1.05	<2.89	232	14.8	20.6
MISS-RM835.2-1-201208271339	8/27/2012	1:39:00 PM	MISS-RM835.2-1	N	12	<2.17	<1.08	<1.08	2.87	1.42	<2.17	<1.08	2.3	<2.17 J	<1.08	1.1	<1.08	318	10.8 J	27.7
MISS-RM835.2-2-201207111628	7/11/2012	4:28:00 PM	MISS-RM835.2-2	N	14.6	<1.9	<0.949	<0.949	<1.8	<0.949	<1.9	<0.949	<0.949	<1.9 J	<0.949	<2.02	<0.949	254	17.6	27.2
MISS-RM835.2-2-201207301343	7/30/2012	1:43:00 PM	MISS-RM835.2-2	N	9.83	<2.04	<1.02	<1.02	<1.57	<1.56	<2.04 J	<1.02	1.69	1.217 J	<1.02	<2.71	<1.02	229	14.9	17.5
MISS-RM835.2-2-201208271358	8/27/2012	1:58:00 PM	MISS-RM835.2-2	N	12	<2.11	<1.05	<1.05	1.95	<1.05	<2.11	<1.05	2.23	1.207 J	<1.05	<1.43	<1.05	276	11.1 J	17.0
MISS-RM835.2-3-201207111628	7/11/2012	4:20:00 PM	MISS-RM835.2-3	N	12.7	<2.05	<1.03	<1.03	<1.03	<1.03	<2.05	<1.03	<2.05 J	<1.03	<1.11	<1.03	235	17.3 J	28.8	
MISS-RM835.2-3-201207301347	7/30/2012	1:47:00 PM	MISS-RM835.2-3	N	11.9	<1.72	<0.858	<0.858	<2.84	<2.57	<1.72	<0.858	1.98	<1.72 J	<0.858	<2.76	<0.858	211	15.0	17.2
MISS-RM835.2-3-201208271402	8/27/2012	2:02:00 PM	MISS-RM835.2-3	N	11.7	<1.97	<0.987	<0.987	1.94	1.55	<1.97	<0.987	3.65	<1.97 J	<0.987	2.19	<0.987	285	10.1 J	16.4
MISS-RM835.2-4-201207111616	7/11/2012	4:16:00 PM	MISS-RM835.2-4	N	11	<1.84	<0.921	<0.921	<2.11	<0.921	<1.84	<0.921	1.25	<1.84 J	<0.921	<2.19	<0.921	260	17.5	29.0
MISS-RM835.2-4-201207301351	7/30/2012	1:51:00 PM	MISS-RM835.2-4	N	12.5	<1.88	<0.941	<0.941	<1.8	<1.06	<1.88	<0.941	2.06	1.738 J	<0.941	<2	<0.941	214	15.1	13.2
MISS-RM835.2-4-201208271410	8/27/2012	2:10:00 PM	MISS-RM835.2-4	N	18.9	<1.93	<0.963	<0.963	2.13	3.33	1.98	0.995	5.73	2.59	<0.963	3.04	<0.963	324	10.3 J	15.5
MISS-RM836.3-C-201207111553	7/11/2012	3:53:00 PM	MISS-RM836.3-C	N	12.7	<2.09	<1.04	<1.04	<1.32	<1.04	<2.09	<1.04	2	<2.09 J	<1.04	<2.08	<1.04	245	17.3	25.6
MISS-RM836.3-C-201207301334	7/30/2012	1:34:00 PM	MISS-RM836.3-C	N	10.8	<2.04	<1.02	<1.02	<3.07	<3.07	<2.04	<1.02	1.2	<2.04 J	<1.02	<3.07	<1.02	218	15.1	19.7
MISS-RM836.3-C-201208271329	8/27/2012	1:29:00 PM	MISS-RM836.3-C	N	11.9	<2.17	<1.09	<1.09	1.49	2.1	<2.17	<1.09	3.09	1.833 J	<1.09	2.1	<1.09	282	10.8 J	16.0
MISS-RM841.0-C-201207111530	7/11/2012	3:30:00 PM	MISS-RM841.0-C	N	11.3	<1.42	<0.708	<0.708	<0.74	<0.708	<1.42	<0.708	1.57	0.805 J	<0.708	<1.97	<0.708	227	18.0	25.5
MISS-RM841.0-C-201207301337	7/30/2012	1:37:00 PM	MISS-RM841.0-C	N	10.3	<1.86	<0.93	<0.93	<2.82	<2.79	<1.86	<0.93	1.41	<1.86 J	<0.93	<2.79	<0.93	219	15.0	19.2
MISS-RM841.0-C-201208271243	8/27/2012	12:43:00 PM	MISS-RM841.0-C	N	9.94	<1.95	<0.976	<0.976	<1.11	1.11	<1.95	<0.976	2.25	<1.95 J	<0.976	1.64	<0.976	288	10.7 J	13.1
MISS-RM844.1-C-201207110244	7/11/2012	2:26:00 PM	MISS-RM844.1-C	N	12.9	<1.8	<0.902	<0.902	<1.25	<0.902	<1.8	<0.902	<0.902	<1.8 J	<0.902	<1.21	<0.902	182	18.7	20.6
MISS-RM844.1-C-201207301300	7/30/2012	1:00:00 PM	MISS-RM844.1-C	N	11.8	<2.01	<1.01	<1.01	<1.24	<1.01	<2.01	<1.01	1.3	<2.01 J	<1.01	<3.63	<1.01	169	16.4	15.6
MISS-RM844.1-C-201208271224	8/27/2012	12:24:00 PM	MISS-RM844.1-C	N	10.7	<1.91	<0.957	<0.957	1.24	<0.957	<1.91	<0.957	2.5	2.21	<0.957	1.14	<0.957	220	11.4 J	12.7
MISS-RM847.3-C-201207111400	7/11/2012	2:00:00 PM	MISS-RM847.3-C	N	10.9	<1.74	<0.872	<0.872	<1.04	<0.872	<1.74	<0.872	0.948	<1.74 J	<0.872	<1.69	<0.872	181	18.7	22.4
MISS-RM847.3-C-201207301213	7/30/2012	12:13:00 PM	MISS-RM847.3-C	N	11.9	<2	<1	<1	<2.91	<1.14	<2	<1	1.09	<2 J	<1	<2.22	<1	171	16.4	17.2
MISS-RM847.3-C-201208271151	8/27/2012	11:51:00 AM	MISS-RM847.3-C	N	10.7	<2.11	<1.05	<1.05	<1.12	<1.05	<2.11	<1.05	1.71	1.459 J	<1.05	<1.27	<1.05	216	11.6 J	10.3
PIGLK-N-201207120915	7/12/2012	9:15:00 AM	PIGLK-N	N	74.8	5.11	<0.983	<0.983	3.01	5.43	2.68	<0.983	84.7	11.1	<0.983	<2.61	<0.983	256		

Table 2
2012 Surface Water Results

Sample Name	Sample Date	Sample Time	Parent Location	Sample Type	PFBA (ng/L)	PFBS (ng/L)	PFDA (ng/L)	PFDoA (ng/L)	PFHpA (ng/L)	PFHxA (ng/L)	PFHxS (ng/L)	PFNA (ng/L)	PFOA (ng/L)	PFOS (ng/L)	PFOSA (ng/L)	PFPeA (ng/L)	PFUnA (ng/L)	TDS (mg/L)	TOC (mg/L)	TSS (mg/L)
WS-FD-20120711	7/11/2012	4:39:00 PM	MISS-RM835.2-1	FD	12.9	< 1.73	< 0.863	< 0.863	< 1.83	< 0.863	< 1.73	< 0.863	1.24	< 1.73 J	< 0.863	1.51	< 0.863	258	< 0.5	30.4
WS-FD-20120712	7/12/2012	2:16:00 PM	MISS-RM817.2-3	FD	14.5	< 3.09	< 1.54	< 1.54	< 1.54	< 1.54	< 3.09	< 1.54	2.25	< 3.09 J	< 1.54	< 1.55	< 1.54	239	< 0.5	31.2
WS-FD-20120730	7/30/2012	1:51:00 PM	MISS-RM835.2-4	FD	11.4	< 1.8	< 0.898	< 0.898	2.02	0.962	< 1.8	< 1.07	1.21	< 1.8 J	< 0.898	< 1.8	< 0.898	206	< 0.5	13.4
WS-FD-20120731	7/31/2012	11:58:00 AM	MISS-RM817.2-5	FD	27.6	< 2.18	< 1.09	< 1.09	< 3.26	< 3.26	< 2.18	< 1.37	6.8	3.27	< 1.09	< 3.26	< 1.09	248	< 0.5	26.5
WS-FD-20120827	8/27/2012	3:45:00 PM	MISS-RM831.0-C	FD	14.2	< 2.24	< 1.12	< 1.12	1.2	1.94	< 2.24	< 1.12	5.01	2.4	< 1.12	2.27	< 1.12	335	< 0.5	15.0
WS-FD-20120828	8/28/2012	1:44:00 PM	MISS-RM814.3-2	FD	79.8	24.4	< 0.913	< 0.913	3.74	7.21	4.77	1.12	19.7	6.09	< 0.913	9	< 0.913	318	< 0.5	25.7
WS-RB-20120714	7/14/2012	9:12:00 AM	--	RB	1.22	< 1.83	< 0.916	< 0.916	< 0.916	< 0.916	< 1.83	< 0.916	< 0.916	< 1.83 J	< 0.916	< 0.916	< 0.916	--	< 0.5	--

Notes:

All non-detect results are reported at the reporting limit.

-- = results not reported or not applicable

< = compound analyzed, but not detected above reporting limit

FB = field blank

FD = field duplicate

J = estimated value

LR = lab replicate

MS = matrix spike

MSD = matrix spike duplicate

mg/L = milligrams per liter

ng/L = nanogram per liter

N = environmental sample

PFBA = Perfluorobutanoate

PFBS = Perfluorobutanesulfonate

PFDA = Perfluorodecanoate

PFDoA = Perfluorododecanoate

PFHpA = Perfluoroheptanoate

PFHxA = Perfluorohexanoate

PFHxS = Perfluorohexanesulfonate

PFNA = Perfluorononanoate

PFOA = Perfluorooctanoate

PFOS = Perfluorooctanesulfonate

PFOSA = Perfluorooctane sulfonamide

PFPeA = Perfluoropentanoate

PFUnA = Perfluoroundecanoate

R = compound analyzed, but rejected

RB = rinse blank

TDS = total dissolved solids

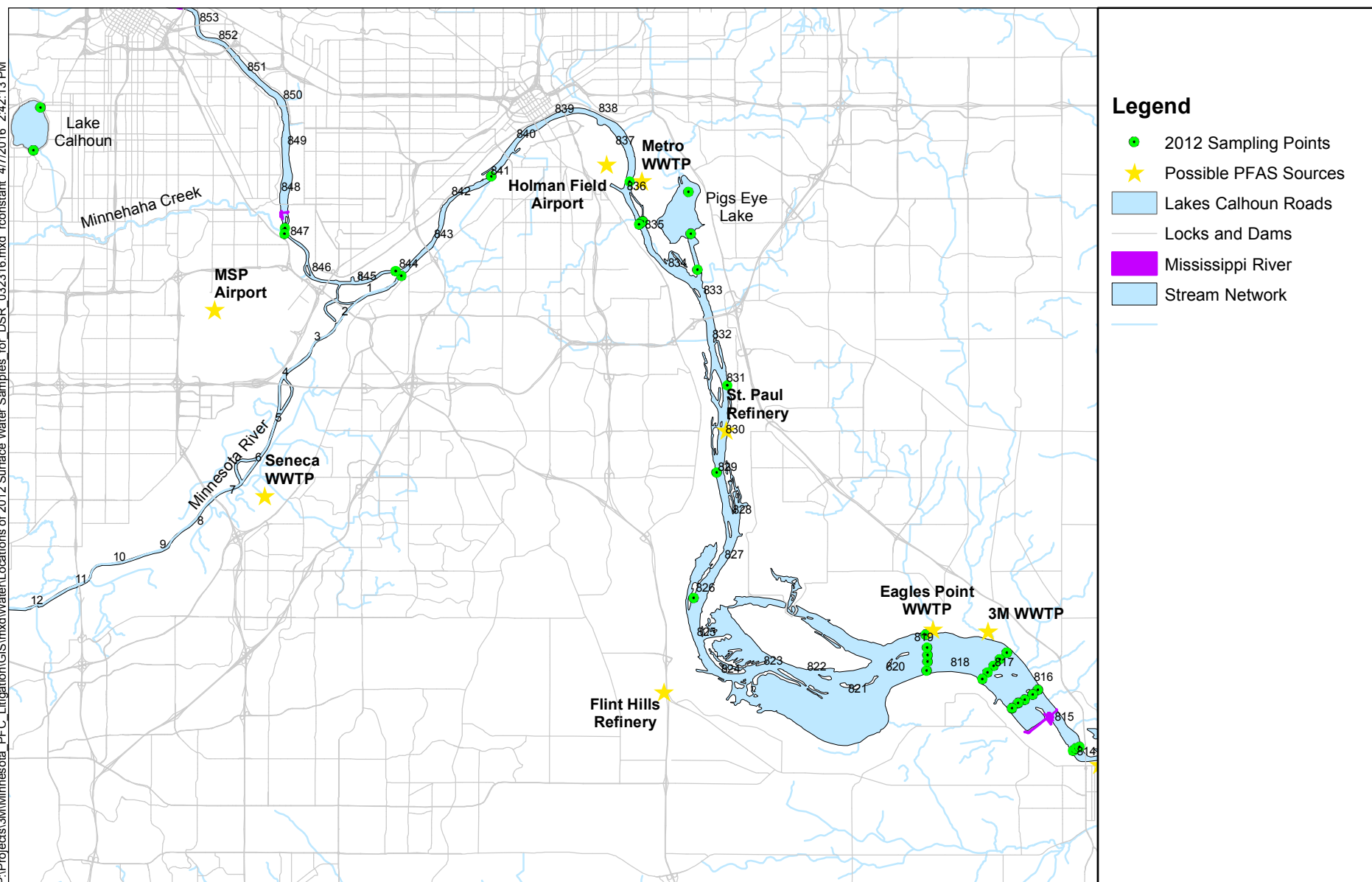
TOC = total organic carbon

TSS = total suspended solids

WS = water sample

FIGURES

P:\Projects\3M\Minnesota_PFC_Litigation\GIS\mxd\Water\Locations of 2012 Surface Water Samples for_DSR_032316.mxd constant 4/7/2016 2:42:13 PM



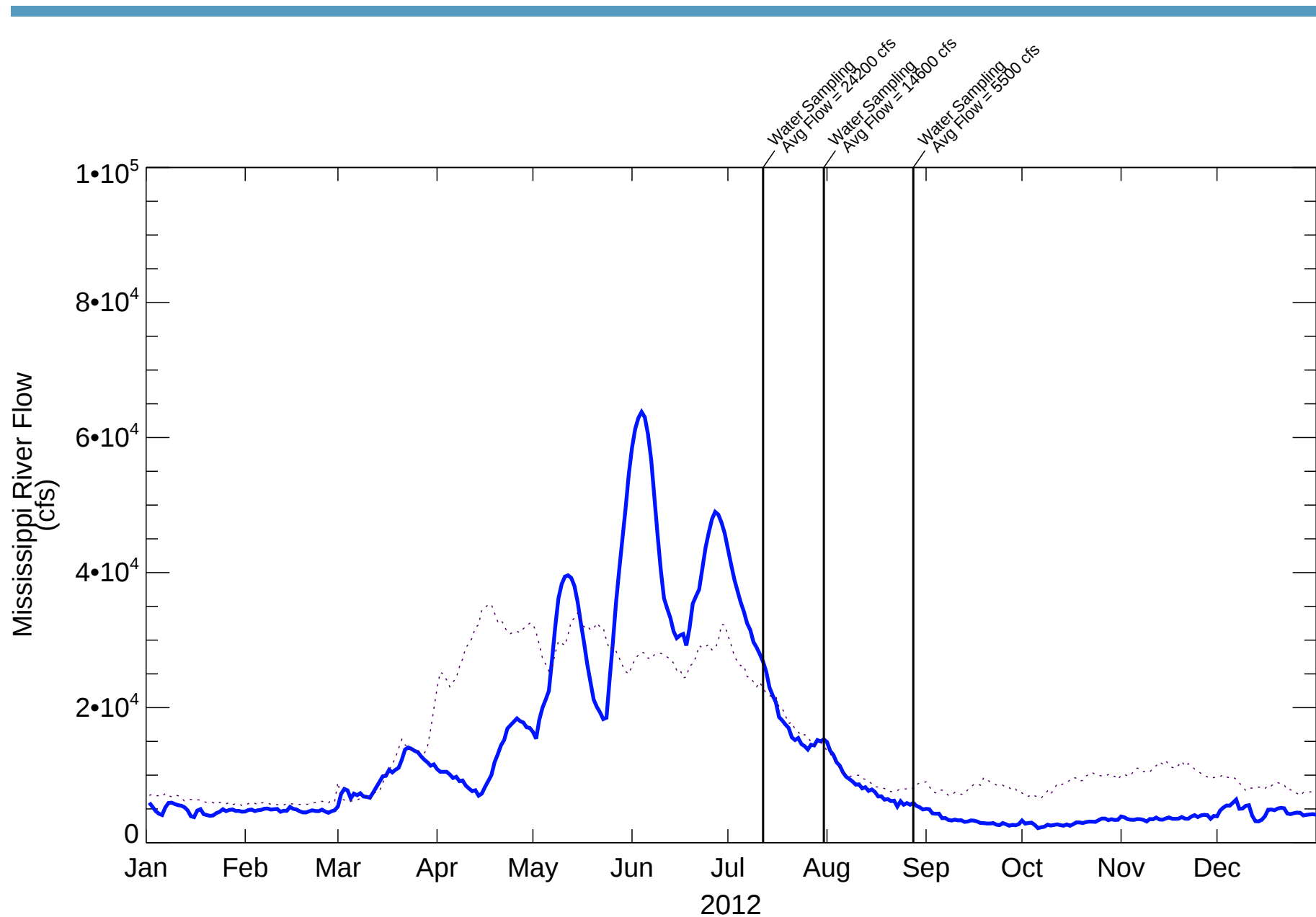
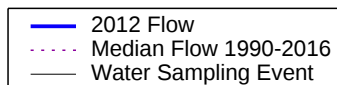


Figure 2

Mississippi River Hydrograph with Sampling Events
2012 Data Summary Report Mississippi River - Pool 2
Flow from USGS gage 5331000 - Mississippi River at St. Paul, MN.



APPENDIX A

DATA VALIDATION REPORTS

DATA VALIDATION REVIEW REPORT – USEPA STAGE 2A

Project: Mississippi River Pool 2 Surface Water Sampling: Round 1
Project Number: 110800-01.01
Date: January 17, 2013

This report summarizes the review of analytical results for 36 water samples, one field blank and two field duplicates collected July 12 – 14, 2012. The samples were collected by Anchor QEA, LLC, and submitted to Axys Analytical Services, Ltd. (Axys) in Sidney, British Columbia and Pace Analytical Services, Inc. (Pace) in Minneapolis, Minnesota. The samples were analyzed for the following parameters:

- Total dissolved solids (TDS) by Standard Method (SM) 2540C
- Total suspended solids (TSS) by SM 2540D
- Total organic carbon (TOC) by U.S. Environmental Protection Agency (USEPA) method 9060
- Perfluorinated organic compounds (PFCs) by Axys method MLA-060, Revision 10

Pace SDG number 10198875 and Axys sample data group (SDG) number L18218 and were reviewed in this report. Axys SDG L18218 consists of individual reports for batches WG40629, WG40630, and WG40640. Samples reviewed in this report are presented in Table 1.

Table 1
Samples Reviewed

Sample ID	Pace Lab ID	Axys Lab ID	Matrix	Analyses Requested
LKCALHOUN-N-201207140945	10198875001	L18218-1	Water	PFCs, TDS, TSS, TOC
LKCALHOUN-S-201207141017	10198875002	L18218-2	Water	PFCs, TDS, TSS, TOC
MIN-RM0.0-C-201207111444	10198875003	L18218-3	Water	PFCs, TDS, TSS, TOC
MINNE-RM847.0-C-201207111323	10198875004	L18218-4	Water	PFCs, TDS, TSS, TOC
MISS-RM814.3-1-201207130838	10198875005	L18218-5	Water	PFCs, TDS, TSS, TOC
MISS-RM814.3-2-201207130848	10198875006	L18218-6	Water	PFCs, TDS, TSS, TOC
MISS-RM814.3-3-201207130900	10198875007	L18218-7	Water	PFCs, TDS, TSS, TOC
MISS-RM815.8-1-201207131043	10198875008	L18218-8	Water	PFCs, TDS, TSS, TOC
MISS-RM815.8-3-201207131014	10198875009	L18218-9	Water	PFCs, TDS, TSS, TOC
MISS-RM815.8-4-201207130945	10198875010	L18218-10	Water	PFCs, TDS, TSS, TOC

Sample ID	Pace Lab ID	Axys Lab ID	Matrix	Analyses Requested
MISS-RM815.8-5-201207131000	10198875011	L18218-11	Water	PFCs, TDS, TSS, TOC
MISS-RM815.8.2-201207131028	10198875012	L18218-12	Water	PFCs, TDS, TSS, TOC
MISS-RM817.2-1-201207121340	10198875013	L18218-13	Water	PFCs, TDS, TSS, TOC
MISS-RM817.2-2-201207121400	10198875014	L18218-14	Water	PFCs, TDS, TSS, TOC
MISS-RM817.2-3-201207121416	10198875015	L18218-15	Water	PFCs, TDS, TSS, TOC
MISS-RM817.2-4-201207121428	10198875016	L18218-16	Water	PFCs, TDS, TSS, TOC
MISS-RM817.2-5-201207121453	10198875017	L18218-17	Water	PFCs, TDS, TSS, TOC
MISS-RM818.5-1-201207121304	10198875018	L18218-18	Water	PFCs, TDS, TSS, TOC
MISS-RM818.5-2-201207121311	10198875019	L18218-19	Water	PFCs, TDS, TSS, TOC
MISS-RM818.5-3-201207121225	10198875020	L18218-20	Water	PFCs, TDS, TSS, TOC
MISS-RM818.5-4-201207121242	10198875021	L18218-21	Water	PFCs, TDS, TSS, TOC
MISS-RM818.5-5-201207121258	10198875022	L18218-22	Water	PFCs, TDS, TSS, TOC
MISS-RM826.0-C-201207121120	10198875023	L18218-23	Water	PFCs, TDS, TSS, TOC
MISS-RM829.0-C-201207121058	10198875024	L18218-24	Water	PFCs, TDS, TSS, TOC
MISS-RM831.0-C-201207121030	10198875025	L18218-25	Water	PFCs, TDS, TSS, TOC
MISS-RM835.2-1-201207111639	10198875026	L18218-26	Water	PFCs, TDS, TSS, TOC
MISS-RM835.2-2-201207111628	10198875027	L18218-27	Water	PFCs, TDS, TSS, TOC
MISS-RM835.2-3-201207111628	10198875028	L18218-28	Water	PFCs, TDS, TSS, TOC
MISS-RM835.2-4-201207111616	10198875029	L18218-29	Water	PFCs, TDS, TSS, TOC
MISS-RM836.3-C-201207111553	10198875030	L18218-30	Water	PFCs, TDS, TSS, TOC
MISS-RM841.0-C-201207111530	10198875031	L18218-31	Water	PFCs, TDS, TSS, TOC
MISS-RM844.1-C-201207110244	10198875032	L18218-32	Water	PFCs, TDS, TSS, TOC
MISS-RM847.3-C-201207111400	10198875033	L18218-33	Water	PFCs, TDS, TSS, TOC
PIGLK-N-201207120915	10198875034	L18218-34	Water	PFCs, TDS, TSS, TOC
PIGLK-OF-201207121000	10198875035	L18218-35	Water	PFCs, TDS, TSS, TOC
PIGLK-S-201207120930	10198875036	L18218-36	Water	PFCs, TDS, TSS, TOC
WS-FD-20120711	10198875037	L18218-37	Water	PFCs, TDS, TSS, TOC
WS-FD-20120712	10198875038	L18218-38	Water	PFCs, TDS, TSS, TOC
WS-RB-20120714	10198875039	L18218-39	Water	PFCs, TDS, TSS, TOC
TOC BLANK-20120716	10198875040		Water	TOC

Data Validation and Qualifications

The following comments refer to the laboratory's performance in meeting the quality assurance/quality control (QA/QC) guidelines outlined in the analytical procedures and data quality objective sections of the Quality Assurance Project Plan (QAPP). Laboratory results were reviewed using the following guidelines:

- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA 2004)
- *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA 1999)

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- *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA 2008)

Laboratory and method QC criteria were also used as stated in USEPA 1986 (SW-846, Third Edition), *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, update 1, August 1993; update II, January 1995; update IIA, February 1994; update IIB, August 1995; update III, June 1997; update IIIA, May 1999; update IIIB, June 2008; update IVA and IVB, January 2008. Unless noted in this report, laboratory results for the samples listed above were within QC criteria.

Field Documentation

Field documentation was checked for completeness and accuracy. The chain-of-custody forms were signed by Pace and Axys at the time of sample receipt; the samples were received in good condition. Coolers received at Pace were within the recommended temperature range of $4.0 \pm 2.0^{\circ}\text{C}$, with the exception of one cooler that was received at ambient temperature; however, the samples were delivered on the day of collection so data are not expected to be affected. All coolers received at Axys were above 10°C . The laboratory indicated that this does not significantly impact data accuracy, so data are not expected to be affected.

Holding Times, Sample Containers and Sample Preservation

Samples were appropriately preserved and analyzed within holding times. The laboratory provided polyethylene bottles for TOC sample collection by mistake, instead of the amber glass bottles recommended by the method. However, EPA method 9060 allows for conventional polyethylene as long as the containers do not contribute any contaminating organics to the sample. A TOC bottle blank (TOC Blank) was analyzed; no TOC was detected in the blank.

Laboratory Method Blanks

Laboratory method blanks were analyzed at the required frequencies. All method blanks were free of target analytes.

Field Quality Control

Field Blanks

One field blank was collected in association with this sample set for PFCs.

Perfluorobutanoate (PFBA) was detected in the field blank at a level above the reporting limit (RL). PFBA results in most samples were greater than ten times (10x) the concentration in the field blank; however, the following four samples contained PFBA at a level less than 10x: MIN-RM0.0-C-201207111444, MISS-RM835.2-4-201207111616, MISS-RM841.0-C-201207111530 and MISS-RM847.3-C-201207111400. No data were qualified based on field blank results.

Field Duplicates

Two field duplicates were collected in association with this sample set. Detected results are summarized in Table 2.

Table 2
Field Duplicate Summary

Analyte	MISS-RM817.2-3-201207121416	WS-FD-20120712	RPD
Perfluorobutanoate (PFBA)	19.7 ng/L	14.5 ng/L	30%
Perfluorooctanoate (PFOA)	1.87 ng/L	2.25 ng/L	18%
TDS	255 mg/L	239 mg/L	6%
TSS	51.6 mg/L	31.2 mg/L	49%
TOC	16.1 mg/L	16.9 mg/L	5%

Analyte	MISS-RM835.2-1-201207111639	WS-FD-20120711	RPD
Perfluorobutanoate (PFBA)	13.4 ng/L	12.9 ng/L	4%
Perfluorooctanoate (PFOA)	1.05U ng/L	1.24 ng/L	200%
Perfluoropentanoate (PFPeA)	1.6U ng/L	1.51 ng/L	200%
TDS	261 mg/L	258 mg/L	1%
TSS	28.6 mg/L	30.4 mg/L	6%
TOC	17.1 mg/L	17.0 mg/L	1%

Results at or near the reporting limit (RL) may have exaggerated relative percent difference (RPD) values. The PFBA and TSS RPD values for sample MISS-RM817.2-3-201207121416 exceeded the QAPP's 20% advisory limit for field duplicates. No data were qualified based on field duplicate results.

Labeled Compound Recoveries

Labeled compound recoveries were below the laboratory control limit for perfluorohexanoate (PFHxA) and/or perfluorobutanoate (PFBA) in several samples. Because final target sample concentrations are corrected using the labeled compound recoveries, no data were qualified unless the labeled compound was not quantifiable (NQ). In these cases, sample results have not been reported. PFHxA and PFBA were also below the control limit in the MSD performed on sample MISS-RM814.3-3-201207130900, however the target analyte %R values were within control limits, so data are not expected to be affected. All other labeled compound recoveries were within the laboratory control limits.

See Table 3 for qualified data.

Laboratory Control Sample and Laboratory Control Sample Duplicate

Laboratory control samples (LCS) and laboratory control sample duplicates (LCSD) were analyzed at the required frequencies. All LCS/LCSD analyses yielded percent recovery (%R) and/or RPD values within laboratory control limits.

Matrix Spike and Matrix Spike Duplicate

Matrix spike (MS) and matrix spike duplicate (MSD) samples were analyzed at required frequencies. All MS/MSD analyses yielded %R and/or RPD values within laboratory control limits with the following exceptions:

- SDG 10198875 TOC: The MS and/or MSD %R values for two of the replicates of samples LKCALHOUN-N-201207140945 and MISS-RM835.2-2-201207111628 were outside of the laboratory control limit. However, since the %R values were in control for the reported mean TOC value, no data were qualified. The TOC mean %R value for the MSD in sample MISS-RM835.2-3-201207111628 was above the control limit. Only the parent sample was qualified as potentially biased high, since the MS/MSDs performed on other samples resulted in %R values that were within control limits.
 - SDG L18218/Batch WG40629 PFCs: The %R values for the MS/MSD performed on sample MISS-RM814.3-3-201207130900 were above the project control limit for perfluoroheptanoate (PFHpA). No data were qualified since this compound was not detected in the parent sample.
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- SDG L18218/Batch WG40630 PFCs: The %R values for perfluoropentanoate (PFPeA) and perfluorobutanesulfonate (PFBS) were below the project control limit, and PFBA was not quantifiable in the MS performed on sample MISS-RM818.5-5-201207121258. Associated results were qualified “J” or “UJ” to indicate a potentially low bias.

See Table 3 for qualified data.

Laboratory Replicates

Laboratory replicates were analyzed for PFCs, TDS and TSS; results were within laboratory control limits. Precision was assessed for TOC using the MSD RPD values.

Sample Analyses

PFBA was not quantifiable in four samples, due to no %R for the associated labeled compound. Sample results were rejected and are not usable for any purpose.

See Table 3 for qualified data.

Method Reporting Limits and Method Detection Limits

Most reporting limits were deemed acceptable as reported. Values for PFOS-1 were reported to the sample adjusted method detection limit (MDL). MDL values were determined using the laboratory's most recent MDL study and then adjusting for sample volume, final extract volume, and sample dilutions. Results detected above the MDL and below the method reporting limit (MRL), with a signal to noise ratio greater than 3, were qualified with a “J” to indicate that the results are estimated. Non-detected results were reported to the MDL and qualified with a “UJ” to indicate that the non-detected value is estimated. Results (detects and non-detects) for other compounds were reported to the sample adjusted MRL.

Overall Assessment

This evaluation determined that the laboratory followed the specified analytical methods and all requested sample analyses were completed. Accuracy was acceptable as demonstrated by the surrogate, LCS and MS/MSD %R values, with the exceptions noted above. Precision was

also acceptable as demonstrated by the laboratory duplicates and MS/MSD RPD values. Most data were deemed acceptable as reported; all other data are acceptable as qualified. Table 3 summarizes the qualifiers applied to samples reviewed in this report.

Data Qualifier Definitions

- U Indicates the compound or analyte was analyzed for but not detected at or above the specified limit.
- J Indicates an estimated value.
- UJ Indicates the compound or analyte was analyzed for but not detected and the specified limit reported is estimated
- R Indicates data is rejected and unusable
- DNR Do not report

Table 3
Data Qualification Summary

Sample ID	Parameter	Analyte	Reported Result	Qualified Result	Reason
MIN-RM0.0-C-201207111444	PFCs	Perfluorooctanesulfonate (PFOS)	1.87U ng/L	0.84UJ ng/L	Result reported to MDL
MISS-RM815.8.2-201207131028	PFCs	Perfluorooctanesulfonate (PFOS)	2.00U ng/L	0.90UJ ng/L	Result reported to MDL
MISS-RM815.8-1-201207131043	PFCs	Perfluorooctanesulfonate (PFOS)	1.98U ng/L	0.89UJ ng/L	Result reported to MDL
MISS-RM815.8-3-201207131014	PFCs	Perfluorooctanesulfonate (PFOS)	2.26U ng/L	1.061J ng/L	Result detected below MRL
MISS-RM815.8-4-201207130945	PFCs	Perfluorooctanesulfonate (PFOS)	2.14U ng/L	0.96UJ ng/L	Result reported to MDL
MISS-RM815.8-5-201207131000	PFCs	Perfluorooctanesulfonate (PFOS)	2.17U ng/L	1.537J ng/L	Result detected below MRL
MISS-RM817.2-1-201207121340	PFCs	Perfluorooctanesulfonate (PFOS)	1.97U ng/L	0.89UJ ng/L	Result reported to MDL
MISS-RM817.2-2-201207121400	PFCs	Perfluorobutanoate (PFBA)	19.1 ng/L	19.1J ng/L	No MS %R
		Perfluorooctanesulfonate (PFOS)	2.03U ng/L	1.653J ng/L	Result detected below MRL
MISS-RM817.2-3-	PFCs	Perfluorobutanoate	19.7 ng/L	19.7J	No MS %R

Sample ID	Parameter	Analyte	Reported Result	Qualified Result	Reason
201207121416		(PFBA)		ng/L	
		Perfluorooctanesulfonate (PFOS)	1.95U ng/L	0.88UJ ng/L	Result reported to MDL
MISS-RM817.2-4-201207121428	PFCs	Perfluorobutanoate (PFBA)	16.4 ng/L	16.4J ng/L	No MS %R
		Perfluorooctanesulfonate (PFOS)	1.88U ng/L	0.893J ng/L	Result detected below MRL
MISS-RM817.2-5-201207121453	PFCs	Perfluorobutanoate (PFBA)	23.4 ng/L	23.4J ng/L	No MS %R
MISS-RM818.5-1-201207121304	PFCs	Perfluorobutanoate (PFBA)	21.2 ng/L	21.2J ng/L	No MS %R
		Perfluorooctanesulfonate (PFOS)	1.96U ng/L	0.88UJ ng/L	Result reported to MDL
MISS-RM818.5-2-201207121311	PFCs	Perfluorobutanoate (PFBA)	NQ	R	Not quantifiable
		Perfluorooctanesulfonate (PFOS)	1.88U ng/L	0.84UJ ng/L	Result reported to MDL
MISS-RM818.5-3-201207121225	PFCs	Perfluorobutanoate (PFBA)	19 ng/L	19J ng/L	No MS %R
		Perfluorooctanesulfonate (PFOS)	2.12U ng/L	1.482J ng/L	Result detected below MRL
MISS-RM818.5-4-201207121242	PFCs	Perfluorobutanoate (PFBA)	NQ	R	Not quantifiable
		Perfluorooctanesulfonate (PFOS)	1.98U ng/L	0.89UJ ng/L	Result reported to MDL
MISS-RM818.5-5-201207121258	PFCs	Perfluorobutanesulfonate (PFBS)	2.01 ng/L	2.01J ng/L	Low MS %R
		Perfluorobutanoate (PFBA)	NQ	R	Not quantifiable
		Perfluoropentanoate (PFPeA)	2.39U ng/L	2.39UJ ng/L	Low MS %R
		Perfluorooctanesulfonate (PFOS)	1.99U ng/L	1.374J ng/J	Result detected below MRL
MISS-RM826.0-C-201207121120	PFCs	Perfluorobutanoate (PFBA)	14 ng/L	14J ng/L	No MS %R
		Perfluorooctanesulfonate (PFOS)	1.73U ng/L	0.78UJ ng/L	Result reported to MDL
MISS-RM829.0-C-201207121058	PFCs	Perfluorobutanoate (PFBA)	NQ	R	Not quantifiable
		Perfluorooctanesulfonate (PFOS)	1.88U ng/L	0.85UJ ng/L	Result reported to MDL
MISS-RM831.0-C-	PFCs	Perfluorobutanoate	18 ng/L	18J ng/L	No MS %R

Sample ID	Parameter	Analyte	Reported Result	Qualified Result	Reason
201207121030		(PFBA)			
		Perfluorooctanesulfonate (PFOS)	1.82U ng/L	0.993J ng/L	Result detected below MRL
MISS-RM835.2-1-201207111639	PFCs	Perfluorobutanoate (PFBA)	13.4 ng/L	13.4J ng/L	No MS %R
		Perfluorooctanesulfonate (PFOS)	2.09U ng/L	0.94UJ ng/L	Result reported to MDL
MISS-RM835.2-2-201207111628	PFCs	Perfluorooctanesulfonate (PFOS)	1.90U ng/L	0.85UJ ng/L	Result reported to MDL
MISS-RM835.2-3-201207111628	Conventionals	Total organic carbon	17.3 mg/L	17.3J mg/L	High MSD %R value
	PFCs	Perfluorooctanesulfonate (PFOS)	2.05U ng/L	0.92UJ ng/L	Result reported to MDL
MISS-RM835.2-4-201207111616	PFCs	Perfluorooctanesulfonate (PFOS)	1.84U ng/L	0.83UJ ng/L	Result reported to MDL
MISS-RM836.3-C-201207111553	PFCs	Perfluorooctanesulfonate (PFOS)	2.09U ng/L	0.94UJ ng/L	Result reported to MDL
MISS-RM841.0-C-201207111530	PFCs	Perfluorooctanesulfonate (PFOS)	1.42U ng/L	0.805J ng/L	Result detected below MRL
MISS-RM844.1-C-201207110244	PFCs	Perfluorooctanesulfonate (PFOS)	1.80U ng/L	0.81UJ ng/L	Result reported to MDL
MISS-RM847.3-C-201207111400	PFCs	Perfluorooctanesulfonate (PFOS)	1.74U ng/L	0.79UJ ng/L	Result reported to MDL
WS-FD-20120711	PFCs	Perfluorooctanesulfonate (PFOS)	1.73U ng/L	0.78UJ ng/L	Result reported to MDL
WS-FD-20120712	PFCs	Perfluorooctanesulfonate (PFOS)	3.09U ng/L	1.39UJ ng/L	Result reported to MDL
WS-RB-20120714	PFCs	Perfluorooctanesulfonate (PFOS)	1.83U ng/L	0.82UJ ng/L	Result reported to MDL

REFERENCES

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DATA VALIDATION REVIEW REPORT – USEPA STAGE 2A

Project: Mississippi River Pool 2 Surface Water Sampling: Round 2
Project Number: 110800-01.01
Date: January 17, 2013

This report summarizes the review of analytical results for 36 water samples, two field blanks and two field duplicates collected July 30 – August 1, 2012. The samples were collected by Anchor QEA, LLC, and submitted to Axys Analytical Services, Ltd. (Axys) in Sidney, British Columbia and Pace Analytical Services, Inc. (Pace) in Minneapolis, Minnesota. The samples were analyzed for the following parameters:

- Total dissolved solids (TDS) by Standard Method (SM) 2540C
- Total suspended solids (TSS) by SM 2540D
- Total organic carbon (TOC) by U.S. Environmental Protection Agency (USEPA) method 9060
- Perfluorinated organic compounds (PFCs) by Axys method MLA-060, Revision 10

Pace SDG number 10200857 and Axys sample data group (SDG) number L18315 and were reviewed in this report. Axys SDG L18315 consists of individual reports for batches WG40822, WG40823, WG40824. Samples reviewed in this report are presented in Table 1.

Table 1
Samples Reviewed

Sample ID	Pace Lab ID	Axys Lab ID	Matrix	Analyses Requested
LKCALHOUN-N-201208010841	10200857001	L18315-1	Water	PFCs, TDS, TSS, TOC
LKCALHOUN-S-201208010821	10200857002	L18315-2	Water	PFCs, TDS, TSS, TOC
MINNE-RM847.0-C-201207301237	10200857004	L18315-4	Water	PFCs, TDS, TSS, TOC
MIN-RM0.0-C-201207301321	10200857003	L18315-3	Water	PFCs, TDS, TSS, TOC
MISS-RM814.3-1-201207311537	10200857005	L18315-5	Water	PFCs, TDS, TSS, TOC
MISS-RM814.3-2-201207311544	10200857006	L18315-6	Water	PFCs, TDS, TSS, TOC
MISS-RM814.3-3-201207311720	10200857007	L18315-7	Water	PFCs, TDS, TSS, TOC
MISS-RM815.8.2-201207311430	10200857011	L18315-12	Water	PFCs, TDS, TSS, TOC

Sample ID	Pace Lab ID	Axys Lab ID	Matrix	Analyses Requested
MISS-RM815.8-1-201207311443	10200857008	L18315-8	Water	PFCs, TDS, TSS, TOC
MISS-RM815.8-3-201207311412	10200857009	L18315-9	Water	PFCs, TDS, TSS, TOC
MISS-RM815.8-4-201207311403	10200857010	L18315-10	Water	PFCs, TDS, TSS, TOC
MISS-RM815.8-5-201207311352	10200857040	L18315-11	Water	PFCs, TDS, TSS, TOC
MISS-RM817.2-1-201207311246	10200857012	L18315-13	Water	PFCs, TDS, TSS, TOC
MISS-RM817.2-2-201207311236	10200857013	L18315-14	Water	PFCs, TDS, TSS, TOC
MISS-RM817.2-3-201207311226	10200857014	L18315-15	Water	PFCs, TDS, TSS, TOC
MISS-RM817.2-4-201207311213	10200857015	L18315-16	Water	PFCs, TDS, TSS, TOC
MISS-RM817.2-5-201207311158	10200857016	L18315-17	Water	PFCs, TDS, TSS, TOC
MISS-RM818.5-1-201207311304	10200857017	L18315-18	Water	PFCs, TDS, TSS, TOC
MISS-RM818.5-2-201207311313	10200857018	L18315-19	Water	PFCs, TDS, TSS, TOC
MISS-RM818.5-3-201207311325	10200857019	L18315-20	Water	PFCs, TDS, TSS, TOC
MISS-RM818.5-4-201207311342	10200857020	L18315-21	Water	PFCs, TDS, TSS, TOC
MISS-RM818.5-5-201207311047	10200857021	L18315-22	Water	PFCs, TDS, TSS, TOC
MISS-RM826.0-C-201207311002	10200857022	L18315-23	Water	PFCs, TDS, TSS, TOC
MISS-RM829.0-C-201207310938	10200857023	L18315-24	Water	PFCs, TDS, TSS, TOC
MISS-RM831.0-C-201207301603	10200857024	L18315-25	Water	PFCs, TDS, TSS, TOC
MISS-RM835.2-1-201207301438	10200857025	L18315-26	Water	PFCs, TDS, TSS, TOC
MISS-RM835.2-2-201207301343	10200857026	L18315-27	Water	PFCs, TDS, TSS, TOC
MISS-RM835.2-3-201207301347	10200857027	L18315-28	Water	PFCs, TDS, TSS, TOC
MISS-RM835.2-4-201207301351	10200857028	L18315-29	Water	PFCs, TDS, TSS, TOC
MISS-RM836.3-C-201207301334	10200857029	L18315-30	Water	PFCs, TDS, TSS, TOC
MISS-RM841.0-C-201207301337	10200857030	L18315-31	Water	PFCs, TDS, TSS, TOC
MISS-RM844.1-C-201207301300	10200857031	L18315-32	Water	PFCs, TDS, TSS, TOC
MISS-RM847.3-C-201207301213	10200857032	L18315-33	Water	PFCs, TDS, TSS, TOC
PIGLK-N-201207310857	10200857033	L18315-34	Water	PFCs, TDS, TSS, TOC
PIGLK-OF-201207301518	10200857034	L18315-35	Water	PFCs, TDS, TSS, TOC
PIGLK-S-201207301457	10200857035	L18315-36	Water	PFCs, TDS, TSS, TOC
WS-FB-20120730	10200857036	L18315-37	Water	PFCs, TDS, TSS, TOC
WS-FB-20120731	10200857037	L18315-38	Water	PFCs, TDS, TSS, TOC
WS-FD-20120730	10200857038	L18315-39	Water	PFCs, TDS, TSS, TOC
WS-FD-20120731	10200857039	L18315-40	Water	PFCs, TDS, TSS, TOC

Data Validation and Qualifications

The following comments refer to the laboratory's performance in meeting the quality assurance/quality control (QA/QC) guidelines outlined in the analytical procedures and data quality objective sections of the Quality Assurance Project Plan (QAPP). Laboratory results were reviewed using the following guidelines:

- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA 2004)
- *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA 1999)
- *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA 2008)

Laboratory and method QC criteria were also used as stated in USEPA 1986 (SW-846, Third Edition), *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, update 1, August 1993; update II, January 1995; update IIA, February 1994; update IIB, August 1995; update III, June 1997; update IIIA, May 1999; update IIIB, June 2008; update IVA and IVB, January 2008. Unless noted in this report, laboratory results for the samples listed above were within QC criteria.

Field Documentation

Field documentation was checked for completeness and accuracy. The chain-of-custody forms were signed by Pace and Axys at the time of sample receipt; the samples were received in good condition. Coolers received at Pace were within the recommended temperature range of $4.0 \pm 2.0^{\circ}\text{C}$. All coolers received at Axys were above the recommended temperature range, but less than or equal to 10°C . The laboratory indicated that this does not significantly impact data accuracy.

Holding Times, Sample Containers and Sample Preservation

Samples were appropriately preserved and analyzed within holding times.

Laboratory Method Blanks

Laboratory method blanks were analyzed at the required frequencies. All method blanks were free of target analytes.

Field Quality Control

Field Blanks

Two field blanks were collected in association with this sample set for TOC and PFCs, and were both free of target analytes.

Field Duplicates

Two field duplicates were collected in association with this sample set. Detected results are summarized in Table 2.

Table 2
Field Duplicate Summary

Analyte	MISS-RM835.2-4-201207301351	WS-FD-20120730	RPD
Perfluorobutanoate (PFBA)	12.5 ng/L	11.4 ng/L	9%
Perfluoroheptanoate (PFHpA)	1.80U ng/L	2.02 ng/L	200%
Perfluorohexanoate (PFHxA)	1.06U ng/L	0.962 ng/L	200%
Perfluorooctanoate (PFOA)	2.06 ng/L	1.21 ng/L	52%
Total dissolved solids	214 mg/L	206 mg/L	4%
Total organic carbon	15.1 mg/L	14.9 mg/L	1%
Total suspended solids	13.2 mg/L	13.4 mg/L	2%

Analyte	MISS-RM817.2-5-201207311158	WS-FD-20120731	RPD
Perfluorobutanoate (PFBA)	24.8 ng/L	27.6 ng/L	11%
Perfluorohexanoate (PFHxA)	1.34 ng/L	3.26U ng/L	200%
Perfluorooctanesulfonate (PFOS)	3.49 ng/L	3.27 ng/L	7%
Perfluorooctanoate (PFOA)	6.13 ng/L	6.80 ng/L	10%
Perfluoropentanoate (PFPeA)	2.96 ng/L	3.26U ng/L	200%
Total dissolved solids	246 mg/L	248 mg/L	1%
Total organic carbon	13.7 mg/L	13.5 mg/L	1%
Total suspended solids	28.6 mg/L	26.5 mg/L	8%

Results at or near the reporting limit (RL) may have exaggerated relative percent difference (RPD) values. The PFOA RPD values for sample MISS-RM835.2-4-201207301351 exceeded the QAPP's 20% advisory limit for field duplicates. No data were qualified based on field duplicate results.

Labeled Compound Recoveries

Labeled compound recoveries were within the laboratory control limits.

Laboratory Control Sample

Laboratory control samples (LCS) or ongoing precision and recovery standard (OPR) were analyzed at the required frequencies. All LCS analyses yielded percent recovery (%R) values within laboratory control limits, with the exception of two PFC compounds in SDG L18315, batch WG40823. The percent recovery (%R) values for perfluorooctanesulfonate (PFOS) and perfluorohexanesulfonate (PFHxS) in the ongoing precision and recovery standard were

below the project control limit. Associated sample results have been qualified “J” or “UJ” to indicate a potentially low bias.

See Table 3 for qualified data.

Matrix Spike and Matrix Spike Duplicate

Matrix spike (MS) and matrix spike duplicate (MSD) samples were analyzed at required frequencies. All MS/MSD analyses yielded %R and/or RPD values within laboratory control limits with the following exceptions:

- SDG 10198875 TOC: The MSD %R values for one of the replicates and for the TOC mean of sample MISS-RM826.0-C-201207311002 were above the laboratory control limit. Only the parent sample was qualified as potentially biased high, since the MS/MSDs performed on other samples resulted in %R values that were within control limits.
- SDG L18315/Batch WG40822 PFCs: In the MS performed on sample MISS-RM814.3-1-201207311537, the %R value for perfluoroheptanoate (PFHpA) was above the project control limit. The data were not qualified because PFHpA was not detected in the sample. The MS %R value for perfluorobutanesulfonate (PFBS) was below the project control limit. The parent sample result was qualified “UJ” to indicate a potentially low bias.
- SDG L18315/Batch WG40823 PFCs: In the MS performed on sample MISS-RM815.8-3-201207311412, the %R values for perfluoropentanoate (PFPeA) and PFBS were below the project control limit. The parent sample results were qualified “UJ” to indicate a potentially low bias.
- SDG L18315/Batch WG40824 PFCs: In the MS performed on sample MISS-RM818.5-5-201207311047, the %R value for PFBS was below the project control limit. The parent sample result was qualified “UJ” to indicate a potentially low bias.

See Table 3 for qualified data.

Laboratory Replicates

Laboratory replicates were analyzed for PFCs, TDS and TSS; results were within laboratory control limits. Precision was assessed for TOC using the MSD RPD values.

Method Reporting Limits and Method Detection Limits

Most reporting limits were deemed acceptable as reported. Values for PFOS-1 were reported to the sample adjusted method detection limit (MDL). MDL values were determined using the laboratory's most recent MDL study and then adjusting for sample volume, final extract volume, and sample dilutions. Results detected above the MDL and below the method reporting limit (MRL), with a signal to noise ratio greater than 3, were qualified with a "J" to indicate that the results are estimated. Non-detected results were reported to the MDL and qualified with a "UJ" to indicate that the non-detected value is estimated. Results (detects and non-detects) for other compounds were reported to the sample adjusted MRL.

Overall Assessment

This evaluation determined that the laboratory followed the specified analytical methods and all requested sample analyses were completed. Accuracy was acceptable as demonstrated by the surrogate, LCS and MS/MSD %R values, with the exceptions noted above. Precision was also acceptable as demonstrated by the laboratory duplicates and MS/MSD RPD values. Most data were deemed acceptable as reported; all other data are acceptable as qualified. Table 3 summarizes the qualifiers applied to samples reviewed in this report.

Data Qualifier Definitions

- U Indicates the compound or analyte was analyzed for but not detected at or above the specified limit.
- J Indicates an estimated value.
- UJ Indicates the compound or analyte was analyzed for but not detected and the specified limit reported is estimated
- R Indicates data is rejected and unusable
- DNR Do not report

Table 3
Data Qualification Summary

Sample ID	Parameter	Analyte	Reported Result	Qualified Result	Reason
MIN-RM0.0-C-201207301321	PFCs	Perfluorooctanesulfonate (PFOS)	1.92U ng/L	1.733J ng/L	Result detected below MRL

Sample ID	Parameter	Analyte	Reported Result	Qualified Result	Reason
MISS-RM814.3-1-201207311537	PFCs	Perfluorobutanesulfonate (PFBS)	1.94U ng/L	1.94UJ ng/L	Low MS %R
MISS-RM815.8-1-201207311443	PFCs	Perfluorooctanesulfonate (PFOS)	1.99U ng/L	1.347J ng/L	Result detected below MRL
MISS-RM815.8-2-201207311430	PFCs	Perfluorooctanesulfonate (PFOS)	2.00U ng/L	1.821J ng/L	Result detected below MRL
MISS-RM815.8-3-201207311412	PFCs	Perfluoropentanoate (PFPeA)	2.70U ng/L	2.70UJ ng/L	Low MS %R
		Perfluorobutanesulfonate (PFBS)	2.15U ng/L	2.15UJ ng/L	
		Perfluorohexanesulfonate (PFHxS)	2.15U ng/L	2.15UJ ng/L	Low LCS %R
		Perfluorooctanesulfonate (PFOS)	2.15U ng/L	1.415J ng/L	Low LCS %R; Result detected below MRL
MISS-RM815.8-4-201207311403	PFCs	Perfluorooctanesulfonate (PFOS)	1.98U ng/L	0.89UJ ng/L	Result reported to MDL
MISS-RM815.8-5-201207311352	PFCs	Perfluorooctanesulfonate (PFOS)	2.03U ng/L	1.506J ng/L	Result detected below MRL
MISS-RM817.2-1-201207311246	PFCs	Perfluorooctanesulfonate (PFOS)	1.90U ng/L	1.646J ng/L	Result detected below MRL
MISS-RM817.2-2-201207311236	PFCs	Perfluorooctanesulfonate (PFOS)	1.98U ng/L	0.89UJ ng/L	Result reported to MDL
MISS-RM817.2-3-201207311226	PFCs	Perfluorohexanesulfonate (PFHxS)	1.97U ng/L	1.97UJ ng/L	Low LCS %R
		Perfluorooctanesulfonate (PFOS)	1.97U ng/L	1.503J ng/L	Low LCS %R; Result detected below MRL
MISS-RM817.2-4-201207311213	PFCs	Perfluorohexanesulfonate (PFHxS)	1.89U ng/L	1.89UJ ng/L	Low LCS %R
		Perfluorooctanesulfonate (PFOS)	1.89U ng/L	1.793J ng/L	Low LCS %R; Result detected below

Sample ID	Parameter	Analyte	Reported Result	Qualified Result	Reason
					MRL
MISS-RM817.2-5-201207311158	PFCs	Perfluorohexanesulfonate (PFHxS)	1.82U ng/L	1.82UJ ng/L	Low LCS %R
		Perfluorooctanesulfonate (PFOS)	3.49 ng/L	3.49J ng/L	
MISS-RM818.5-1-201207311304	PFCs	Perfluorohexanesulfonate (PFHxS)	1.94U ng/L	1.94UJ ng/L	Low LCS %R
		Perfluorooctanesulfonate (PFOS)	1.94U ng/L	1.431J ng/L	Low LCS %R; Result detected below MRL
MISS-RM818.5-2-201207311313	PFCs	Perfluorohexanesulfonate (PFHxS)	1.94U ng/L	1.94UJ ng/L	Low LCS %R
		Perfluorooctanesulfonate (PFOS)	1.94U ng/L	0.919J ng/L	Low LCS %R; Result detected below MRL
MISS-RM818.5-3-201207311325	PFCs	Perfluorohexanesulfonate (PFHxS)	2.05U ng/L	2.05UJ ng/L	Low LCS %R
		Perfluorooctanesulfonate (PFOS)	2.05U ng/L	1.096J ng/L	Low LCS %R; Result detected below MRL
MISS-RM818.5-4-201207311342	PFCs	Perfluorohexanesulfonate (PFHxS)	2.01U ng/L	2.01UJ ng/L	Low LCS %R
		Perfluorooctanesulfonate (PFOS)	2.01U ng/L	1.807J ng/L	Low LCS %R; Result detected below MRL
MISS-RM818.5-5-201207311047	PFCs	Perfluorobutanesulfonate (PFBS)	1.97U ng/L	1.97UJ ng/L	Low MS %R
MISS-RM826.0-C-201207311002	PFCs	Perfluorohexanesulfonate (PFHxS)	1.81U ng/L	1.81UJ ng/L	Low LCS %R
		Perfluorooctanesulfonate (PFOS)	1.81U ng/L	1.549J ng/L	Low LCS %R; Result detected below MRL
	Conventionals	Total organic carbon	14.7 mg/L	14.7J mg/L	High MS %R
MISS-RM829.0-C-201207310938	PFCs	Perfluorohexanesulfonate (PFHxS)	1.85U ng/L	1.85UJ ng/L	Low LCS %R
		Perfluorooctanesulfonate (PFOS)	1.85U ng/L	0.83UJ ng/L	Low LCS %R; Result

Sample ID	Parameter	Analyte	Reported Result	Qualified Result	Reason
					reported to MDL
MISS-RM831.0-C-201207301603	PFCs	Perfluorohexanesulfonate (PFHxS)	2.21U ng/L	2.21UJ ng/L	Low LCS %R
		Perfluorooctanesulfonate (PFOS)	2.21U ng/L	0.99UJ ng/L	Low LCS %R; Result reported to MDL
MISS-RM835.2-1-201207301438	PFCs	Perfluorohexanesulfonate (PFHxS)	2.1U ng/L	2.1UJ ng/L	Low LCS %R
		Perfluorooctanesulfonate (PFOS)	2.1U ng/L	0.95UJ ng/L	Low LCS %R; Result reported to MDL
MISS-RM835.2-2-201207301343	PFCs	Perfluorohexanesulfonate (PFHxS)	2.04U ng/L	2.04UJ ng/L	Low LCS %R
		Perfluorooctanesulfonate (PFOS)	2.04U ng/L	1.217J ng/L	Low LCS %R; Result detected below MRL
MISS-RM835.2-3-201207301347	PFCs	Perfluorooctanesulfonate (PFOS)	1.72U ng/L	0.77UJ ng/L	Result reported to MDL
MISS-RM835.2-4-201207301351	PFCs	Perfluorooctanesulfonate (PFOS)	1.88U ng/L	1.738J ng/L	Result detected below MRL
MISS-RM836.3-C-201207301334	PFCs	Perfluorooctanesulfonate (PFOS)	2.04U ng/L	0.92UJ ng/L	Result reported to MDL
MISS-RM841.0-C-201207301337	PFCs	Perfluorooctanesulfonate (PFOS)	1.86U ng/L	0.84UJ ng/L	Result reported to MDL
MISS-RM844.1-C-201207301300	PFCs	Perfluorooctanesulfonate (PFOS)	2.01U ng/L	0.91UJ ng/L	Result reported to MDL
MISS-RM847.3-C-201207301213	PFCs	Perfluorooctanesulfonate (PFOS)	2.00U ng/L	0.90UJ ng/L	Result reported to MDL
WS-FB-20120730	PFCs	Perfluorooctanesulfonate (PFOS)	1.98U ng/L	0.89UJ ng/L	Result reported to MDL
WS-FB-20120731	PFCs	Perfluorooctanesulfonate (PFOS)	2.12U ng/L	0.95UJ ng/L	Result reported to MDL
WS-FD-20120730	PFCs	Perfluorooctanesulfonate (PFOS)	1.8U ng/L	0.81UJ ng/L	Result reported

Sample ID	Parameter	Analyte	Reported Result	Qualified Result	Reason
					to MDL

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DATA VALIDATION REVIEW REPORT – USEPA STAGE 2A

Project: Mississippi River Pool 2 Surface Water Sampling: Round 3
Project Number: 110800-01.01
Date: January 17, 2013

This report summarizes the review of analytical results for 36 water samples, two field blanks and two field duplicates collected August 27 through 29, 2012. The samples were collected by Anchor QEA, LLC, and submitted to Axys Analytical Services, Ltd. (Axys) in Sidney, British Columbia and Pace Analytical Services, Inc. (Pace) in Minneapolis, Minnesota. The samples were analyzed for the following parameters:

- Total dissolved solids (TDS) by Standard Method (SM) 2540C
- Total suspended solids (TSS) by SM 2540D
- Total organic carbon (TOC) by U.S. Environmental Protection Agency (USEPA) method 9060
- Perfluorinated organic compounds (PFCs) by Axys method MLA-060, Revision 10

Pace SDG number 10203837 and Axys sample data group (SDG) number L18486 were reviewed in this report. Axys SDG L18486 consists of individual reports for batches WG41168 and WG41317. Samples reviewed in this report are presented in Table 1.

Table 1
Samples Reviewed

Sample ID	Pace Lab ID	Axys Lab ID	Matrix	Analyses Requested
LKCALHOUN-N-201208291121	10203837001	L18486-1	Water	PFCs, TDS, TSS, TOC
LKCALHOUN-S-201208291224	10203837002	L18486-2	Water	PFCs, TDS, TSS, TOC
MIN-RM0.0-C-201208271234	10203837003	L18486-3	Water	PFCs, TDS, TSS, TOC
MINNE-RM847.0-C-201208271213	10203837004	L18486-4	Water	PFCs, TDS, TSS, TOC
MISS-RM814.3-1-201208281339	10203837005	L18486-5	Water	PFCs, TDS, TSS, TOC
MISS-RM814.3-2-201208281344	10203837006	L18486-6	Water	PFCs, TDS, TSS, TOC
MISS-RM814.3-3-201208281352	10203837007	L18486-7	Water	PFCs, TDS, TSS, TOC
MISS-RM815.8-1-201208281200	10203837008	L18486-8	Water	PFCs, TDS, TSS, TOC

Sample ID	Pace Lab ID	Axys Lab ID	Matrix	Analyses Requested
MISS-RM815.8-3-201208281230	10203837009	L18486-9	Water	PFCs, TDS, TSS, TOC
MISS-RM815.8-4-201208281237	10203837010	L18486-10	Water	PFCs, TDS, TSS, TOC
MISS-RM815.8-5-201208281245	10203837011	L18486-11	Water	PFCs, TDS, TSS, TOC
MISS-RM815.8.2-201208281216	10203837012	L18486-12	Water	PFCs, TDS, TSS, TOC
MISS-RM817.2-1-201208281137	10203837013	L18486-13	Water	PFCs, TDS, TSS, TOC
MISS-RM817.2-2-201208281126	10203837014	L18486-14	Water	PFCs, TDS, TSS, TOC
MISS-RM817.2-3-201208281111	10203837015	L18486-15	Water	PFCs, TDS, TSS, TOC
MISS-RM817.2-4-201208281106	10203837016	L18486-16	Water	PFCs, TDS, TSS, TOC
MISS-RM817.2-5-201208281059	10203837017	L18486-17	Water	PFCs, TDS, TSS, TOC
MISS-RM818.5-1-201208280915	10203837018	L18486-18	Water	PFCs, TDS, TSS, TOC
MISS-RM818.5-2-201208280932	10203837019	L18486-19	Water	PFCs, TDS, TSS, TOC
MISS-RM818.5-3-201208280939	10203837020	L18486-20	Water	PFCs, TDS, TSS, TOC
MISS-RM818.5-4-201208280952	10203837021	L18486-21	Water	PFCs, TDS, TSS, TOC
MISS-RM818.5-5-201208281015	10203837022	L18486-22	Water	PFCs, TDS, TSS, TOC
MISS-RM826.0-C-201208280842	10203837023	L18486-23	Water	PFCs, TDS, TSS, TOC
MISS-RM829.0-C-201208280818	10203837024	L18486-24	Water	PFCs, TDS, TSS, TOC
MISS-RM831.0-C-201208271545	10203837025	L18486-25	Water	PFCs, TDS, TSS, TOC
MISS-RM835.2-1-201208271339	10203837026	L18486-26	Water	PFCs, TDS, TSS, TOC
MISS-RM835.2-2-201208271358	10203837027	L18486-27	Water	PFCs, TDS, TSS, TOC
MISS-RM835.2-3-201208271402	10203837028	L18486-28	Water	PFCs, TDS, TSS, TOC
MISS-RM835.2-4-201208271410	10203837029	L18486-29	Water	PFCs, TDS, TSS, TOC
MISS-RM836.3-C-201208271329	10203837030	L18486-30	Water	PFCs, TDS, TSS, TOC
MISS-RM841.0-C-201208271243	10203837031	L18486-31	Water	PFCs, TDS, TSS, TOC
MISS-RM844.1-C-201208271224	10203837032	L18486-32	Water	PFCs, TDS, TSS, TOC
MISS-RM847.3-C-201208271151	10203837033	L18486-33	Water	PFCs, TDS, TSS, TOC
PIGLK-N-201208271513	10203837034	L18486-34	Water	PFCs, TDS, TSS, TOC
PIGLK-OF-201208271425	10203837035	L18486-35	Water	PFCs, TDS, TSS, TOC
PIGLK-S-201208271453	10203837036	L18486-36	Water	PFCs, TDS, TSS, TOC
WS-FB-20120828	10203837037	L18486-37	Water	PFCs, TDS, TSS, TOC
WS-FB-20120829	10203837038	L18486-38	Water	PFCs, TDS, TSS, TOC
WS-FD-20120827	10203837039	L18486-39	Water	PFCs, TDS, TSS, TOC
WS-FD-20120828	10203837040	L18486-40	Water	PFCs, TDS, TSS, TOC

Data Validation and Qualifications

The following comments refer to the laboratory's performance in meeting the quality assurance/quality control (QA/QC) guidelines outlined in the analytical procedures and data quality objective sections of the Quality Assurance Project Plan (QAPP). Laboratory results were reviewed using the following guidelines:

- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA 2004)
- *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA 1999)
- *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA 2008)

Laboratory and method QC criteria were also used as stated in USEPA 1986 (SW-846, Third Edition), *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, update 1, August 1993; update II, January 1995; update IIA, February 1994; update IIB, August 1995; update III, June 1997; update IIIA, May 1999; update IIIB, June 2008; update IVA and IVB, January 2008. Unless noted in this report, laboratory results for the samples listed above were within QC criteria.

Field Documentation

Field documentation was checked for completeness and accuracy. The chain-of-custody forms were signed by Pace and Axys at the time of sample receipt; the samples were received in good condition. Four coolers received at Pace were above the recommended temperature range of $4.0 \pm 2.0^{\circ}\text{C}$, but below 10°C . One cooler was received at 10.2°C . Data is not expected to be affected since the samples were preserved at the time of collection. Two coolers received at Axys were above the recommended temperature range, but less than or equal to 10°C ; two other coolers were above 10°C . The laboratory indicated that this does not significantly impact data accuracy, so data were not qualified.

Holding Times, Sample Containers and Sample Preservation

Samples were appropriately preserved and analyzed within holding times.

Laboratory Method Blanks

Laboratory method blanks were analyzed at the required frequencies. All method blanks were free of target analytes.

Field Quality Control

Field Blanks

Two field blanks were collected in association with this sample set for TDS, TSS, TOC and PFCs, and were free of target analytes.

Field Duplicates

Two field duplicates were collected in association with this sample set. Detected results are summarized in Table 2.

Table 2
Field Duplicate Summary

Analyte	MISS-RM831.0-C-201208271545	WS-FD-20120827	RPD
Perfluorobutanoate (PFBA)	14.1 ng/L	14.2 ng/L	1%
Perfluoroheptanoate (PFHpA)	2.01 ng/L	1.20 ng/L	50%
Perfluorohexanoate (PFHxA)	2.30 ng/L	1.94 ng/L	17%
Perfluorooctanesulfonate (PFOS)	2.18U ng/L	2.40 ng/L	200%
Perfluorooctanoate (PFOA)	4.62 ng/L	5.01 ng/L	8%
Perfluoropentanoate (PFPeA)	1.56U ng/L	2.27 ng/L	200%
Total dissolved solids	327 mg/L	335 mg/L	2%
Total organic carbon	10.6 mg/L	10.1 mg/L	5%
Total suspended solids	14.8 mg/L	15.0 mg/L	1%

Analyte	MISS-RM814.3-2-201208281344	WS-FD-20120828	RPD
Perfluorobutanesulfonate (PFBS)	26.9 ng/L	24.4 ng/L	10%
Perfluorobutanoate (PFBA)	70.2 ng/L	79.8 ng/L	13%
Perfluoroheptanoate (PFHpA)	4.67 ng/L	3.74 ng/L	22%
Perfluorohexanesulfonate (PFHxS)	7.08 ng/L	4.77 ng/L	39%
Perfluorohexanoate (PFHxA)	10.0 ng/L	7.21 ng/L	32%
Perfluorononanoate (PFNA)	1.02U ng/L	1.12 ng/L	200%
Perfluorooctanesulfonate (PFOS)	8.30 ng/L	6.09 ng/L	31%
Perfluorooctanoate (PFOA)	20.4 ng/L	19.7 ng/L	3%
Perfluoropentanoate (PFPeA)	10.4 ng/L	9.00 ng/L	14%
Total dissolved solids	334 mg/L	318 mg/L	5%
Total suspended solids	26.0 mg/L	25.7 mg/L	1%
Total organic carbon	10.5 mg/L	10.2 mg/L	3%

Results at or near the reporting limit (RL) may have exaggerated relative percent difference (RPD) values. Results below detection were treated as a zero concentration when calculating RPD values. Three PFCs had RPD values that exceeded the QAPP's 20% advisory limit for field duplicates in sample MISS-RM831.0-C-201208271545. Five PFCs had RPD values that

exceeded the advisory limit in sample MISS-RM814.3-2-201208281344. No data were qualified based on field duplicate results.

Labeled Compound Recoveries

Labeled compound recoveries were within the laboratory control limits with one exception. The compound $^{13}\text{C}_2$ -Perfluorocaproic acid ($^{13}\text{C}_2$ -PFHxA) in sample PIGLK-N-201208271513 recovered below method control limits. Because final target sample concentrations are corrected using the labeled compound recoveries, no data were qualified.

Laboratory Control Sample

Laboratory control samples (LCS) or ongoing precision and recovery standard (OPR) were analyzed at the required frequencies. All LCS and OPR analyses yielded percent recovery (%R) values within laboratory control limits.

Matrix Spike and Matrix Spike Duplicate

Matrix spike (MS) and matrix spike duplicate (MSD) samples were analyzed at required frequencies. All MS/MSD analyses yielded %R and/or RPD values within laboratory control limits with the following exceptions:

- SDG 10203837 TOC: The MS and/or the MSD %R values for several of the replicates and for the TOC mean of samples MISS-RM818.5-4-201208280952 and MISS-RM826.0-C-201208280842 were above the laboratory control limit.

Associated detected results were qualified “J” to indicate a potentially high bias.

See Table 3 for qualified data.

Laboratory Replicates

Laboratory replicates were analyzed for PFCs, TDS and TSS; results were within laboratory control limits. Precision was assessed for TOC using the MSD RPD values.

Method Reporting Limits and Method Detection Limits

Most reporting limits were deemed acceptable as reported. Values for PFOS-1 were reported to the sample adjusted method detection limit (MDL). MDL values were determined using the laboratory’s most recent MDL study and then adjusting for sample volume, final extract volume, and sample dilutions. Results detected above the MDL and below the method reporting limit (MRL), with a signal to noise ratio greater than 3, were qualified with a “J” to

indicate that the results are estimated. Non-detected results were reported to the MDL and qualified with a “UJ” to indicate that the non-detected value is estimated. Results (detects and non-detects) for other compounds were reported to the sample adjusted MRL.

Overall Assessment

This evaluation determined that the laboratory followed the specified analytical methods and all requested sample analyses were completed. Accuracy was acceptable as demonstrated by the surrogate, LCS, OPR and MS/MSD %R values, with the exceptions noted above.

Precision was also acceptable as demonstrated by the laboratory duplicates and MS/MSD RPD values. Most data were deemed acceptable as reported; all other data are acceptable as qualified. Table 3 summarizes the qualifiers applied to samples reviewed in this report.

Data Qualifier Definitions

- U Indicates the compound or analyte was analyzed for but not detected at or above the specified limit.
- J Indicates an estimated value.
- UJ Indicates the compound or analyte was analyzed for but not detected and the specified limit reported is estimated
- R Indicates data is rejected and unusable
- DNR Do not report

Table 3
Data Qualification Summary

Sample ID	Parameter	Analyte	Reported Result	Qualified Result	Reason
MIN-RM0.0-C-201208271234	PFCs	Perfluorooctanesulfonate (PFOS)	2.01U ng/L	1.995J ng/L	Result detected below MRL
MISS-RM818.5-4-201208280952	PFCs	Perfluorooctanesulfonate (PFOS)	1.94U ng/L	1.446J ng/L	Result detected below MRL
	Conventionals	TOC	9.8 mg/L	9.8J mg/L	High MS and/or MSD %R
MISS-RM818.5-5-201208281015	PFCs	Perfluorooctanesulfonate (PFOS)	2.24U ng/L	2.088J ng/L	Result detected below MRL
	Conventionals	TOC	9.9 mg/L	9.9J mg/L	High MS and/or MSD %R
MISS-RM826.0-C-201208280842	PFCs	Perfluorooctanesulfonate (PFOS)	2.24U ng/L	1.091J ng/L	Result detected below MRL
	Conventionals	TOC	11.3 mg/L	11.3J mg/L	High MS and/or MSD %R

Sample ID	Parameter	Analyte	Reported Result	Qualified Result	Reason
MISS-RM829.0-C-201208280818	PFCs	Perfluorooctanesulfonate (PFOS)	1.99U ng/L	1.593J ng/L	Result detected below MRL
	Conventionals	TOC	9.4 mg/L	9.4J mg/L	High MS and/or MSD %R
MISS-RM831.0-C-201208271545	PFCs	Perfluorooctanesulfonate (PFOS)	2.18U ng/L	0.98UJ ng/L	Result reported to MDL
	Conventionals	TOC	10.6 mg/L	10.6J mg/L	High MS and/or MSD %R
MISS-RM835.2-1-201208271339	PFCs	Perfluorooctanesulfonate (PFOS)	2.17U ng/L	0.98UJ ng/L	Result reported to MDL
	Conventionals	TOC	10.8 mg/L	10.8J mg/L	High MS and/or MSD %R
MISS-RM835.2-2-201208271358	PFCs	Perfluorooctanesulfonate (PFOS)	2.11U ng/L	1.207J ng/L	Result detected below MRL
	Conventionals	TOC	11.1 mg/L	11.1J mg/L	High MS and/or MSD %R
MISS-RM835.2-3-201208271402	PFCs	Perfluorooctanesulfonate (PFOS)	1.97U ng/L	0.89UJ ng/L	Result reported to MDL
	Conventionals	TOC	10.1 mg/L	10.1J mg/L	High MS and/or MSD %R
MISS-RM835.2-4-201208271410	Conventionals	TOC	10.3 mg/L	10.3J mg/L	High MS and/or MSD %R
MISS-RM836.3-C-201208271329	PFCs	Perfluorooctanesulfonate (PFOS)	2.17U ng/L	1.833J ng/L	Result detected below MRL
	Conventionals	TOC	10.8 mg/L	10.8J mg/L	High MS and/or MSD %R
MISS-RM841.0-C-201208271243	PFCs	Perfluorooctanesulfonate (PFOS)	1.95U ng/L	0.88UJ ng/L	Result reported down to MDL
	Conventionals	TOC	10.7 mg/L	10.7J mg/L	High MS and/or MSD %R
MISS-RM844.1-C-201208271224	Conventionals	TOC	11.4 mg/L	11.4J mg/L	High MS and/or MSD %R
MISS-RM847.3-C-201208271151	PFCs	Perfluorooctanesulfonate (PFOS)	2.11U ng/L	1.459J ng/L	Result detected below MRL
	Conventionals	TOC	11.6 mg/L	11.6J mg/L	High MS and/or MSD %R
PIGLK-N-201208271513	Conventionals	TOC	12.2 mg/L	12.2J mg/L	High MS and/or MSD %R
PIGLK-OF-201208271425	Conventionals	TOC	10.8 mg/L	10.8J mg/L	High MS and/or MSD %R
PIGLK-S-201208271453	Conventionals	TOC	11.6 mg/L	11.6J mg/L	High MS and/or MSD %R
WS-FB-20120828	PFCs	Perfluorooctanesulfonate (PFOS)	2.24U ng/L	1.01UJ ng/L	Result reported down to MDL
WS-FB-20120829	PFCs	Perfluorooctanesulfonate (PFOS)	2.16U ng/L	0.97UJ ng/L	Result reported down to MDL
WS-FD-20120827	Conventionals	TOC	10.1 mg/L	10.1J mg/L	High MS and/or MSD %R

Sample ID	Parameter	Analyte	Reported Result	Qualified Result	Reason
WS-FD-20120828	Conventionals	TOC	10.2 mg/L	10.2J mg/L	High MS and/or MSD %R

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