

APPENDIX B
DATA VERIFICATION REPORTS

DATA VERIFICATION SUMMARY REPORT
for
TOC, TSS and TPH in
WATER AND SEDIMENT SAMPLES COLLECTED IN THE
HOUSTON SHIP CHANNEL SYSTEM
(Segments 2426, 2436, 2438, and 2421)
HOUSTON, TEXAS

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INTRODUCTION

The following data verification summary report covers analysis of environmental water samples, including forty-one (41) water samples and four (4) water field duplicate samples, collected from the Houston Ship Channel System in Houston Texas over the 4 month period between April 21, 2008 and July 29, 2008. The samples were analyzed for Total Suspended Solids (TSS), Dissolved Organic Carbon (DOC) and Total Petroleum Hydrocarbons (TPH) in the following laboratory Sample Delivery Groups (SDGs):

302847, 3029610, 303276, 303881, 304054, 304461, 305203, 305844, 304911, 305450, 306506 and 309057

In addition to the water samples, there were eighty-nine (89) sediment and/or soil samples and ten (10) field duplicate samples collected from the Houston Ship Channel System in Houston Texas over the 4 month period between April 28, 2008 and July 15, 2008. The samples were analyzed for Total Petroleum Hydrocarbons (TPH) in the following laboratory Sample Delivery Groups (SDGs):

3029610, 303276, 304911, 305450, 305204, 307842, 307931 and 309057

All samples were collected by the University of Houston and Parsons following the procedures described in the QAPP. All analyses were performed by Xenco Laboratories in Houston Texas following procedures outlined in the QAPP and EPA Method 160.2 for TSS (SM2450D), SM5310 for DOC, and Texas 1005 for TPH.

Note: In addition to the water samples analyzed for TSS, DOC and TPH, sediment samples were sent to Xenco, whom then forwarded the samples to PTS Laboratories in Houston, Texas for Particle Size Analysis (also known as Grain Size) and % Solids analysis. The Particle Size method used by PTS Laboratories is ASTM D422/D4464M

and % Solids method is ASTM D2216. Since there isn't QC data analyzed in association with the sediment analyses, this data verification report will focus on water sample analysis and the TPH sediment analysis only.

EVALUATION CRITERIA

The data submitted by the laboratory has been reviewed and verified following the guidelines outlined in the QAPP and National Functional Guidelines for Organic and Inorganic Data (EPA 1994). Information reviewed in the data packages includes sample results; blanks; case narrative and chain-of-custody forms. The analyses and findings presented in this report are based on the reviewed information, and meeting guidelines in the QAPP (with the exceptions noted below).

TOTAL SUSPENDED SOLIDS

General

The SDGs included in this report contained the samples listed in Table 1 and analyzed for TSS. The TSS analyses were performed using EPA Method 160.2. All samples for this SDG were collected and analyzed following the procedures and protocols outlined in the QAPP. All samples collected were prepared and analyzed within the holding times required by the method, with the exception of the following:

Table 1: Data Packages, Sample IDs and Collection Dates and Times

SDG	Sample ID	TSS Result mg/L	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
302847	11287-W-1	28.0	4/21/2008 16:00	5/1/2008 13:20	9.89	N
	13338-W-1-Dup	152	4/22/2008 16:30	5/1/2008 13:22	8.87	N
	13338-W-1	105	4/22/2008 15:00	5/1/2008 13:24	8.93	N
	11280-W-1	35.0	4/23/2008 14:02	5/1/2008 13:26	7.97	N
	11171-W-1	BRL	4/24/2008 13:30	5/1/2008 13:28	7.00	Y
	11274-W-1	40.0	4/29/2008 13:30	5/1/2008 13:30	2.00	Y
	11270-W-1	32.0	4/29/2008 18:00	5/1/2008 13:32	1.81	Y
302961	15936-W-1	22.0	4/30/2008 13:41	5/6/2008 15:38	6.08	Y
	15979-W-1	21.0	4/30/2008 19:00	5/6/2008 15:40	5.86	Y
303276	16622-W-1	24.00	5/2/2008 12:00	5/8/2008 14:14	6.09	Y
	11264-W-1	53.00	5/1/2008 12:55	5/8/2008 14:16	7.06	N
	11193-W-1	84.00	5/1/2008 18:00	5/8/2008 14:18	6.85	Y
303881	11387-W-1	18.00	5/12/2008 12:00	5/20/2008 14:06	8.09	N
	11139-W-1	11.00	5/13/2008 17:30	5/20/2008 14:08	6.86	Y
	TBD5-W-1	39.00	5/12/2008 18:10	5/20/2008 14:10	7.83	N
	11132-W-1	74.00	5/13/2008 12:00	5/20/2008 14:12	7.09	N
304054	TBD6-W-1	20.00	5/14/2008 12:00	5/20/2008 14:30	6.10	Y

SDG	Sample ID	TSS Result mg/L	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
	11368-W-1	24.00	5/14/2008 12:00	5/20/2008 14:32	6.11	Y
	TBD7-W-1	94.00	5/15/2008 12:00	5/20/2008 14:34	5.11	Y
	TBD2-W-1	37.00	5/15/2008 12:00	5/20/2008 14:54	5.12	Y
304461	11347-W-1	18.00	5/21/2008 12:00	5/27/2008 11:22	5.97	Y
305203	16618-W-1	92.00	5/30/2008 0:00	6/6/2008 10:36	7.44	N
	13342-W-1	89.00	5/30/2008 0:00	6/6/2008 10:40	7.44	N
	11292-W-1	22.00	6/2/2008 0:00	6/6/2008 10:42	4.45	Y
	11258-W-1	70.00	6/2/2008 0:00	6/6/2008 10:44	4.45	Y
	TRIP1-W-1	BRL	6/2/2008 0:00	6/6/2008 10:46	4.45	Y
	13344-W-1	76.00	6/3/2008 0:00	6/6/2008 10:48	3.45	Y
	13344-W-1-DUP	72.00	6/3/2008 0:00	6/6/2008 10:50	3.45	Y
305844	13340-W-1	102.00	6/3/2008 0:00	6/6/2008 10:52	3.45	Y
	13363A-W-1	48.00	6/11/2008 0:00	6/16/2008 15:12	5.63	Y
	13363A-W-1-Dup	52.00	6/11/2008 0:00	6/16/2008 15:15	5.64	Y
304911	16499-W-1	83.00	5/29/2008 11:35	6/3/2008 16:07	5.19	Y
	13355-W-1	95.00	5/29/2008 0:00	6/3/2008 16:08	5.67	Y
	14560-W-1	81.00	5/28/2008 0:00	6/3/2008 16:09	6.67	Y
	11252-W-1	106.00	5/28/2008 0:00	6/3/2008 16:10	6.67	Y
	16213-W-1	144.00	5/27/2008 12:05	6/3/2008 16:11	7.17	N
	13363-W-1	117.00	5/27/2008 18:15	6/3/2008 16:12	6.91	Y
305450	15301-W-1	50.00	6/4/2008 12:00	6/12/2008 19:05	8.30	N
	11262-W-1	47.00	6/4/2008 12:00	6/12/2008 19:06	8.30	N
	11262-W-1-DUP	40.00	6/4/2008 12:00	6/12/2008 19:07	8.30	N
	11261-W-1	71.00	6/4/2008 12:00	6/12/2008 19:08	8.30	N
	TRIP2-W-1	BRL	6/4/2008 12:00	6/12/2008 19:09	8.30	N
306506	16657-W-1	4.00	6/20/2008 12:00	6/25/2008 16:08	5.17	Y
309057	17149-W-1	90.00	7/29/2008 0:00	8/4/2008 0:00	6.00	Y
	TRIP3-W-1	4.00	7/29/2008 0:00	8/4/2008 0:00	6.00	Y

The holding time exceedances above are considered minor, although the TSS results were flagged “H” as estimated.

Accuracy

Accuracy was evaluated using the %R results for the blank spike samples (BS) and Blank Spike Duplicate (BSD) samples. The BS/BSD %Rs were within method acceptance criteria for all SDGs.

The BS/BSD results are as follows:

Blank Spike Duplicate Results for TSS Samples							
SDG	Lab Batch #	Sample ID	Date Performed	TSS (mg/L)		RPD	Accept
				D1	D2		
302847	721487	Blank Spike	5/1/2008	1010	1030	2.0	Y
302961	721896	Blank Spike	5/6/2008	1030	1030	0.0	Y
303276	722253	Blank Spike	5/8/2008	974	973	0.1	Y
303881	723248	Blank Spike	5/20/2008	1070	1070	0.0	Y
304054							
304054	723281	Blank Spike	5/20/2008	1070	1070	0.0	Y
304461	723863	Blank Spike	5/27/2008	948	959	1.2	Y
305203	724832	Blank Spike	6/6/2008	958	952.0	0.6	Y
305844	725532	Blank Spike	6/16/2008	993	1010.0	1.7	Y
304911	724372	Blank Spike	6/3/2008	950	969.0	2.0	Y
305450	725333	Blank Spike	6/12/2008	960.0	1010	5.1	Y
306506	726426	Blank Spike	6/25/2008	989.0	982	0.7	Y
309057	730061	Blank Spike	8/4/2008	927.0	966	4.1	Y

Precision

Precision was evaluated using the Relative Percent Difference (%RPD) obtained from the parent sample/field duplicate sample results, lab duplicate results and BS/BSD duplicate results. The following samples were collected and analyzed in duplicate for field duplicate QC purposes: 13338-W-1 (collected 4/22/08), 13344-W-1 (collected 6/3/08), 13363A-W-1 (collected 6/11/08), and 11262-W-1 (collection 6/4/08). All field duplicate results were within QAPP tolerance.

The following table lists the samples that were analyzed in duplicate for lab duplicate QC purposes:

Laboratory Duplicate Results for TSS Samples							
SDG	Lab Batch #	Sample ID	Date Performed	TSS (mg/L)		RPD	Accept
				D1	D2		
302847	721487	11270:302847-007D	5/1/2008	32	30	6.5	Y
302847	721487	Unk:302729-001D	5/1/2008	75	73	2.7	Y
302961	721896	Unk:303117-002D	5/6/2008	<5	<5	NC	
303276	722253	Unk:303117-002D	5/8/2008	390	430	9.8	Y
303881	723248	Unk:304054-003D	5/20/2008	94	88	6.6	Y
304054							
304054	723281	TBD2:304054-004D	5/20/2008	37	34	8.5	Y
304461	723863	Unk:304191-001D	5/27/2008	130	140.0	7.4	Y
305203	724832	16618:305203-001D	6/6/2008	92	92.0	0.0	Y
305844	725532	Unk:305891-001 D	6/16/2008	<5	<5	NC	
304911	724372	Unk:304889-001 D	6/3/2008	16.0	16	0.0	Y
305450	725333	Unk:305436-002 D	6/12/2008	<5	<5	NC	

Laboratory Duplicate Results for TSS Samples							
SDG	Lab Batch #	Sample ID	Date Performed	TSS (mg/L)		RPD	Accept
				D1	D2		
306506	726426	Unk:306511-001 D	6/25/2008	<4	<4	NC	
309057	730061	Unk:308430-001 D	8/4/2008	257.0	269	4.6	Y

All lab samples used for batch QC lab duplicate purposes, with the exception of 11270-W-1, TBD7-W-1, TBD2-W-1 and 16618-W-1, were other clients' samples. The QAPP does not require a sample collected under this project be used for batch QC purposes. All lab duplicate results were within QAPP tolerance.

Each TSS batch QC includes both BS and BSD samples. All BS/BSD % RPDs were within QAPP required tolerance.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the chain-of-custody procedures to those described in the QAPP;
- Evaluating holding times; and
- Examining method blanks for contamination of samples during analysis.

The samples in this SDG were collected and analyzed following the QAPP, COC and analytical procedures. All samples were prepared and analyzed with the holding times required for the analysis, with the exception of those noted in Table 1. An "H" flag was applied to the TSS results that were out of holding time.

There was at least one method blank analyzed with each batch associated with the TSS analyses in each SDG. The method blanks were below the RLs.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

No reported results for samples in this SDG have been rejected or invalidated (qualified "R"). The completeness for this SDG is 100% compared to the minimum acceptance limit of 90%.

DISSOLVED ORGANIC CARBON

General

The SDGs included in this report contained the samples listed in Table 1 and analyzed for DOC. The DOC analyses were performed using EPA Method SM5310. All samples for this SDG were collected and analyzed following the procedures and protocols outlined in the QAPP. All samples collected were prepared and analyzed within the holding times required by the method.

Table 1: Data Packages, Sample IDs and Collection Dates and Times

SDG	Sample ID	DOC Result mg/L	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
302847	11287-W-1	5.21	4/21/2008 16:00	5/6/2008 14:27	14.94	Y
	13338-W-1-Dup	1.95	4/22/2008 16:30	5/6/2008 14:45	13.93	Y
	13338-W-1	2.19	4/22/2008 15:00	5/6/2008 15:03	14.00	Y
	11280-W-1	3.16	4/23/2008 14:02	5/6/2008 15:22	13.06	Y
	11171-W-1	6.69	4/24/2008 13:30	5/6/2008 15:40	12.09	Y
	11274-W-1	4.48	4/29/2008 13:30	5/6/2008 15:58	7.10	Y
	11270-W-1	3.19	4/29/2008 18:00	5/6/2008 16:17	6.93	Y
302961	15936-W-1	2.73	4/30/2008 13:41	5/6/2008 16:35	6.12	Y
	15979-W-1	2.62	4/30/2008 19:00	5/6/2008 16:53	5.91	Y
303276	16622-W-1	9.31	5/2/2008 0:00	5/10/2008 0:54	8.04	Y
	11264-W-1	2.49	5/1/2008 12:55	5/10/2008 1:12	8.51	Y
	11193-W-1	2.54	5/1/2008 18:00	5/10/2008 1:30	8.31	Y
303881	11387-W-1	6.47	5/12/2008 0:00	5/20/2008 12:53	8.54	Y
	11139-W-1	6.03	5/13/2008 0:00	5/20/2008 13:11	7.55	Y
	TBD5-W-1	5.41	5/12/2008 0:00	5/20/2008 13:29	8.56	Y
	11132-W-1	8.75	5/13/2008 0:00	5/20/2008 13:48	7.57	Y
304054	TBD6-W-1	6.22	5/14/2008 0:00	5/20/2008 14:06	6.59	Y
	11368-W-1	7.96	5/14/2008 0:00	5/20/2008 14:24	6.60	Y
	TBD7-W-1	7.94	5/15/2008 0:00	5/20/2008 14:43	5.61	Y
	TBD2-W-1	7.90	5/15/2008 0:00	5/20/2008 15:01	5.63	Y
304461	11347-W-1	6.31	5/21/2008 0:00	6/2/2008 19:13	12.80	Y
305203	16618-W-1	2.96	5/30/2008 0:00	6/12/2008 19:11	13.80	Y
	13342-W-1	3.23	5/30/2008 0:00	6/12/2008 19:30	13.81	Y
	11292-W-1	7.56	6/2/2008 0:00	6/12/2008 19:48	10.82	Y
	11258-W-1	3.06	6/2/2008 0:00	6/12/2008 20:06	10.84	Y
	TRIP1-W-1	BRL	6/2/2008 0:00	6/12/2008 20:25	10.85	Y
	13344-W-1	3.42	6/3/2008 0:00	6/12/2008 21:20	9.89	Y
	13344-W-1-DUP	3.23	6/3/2008 0:00	6/12/2008 21:38	9.90	Y
	13340-W-1	3.38	6/3/2008 0:00	6/12/2008 21:56	9.91	Y
305844	13363A-W-1	1.88	6/11/2008 0:00	6/20/2008 15:39	9.65	Y
	13363A-W-1-Dup	1.87	6/11/2008 0:00	6/20/2008 16:32	9.69	Y

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SDG	Sample ID	DOC Result mg/L	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
304911	16499-W-1	2.27	5/29/2008 11:35	6/3/2008 0:07	4.52	Y
	13355-W-1	1.83	5/29/2008 0:00	6/3/2008 0:25	5.02	Y
	14560-W-1	1.59	5/28/2008 0:00	6/3/2008 0:43	6.03	Y
	11252-W-1	1.98	5/28/2008 0:00	6/3/2008 2:15	6.09	Y
	16213-W-1	1.41	5/27/2008 12:05	6/3/2008 2:33	6.60	Y
	13363-W-1	1.70	5/27/2008 18:15	6/3/2008 2:51	6.36	Y
305450	15301-W-1	3.01	6/4/2008 12:00	6/12/2008 22:15	8.43	Y
	11262-W-1	2.58	6/4/2008 12:00	6/12/2008 22:33	8.44	Y
	11262-W-1-DUP	2.54	6/4/2008 12:00	6/12/2008 22:51	8.45	Y
	11261-W-1	2.55	6/4/2008 12:00	6/12/2008 23:10	8.47	Y
	TRIP2-W-1	2.62	6/4/2008 12:00	6/12/2008 23:28	8.48	Y
306506	16657-W-1	7.75	6/20/2008 12:00	6/27/2008 13:32	7.06	Y
309057	17149-W-1	2.06	7/29/2008 0:00	8/5/2008 0:00	7.00	Y
	TRIP3-W-1	0.61	7/29/2008 0:00	8/5/2008 0:00	7.00	Y

Accuracy

Accuracy was evaluated using the %R results for the blank spike samples (BS) and the matrix spike (MS) and matrix spike duplicate (MSD) samples. The BS %Rs were within method acceptance criteria for all SDGs.

Blank spike results are as follows:

Blank Spike Recovery Results for DOC Samples					
SDG	Date Performed	DOC (mg/L)		DOC % Recovery	Accept
		Blank spike	Blank Spike Result		
302847	5/6/2008	10	9.74	97.4	Y
302961	5/6/2008	10	9.74	97.4	Y
303276	5/9/2008	10	9.83	98.3	Y
303881	5/20/2008	10	10.3	103.0	Y
304054	5/20/2008	10	10.3	103.0	Y
304461	6/2/2008	10	9.24	92.4	Y
304911					
305203	6/12/2008	10	9.69	96.9	Y
305450					
305844	6/20/2008	10	9.3	93.3	Y
306506	6/27/2008	10	9.49	94.9	Y
309057	8/5/2008	10	9.71	97.1	Y

The MS and MSD spike recovery results are as follows:

Matrix Spike Duplicate Results for DOC Samples							
SDG	Lab Batch #	Sample ID	Date Performed	DOC % Recovery		RPD	Accept
				D1	D2		
302847	721933	Unk:303083-007S	5/6/2008	95	90	5.4	Y
302961							
303276	722546	Unk:303145-001S	5/9/2008	89	103	14.6	Y
304461	724252	Unk:304521-002S	6/2/2008	98	91	7.4	Y
304911							
305203	725319	Unk:305005-004S	6/12/2008	91	92	1.1	Y
305450							
305844	726074	Unk:305844-001 S	6/20/2008	50			N
306506	726655	Unk:306634-001 S	6/27/2008	118	114	3.4	Y
309057	730109	Unk:308805-004 S	8/5/2008	95	96	1.0	Y

The MS and MSD %Rs were within method acceptance criteria for all SDGs, except for sample 13363A-W-1 was not calculated. The MSD for DOC was analyzed due to insufficient sample volume. No corrective action was required.

Precision

Precision was evaluated using the Relative Percent Difference (%RPD) obtained from the parent sample/field duplicate sample results, lab duplicate results, BS/BSD and MS/MSD duplicate results. The following samples were collected and analyzed in duplicate for field duplicate QC purposes: 13338-W-1 (collected 4/22/08), 13344-W-1 (collected 6/3/08), 13363A-W-1 (collected 6/11/08), and 11262-W-1 (collection 6/4/08). All field duplicate results were within QAPP tolerance.

The following table lists the samples that were analyzed in duplicate for lab duplicate QC purposes:

Laboratory Duplicate Results for DOC Samples							
SDG	Lab Batch #	Sample ID	Date Performed	DOC (mg/L)		RPD	Accept
				D1	D2		
302847	721933	Unk:303083-007D	5/6/2008	4.72	4.80	1.7	Y
302961	721933	Unk:303083-007D	5/6/2008	4.72	4.80	1.7	Y
303276	722546	Unk:303145-001D	5/9/2008	8.16	8.15	0.1	Y
303881	723208	TBD2-W-1:304054-004D	5/20/2008	7.9	8.17	3.4	Y
304054							
304461	724252	Unk:304521-002D	6/2/2008	4.98	4.69	6.0	Y
304911							
305203	725319	Unk:305005-004D	6/12/2008	4.75	4.67	1.7	Y
305450							
305844	726074	13363A-W-1:305844-001 D	6/20/2008	1.88	1.88	0.0	Y
306506	726655	Unk:306634-001 D	6/27/2008	33.3	32.7	1.8	Y
309057	730109	Unk:308805-004 D	8/5/2008	4.44	4.5	0.9	Y

All lab samples used for batch QC lab duplicate purposes, with the exception of TBD2-W-1 and 13363A-W-1, were other clients' samples. The QAPP does not require a sample collected under this project be used for batch QC purposes. All lab duplicate results were within QAPP tolerance.

Each DOC batch QC includes a BS, MS and MSD and all % RPDs were within QAPP required tolerance, unless previously noted.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the chain-of-custody procedures to those described in the QAPP;

- Evaluating holding times; and
- Examining method blanks for contamination of samples during analysis.

The samples in this SDG were collected and analyzed following the QAPP, COC and analytical procedures. All samples were prepared and analyzed with the holding times required for the analysis.

There was at least one method blank analyzed with each batch associated with the DOC analyses in each SDG. The method blanks were below the RLs.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

No reported results for samples in this SDG have been rejected or invalidated (qualified “R”). The completeness for this SDG is 100% compared to the minimum acceptance limit of 90%.

TOTAL PETROLEUM HYDROCARBONS (Waters)

General

The SDGs included in this report contained the samples listed in Table 1 and analyzed for TPH. The TPH analyses were performed using TPH by Texas 1005. All samples for this SDG were collected and analyzed following the procedures and protocols outlined in the QAPP. All samples collected were prepared and analyzed within the holding times required by the method. The hydrocarbon ranges analyzed for by this method include: C6-C12 (Gasoline), C12-C28 (Diesel) and C28-C35 (Oil) Range Hydrocarbons.

Table 1: Data Packages, Sample IDs and Collection Dates and Times

SDG	Sample ID	Total TPH Result mg/L	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
302847	11287-W-1	BRL	4/21/2008 16:00	5/1/2008 18:14	10.09	Y
	13338-W-1-Dup	BRL	4/22/2008 16:30	5/1/2008 18:43	9.09	Y
	13338-W-1	BRL	4/22/2008 15:00	5/1/2008 19:11	9.17	Y
	11280-W-1	BRL	4/23/2008 14:02	5/1/2008 19:40	8.23	Y
	11171-W-1	BRL	4/24/2008 13:30	5/1/2008 20:08	7.28	Y

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SDG	Sample ID	Total TPH Result mg/L	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
302961	11274-W-1	BRL	4/29/2008 13:30	5/2/2008 13:29	3.00	Y
	11270-W-1	BRL	4/29/2008 18:00	5/2/2008 13:58	2.83	Y
	15936-W-1	BRL	4/30/2008 13:41	5/5/2008 14:12	5.02	Y
	15979-W-1	BRL	4/30/2008 19:00	5/5/2008 17:41	4.95	Y
303276	16622-W-1	BRL	5/2/2008 0:00	5/12/2008 20:48	10.87	Y
	11264-W-1	BRL	5/1/2008 12:55	5/12/2008 21:16	11.35	Y
	11193-W-1	BRL	5/1/2008 18:00	5/12/2008 21:44	11.16	Y
303881	11387-W-1	BRL	5/12/2008 0:00	5/21/2008 22:15	9.93	Y
	11139-W-1	BRL	5/13/2008 0:00	5/21/2008 22:49	8.95	Y
	TBD5-W-1	BRL	5/12/2008 0:00	5/21/2008 23:22	9.97	Y
	11132-W-1	BRL	5/13/2008 0:00	5/21/2008 23:56	9.00	Y
304054	TBD6-W-1	BRL	5/14/2008 0:00	5/22/2008 19:07	8.80	Y
	11368-W-1	BRL	5/14/2008 0:00	5/22/2008 18:42	8.78	Y
	TBD7-W-1	BRL	5/15/2008 0:00	5/22/2008 20:17	7.85	Y
	TBD2-W-1	BRL	5/15/2008 0:00	5/22/2008 20:53	7.87	Y
304461	11347-W-1	BRL	5/21/2008 0:00	5/23/2008 22:35	2.94	Y
305203	16618-W-1	BRL	5/30/2008 0:00	6/12/2008 1:54	13.08	Y
	13342-W-1	BRL	5/30/2008 0:00	6/12/2008 2:28	13.10	Y
	11292-W-1	BRL	6/2/2008 0:00	6/12/2008 8:50	10.37	Y
	11258-W-1	BRL	6/2/2008 0:00	6/12/2008 9:24	10.39	Y
	TRIP1-W-1	BRL	6/2/2008 0:00	6/12/2008 9:58	10.42	Y
	13344-W-1	BRL	6/3/2008 0:00	6/12/2008 10:33	9.44	Y
	13344-W-1-DUP	BRL	6/3/2008 0:00	6/12/2008 9:58	9.42	Y
305844	13340-W-1	BRL	6/3/2008 0:00	6/11/2008 23:34	8.98	Y
	13363A-W-1	BRL	6/11/2008 0:00	6/19/2008 18:04	8.75	Y
304911	13363A-W-1-Dup	BRL	6/11/2008 0:00	6/19/2008 18:36	8.78	Y
	16499-W-1	BRL	5/29/2008 11:35	6/3/2008 22:06	5.44	Y
	13355-W-1	BRL	5/29/2008 0:00	6/3/2008 22:39	5.94	Y
	14560-W-1	BRL	5/28/2008 0:00	6/3/2008 23:12	6.97	Y
	11252-W-1	BRL	5/28/2008 0:00	6/3/2008 23:44	6.99	Y
	16213-W-1	BRL	5/27/2008 12:05	6/4/2008 0:17	7.51	Y
305450	13363-W-1	BRL	5/27/2008 18:15	6/4/2008 0:49	7.27	Y
	15301-W-1	BRL	6/4/2008 12:00	6/16/2008 20:56	12.37	Y
	11262-W-1	BRL	6/4/2008 12:00	6/16/2008 21:55	12.41	Y
	11262-W-1-DUP	BRL	6/4/2008 12:00	6/16/2008 22:25	12.43	Y
	11261-W-1	BRL	6/4/2008 12:00	6/16/2008 22:55	12.45	Y
306506	TRIP2-W-1	BRL	6/4/2008 12:00	6/16/2008 23:25	12.48	Y
	16657-W-1	BRL	6/20/2008 12:00	6/27/2008 12:57	7.04	Y
309057	17149-W-1	BRL	7/29/2008 0:00	8/5/2008 0:00	7.00	Y
	TRIP3-W-1	BRL	7/29/2008 0:00	8/5/2008 0:00	7.00	Y

Accuracy

Accuracy was evaluated using the %R results for the blank spike samples (BS) and blank spike duplicate (BSD) samples. The BS/BSD %Rs were within method acceptance criteria for all SDGs.

The blank spike results are as follows:

Blank Spike Duplicate Results for DRO (C12-C28) Samples							
SDG	Lab Batch #	Sample ID	Date Performed	TPH (mg/L)		RPD	Accept
				D1	D2		
302847	721593	Unk:508464-1-BKS	5/1/2008	87.6	91.7	4.6	Y
302961	721757	Unk:508539-1-BKS	5/5/2008	82.60	82.20	0.5	Y
303276	722412	Unk:508905-1-BKS	5/9/2008	101	115	13.0	Y
303881	723334	Unk:509416-1-BKS	5/21/2008	105	105	0.0	Y
304054	723444	Unk:509486-1-BKS	5/21/2008	90.8	87	4.3	Y
304461	723573	Unk:509550-1-BKS	5/23/2008	111	111	0.0	Y
305203	725095	Unk:510428-1-BKS	6/10/2008	95.8	97.6	1.9	Y
305844	725995	Unk:510929-1-BKS	6/19/2008	123	123.0	0.0	Y
304911	724346	Unk:510012-1-BKS	6/3/2008	120	119.0	0.8	Y
305450	725584	Unk:510701-1-BKS	6/16/2008	82.7	80.0	3.3	Y
306506	726594	Lab Blank:511268-1-BKS	6/27/2008	75	77.0	2.6	Y
309057	729845	Lab Blank:513347-1-BKS	8/4/2008	78	82.2	5.2	Y

Precision

Precision was evaluated using the Relative Percent Difference (%RPD) obtained from the parent sample/field duplicate sample results and the BS/BSD duplicate results. All BS/BSD % RPD were within acceptance criteria as indicated in the tables above.

The following samples were collected and analyzed in duplicate for field duplicate QC purposes: 13338-W-1 (collected 4/22/08), 13344-W-1 (collected 6/3/08), 13363A-W-1 (collected 6/11/08), and 11262-W-1 (collection 6/4/08). No precision data was available since all results were below the reporting limit for TPH.

Each TPH batch QC includes a BS and BSD and all % RPDs were within QAPP required tolerance, unless previously noted.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the chain-of-custody procedures to those described in the QAPP;

- Evaluating holding times; and
- Examining method blanks for contamination of samples during analysis.

The samples in this SDG were collected and analyzed following the QAPP, COC and analytical procedures. All samples were prepared and analyzed with the holding times required for the analysis.

There was at least one method blank analyzed with each batch associated with the TPH analyses in each SDG. The method blanks were below the RLs.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

No reported results for samples in this SDG have been rejected or invalidated (qualified “R”). The completeness for this SDG is 100% compared to the minimum acceptance limit of 90%.

TOTAL PETROLEUM HYDROCARBONS (Sediments/Soils)

General

The SDGs included in this report contained the samples listed in Table 1 and analyzed for TPH. The TPH analyses were performed using TPH by Texas 1005. All samples for this SDG were collected and analyzed following the procedures and protocols outlined in the QAPP. All samples collected were prepared and analyzed within the holding times required by the method, with the exception of sample 16622-SE-1. This sample was analyzed 5.16 days outside of the required 14 day HT. An “H” flag was applied to these sample results.

The hydrocarbon ranges analyzed for by this method include: C6-C12 (Gasoline), C12-C28 (Diesel) and C28-C35 (Oil) Range Hydrocarbons.

Table 1: Data Packages, Sample IDs and Collection Dates and Times

SDG	Sample ID	Total TPH Result mg/kg	Sample Collected Date/Time	Sample analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
302961	11270-SE-1	BRL	4/29/2008 14:10	5/9/2008 9:54	9.82	Y
	13338-SE-1	BRL	4/24/2008 9:30	5/9/2008 1:49	14.68	Y
	15979-SE-1	BRL	4/30/2008 15:30	5/9/2008 2:33	8.46	Y
	11274-SE-1	BRL	4/28/2008 14:00	5/9/2008 3:17	10.55	Y
	11287-SE-1	BRL	4/28/2008 14:58	5/9/2008 10:30	10.81	Y
	11280-SE-1	BRL	4/30/2008 14:40	5/9/2008 4:44	8.59	Y
303276	11193-SE-1	BRL	5/2/2008 11:08	5/13/2008 13:02	11.08	Y
	11193-SE-1-DUP	BRL	5/2/2008 11:51	5/13/2008 13:32	11.07	Y
	11264-SE-1	BRL	5/2/2008 13:10	5/13/2008 14:01	11.04	Y
	16622-SE-1	95.3	5/1/2008 13:00	5/20/2008 16:56	19.16	N
304911	16213-SE-1	BRL	5/27/2008 0:00	6/6/2008 2:49	10.12	Y
	11252-SE-1	BRL	5/27/2008 0:00	6/6/2008 3:22	10.14	Y
	14560-SE-1	BRL	5/27/2008 0:00	6/6/2008 3:55	10.16	Y
	13363-SE-1	BRL	5/27/2008 0:00	6/6/2008 4:29	10.19	Y
	16499-SE-1	BRL	5/27/2008 0:00	6/6/2008 5:02	10.21	Y
	16618-SE-1	BRL	5/29/2008 0:00	6/6/2008 5:35	8.23	Y
	13355-SE-1	BRL	5/29/2008 0:00	6/6/2008 6:08	8.26	Y
305450	13342-SE-1	BRL	6/4/2008 0:00	6/16/2008 23:53	13.00	Y
	11262-SE-1	BRL	6/4/2008 0:00	6/17/2008 0:27	13.02	Y
	11261-SE-1	BRL	6/4/2008 0:00	6/17/2008 1:35	13.07	Y
	11132-SE-1	BRL	6/4/2008 0:00	6/17/2008 2:08	13.09	Y
	TRIP1-SE-1	BRL	6/4/2008 0:00	6/17/2008 2:42	13.11	Y
	TRIP2-SE-1	BRL	6/4/2008 0:00	6/17/2008 3:15	13.14	Y
305204	15301-SE-1	BRL	6/2/2008 12:00	6/16/2008 19:52	14.33	Y
	11258-SE-1	BRL	6/2/2008 12:00	6/16/2008 20:28	14.35	Y
	11292-SE-1	BRL	6/2/2008 12:00	6/16/2008 21:03	14.38	Y
	15301-SE-1-DUP	BRL	6/2/2008 12:00	6/16/2008 21:37	14.40	Y
	11347-SE-1	52.7	6/2/2008 12:00	6/16/2008 22:11	14.42	Y
	11258-SE-1-DUP	BRL	6/2/2008 12:00	6/16/2008 22:44	14.45	Y
	13344-SE-1	BRL	6/2/2008 12:00	6/16/2008 23:19	14.47	Y
307842	E001-SE-1	0	7/8/2008 0:00	7/17/2008 0:00	9.00	Y
	E002-SE-1	0	7/8/2008 0:00	7/17/2008 0:00	9.00	Y
	E003-SE-1	0	7/8/2008 0:00	7/17/2008 0:00	9.00	Y
	E004-SE-1	0	7/8/2008 0:00	7/17/2008 0:00	9.00	Y
	E005-SE-1	0	7/8/2008 0:00	7/17/2008 0:00	9.00	Y
	E006-SE-1	0	7/9/2008 0:00	7/17/2008 0:00	8.00	Y
	E007-SE-1	0	7/9/2008 0:00	7/17/2008 0:00	8.00	Y
	E008-SE-1	0	7/9/2008 0:00	7/17/2008 0:00	8.00	Y
	E009-SE-1	0	7/9/2008 0:00	7/21/2008 0:00	12.00	Y

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SDG	Sample ID	Total TPH Result mg/kg	Sample Collected Date/Time	Sample analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
	E010-SE-1	0	7/9/2008 0:00	7/21/2008 0:00	12.00	Y
	E011-SE-1	0	7/9/2008 0:00	7/21/2008 0:00	12.00	Y
	E011-SE-1-DUP	0	7/9/2008 0:00	7/21/2008 0:00	12.00	Y
	T001-SE-1	0	7/10/2008 0:00	7/22/2008 0:00	12.00	Y
	T002-SE-1	0	7/10/2008 0:00	7/22/2008 0:00	12.00	Y
	T005-SE-1	0	7/10/2008 0:00	7/22/2008 0:00	12.00	Y
	T006-SE-1	0	7/10/2008 0:00	7/22/2008 0:00	12.00	Y
	T001-SE-1-DUP	0	7/10/2008 0:00	7/22/2008 0:00	12.00	Y
	T007-SE-1	0	7/10/2008 0:00	7/22/2008 0:00	12.00	Y
	T008-SE-1	0	7/10/2008 0:00	7/22/2008 0:00	12.00	Y
	W001-SE-1	0	7/11/2008 0:00	7/17/2008 0:00	6.00	Y
	W002-SE-1	0	7/11/2008 0:00	7/18/2008 0:00	7.00	Y
	W002-SE-1-DUP	0	7/11/2008 0:00	7/18/2008 0:00	7.00	Y
	W003-SE-1	0	7/11/2008 0:00	7/18/2008 0:00	7.00	Y
	W004-SE-1	0	7/11/2008 0:00	7/18/2008 0:00	7.00	Y
	W005-SE-1	0	7/11/2008 0:00	7/18/2008 0:00	7.00	Y
	W006-SE-1	0	7/11/2008 0:00	7/18/2008 0:00	7.00	Y
	W007-SE-1	0	7/11/2008 0:00	7/18/2008 0:00	7.00	Y
	W007-SE-1-A	92.5	7/11/2008 0:00	7/21/2008 0:00	10.00	Y
	W007-SE-1-B	58.5	7/11/2008 0:00	7/21/2008 0:00	10.00	Y
	W007-SE-1-C	0	7/11/2008 0:00	7/21/2008 0:00	10.00	Y
	W007-SE-1-D	0	7/11/2008 0:00	7/21/2008 0:00	10.00	Y
	W007-SE-1-E	0	7/11/2008 0:00	7/21/2008 0:00	10.00	Y
	T003-SE-1	0	7/11/2008 0:00	7/22/2008 0:00	11.00	Y
	T004-SE-1	0	7/11/2008 0:00	7/22/2008 0:00	11.00	Y
	W008-SE-1	0	7/12/2008 0:00	7/21/2008 0:00	9.00	Y
	ERS-SE-1	0	7/12/2008 0:00	7/21/2008 0:00	9.00	Y
	C001-SE-1	0	7/12/2008 0:00	7/21/2008 0:00	9.00	Y
	C002-SE-1	0	7/12/2008 0:00	7/22/2008 0:00	10.00	Y
	C003-SE-1	0	7/12/2008 0:00	7/22/2008 0:00	10.00	Y
	C005-SE-1	0	7/12/2008 0:00	7/22/2008 0:00	10.00	Y
	C004-SE-1	0	7/12/2008 0:00	7/22/2008 0:00	10.00	Y
	C004-SE-1-A	0	7/12/2008 0:00	7/22/2008 0:00	10.00	Y
	C004-SE-1-B	0	7/12/2008 0:00	7/22/2008 0:00	10.00	Y
	C004-SE-1-C	0	7/12/2008 0:00	7/22/2008 0:00	10.00	Y
	C004-SE-1-D	0	7/12/2008 0:00	7/22/2008 0:00	10.00	Y
	C004-SE-1-E	0	7/12/2008 0:00	7/22/2008 0:00	10.00	Y
	T009-SE-1-DUP	0	7/13/2008 0:00	7/17/2008 0:00	4.00	Y
	T010-SE-1	0	7/13/2008 0:00	7/17/2008 0:00	4.00	Y
	T011-SE-1	0	7/13/2008 0:00	7/17/2008 0:00	4.00	Y
	T012-SE-1	0	7/13/2008 0:00	7/17/2008 0:00	4.00	Y
	E012-SE-1	0	7/13/2008 0:00	7/21/2008 0:00	8.00	Y
	E013-SE-1	0	7/13/2008 0:00	7/21/2008 0:00	8.00	Y

SDG	Sample ID	Total TPH Result mg/kg	Sample Collected Date/Time	Sample analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
	E013-SE-1-A	0	7/13/2008 0:00	7/21/2008 0:00	8.00	Y
	E013-SE-1-A-DUP	0	7/13/2008 0:00	7/21/2008 0:00	8.00	Y
	E013-SE-1-B	0	7/13/2008 0:00	7/21/2008 0:00	8.00	Y
	E013-SE-1-B-DUP	0	7/13/2008 0:00	7/21/2008 0:00	8.00	Y
	E013-SE-1-C	0	7/13/2008 0:00	7/21/2008 0:00	8.00	Y
	E013-SE-1-D	0	7/13/2008 0:00	7/21/2008 0:00	8.00	Y
	C006-SE-1	0	7/13/2008 0:00	7/22/2008 0:00	9.00	Y
	T009-SE-1	0	7/13/2008 0:00	7/22/2008 0:00	9.00	Y
	E013-SE-1-E	0	7/13/2008 0:00	7/22/2008 0:00	9.00	Y
	E014-SE-1	0	7/13/2008 0:00	7/22/2008 0:00	9.00	Y
	E015-SE-1	0	7/13/2008 0:00	7/22/2008 0:00	9.00	Y
307931	T014-SE-1	0	7/15/2008 0:00	7/18/2008 0:00	3.00	Y
	T016-SE-1	0	7/15/2008 0:00	7/18/2008 0:00	3.00	Y
	T014-SE-1-DUP	0	7/15/2008 0:00	7/21/2008 0:00	6.00	Y
	TRIP1-SE-1	0	7/14/2008 0:00	7/21/2008 0:00	7.00	Y
	T015-SE-1	0	7/15/2008 0:00	7/21/2008 0:00	6.00	Y
	T013-SE-1	0	7/15/2008 0:00	7/21/2008 0:00	6.00	Y
309057	TRIP2-SE-1	BRL	7/29/2008 0:00	8/2/2008 0:00	4.00	Y

Accuracy

Accuracy was evaluated using the %R results for the blank spike samples (BS) and MS/MSD recovery results. The BS/MS/MSD %Rs were within method acceptance criteria for all SDGs.

The MS/MSD % recovery results are as follows:

Matrix Spike Duplicate Results for GRO (C6-C12) Samples						
SDG	Lab Batch #	Date Performed	TPH (%)		RPD	Accept
			D1	D2		
302961	722418	5/9/2008	87.00	98.00	11.9	Y
303276	722492	5/13/2008	128	128	0.0	Y
304911	724670	6/5/2008	104	107	2.8	Y
305450	725578	6/16/2008	123	117	5.0	Y
305204						
307931	728490	7/18/2008	79	79	0.0	Y
307842	728360	7/18/2008	72	73.0	1.4	Y
	728554	7/21/2008	101	103.0	2.0	Y
	728610	7/21/2008	91	84.0	8.0	Y
	728662	7/22/2008	83	82.0	1.2	Y
309057	729845	8/2/2008	324	354.0	1.2	Y

Matrix Spike Duplicate Results for DRO (C12-C28) Samples						
SDG	Lab Batch #	Date Performed	TPH (%)		RPD	Accept
			D1	D2		
302961	722418	5/9/2008	80	93	15.0	Y
303276	722492	5/13/2008	118	114	3.4	Y
304911	724670	6/5/2008	117	116	0.9	Y
305450	725578	6/16/2008	125	124	0.8	Y
305204						
307931	728490	7/18/2008	83	85	2.4	Y
307842	728360	7/18/2008	79	79	0.0	Y
	728554	7/21/2008				
	728610	7/21/2008	80	72	10.5	Y
	728662	7/22/2008	89	89	0.0	Y
309057	729845	8/2/2008	0	0	0.0	Y

All MS/MSD recoveries were within acceptance criteria except for Unk:308343-001-S which had a high concentration of C12-C28 in the parent sample. No corrective actions were required since the sample spiked was not from this project.

Precision

Precision was evaluated using the Relative Percent Difference (%RPD) obtained from the parent sample/field duplicate sample results and the MS/MSD duplicate results. All field duplicate results and MS/MSD % RPD were within acceptance criteria as indicated in the tables above.

The following table lists the field duplicate samples. Note that precision could not be evaluated since all samples were non detected (ND) for TPH.

Field Duplicate Results for TPH Samples							
SDG	Lab Batch #	Sample ID	Sample Date	Total TPH (mg/kg)		RPD	Accept
				D1	D2		
303276	722792	11193-SE-1	4/22/2008	ND	ND	NC	Y
305204	725578	15301-SE-1	6/2/2008	ND	ND	NC	Y
307931	728490	T014-SE-1	7/15/2008	ND	ND	NC	Y
307842	728360	T009-SE-1	7/13/2008	ND	ND	NC	Y
	728360	W002-SE-1	7/11/2008	ND	ND	NC	Y
	728610	E011-SE-1	7/9/2008	ND	ND	NC	Y
	7286140	E013-SE-1-A	7/13/2008	ND	ND	NC	Y
	728610	E013-SE-1-B	7/13/2008	ND	ND	NC	Y
	728662	T001-SE-1	7/10/2008	ND	ND	NC	Y

Each TPH batch QC includes a BS/MS/MSD and all % RPDs were within QAPP required tolerance, unless previously noted.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the chain-of-custody procedures to those described in the QAPP;
- Evaluating holding times; and
- Examining method blanks for contamination of samples during analysis.

The samples in this SDG were collected and analyzed following the QAPP, COC and analytical procedures. All samples were prepared and analyzed with the holding times required for the analysis.

There was at least one method blank analyzed with each batch associated with the TPH analyses in each SDG. The method blanks were below the RLs.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

No reported results for samples in this SDG have been rejected or invalidated. The completeness for this SDG is 100% compared to the minimum acceptance limit of 90%.

Flag Key:
H = Holding time exceedance
I = Ion ration failure
F = Field dup exceedance
L = Lab dup exceedance
S = Blank spike or lab control spike exceedance
Q = Limit of Quantitation (LOQ) exceedance
R = Surrogate/Internal Standard exceedance
J = Estimated by lab
U = Non-detected above MDL
B = Blank Contamination

DATA VERIFICATION SUMMARY REPORT

for

PCBs and POCs in

WATER SAMPLES COLLECTED IN THE

HOUSTON SHIP CHANNEL SYSTEM

(Segments 2426, 2436, 2438, and 2421)

HOUSTON, TEXAS

Data Verifier: Sandra de las Fuentes (Parsons - Austin, TX)

INTRODUCTION

The following data verification summary report covers analysis of environmental water samples, including forty-two (42) glass fiber filters and four (4) filter field duplicates and forty-three (43) XAD-2 resin columns and four (4) XAD-2 field duplicates, collected from the Houston Ship Channel System in Houston Texas over the five month period between April 21, 2008 and September 23, 2008. The samples were analyzed for Polychlorinated Biphenyls (PCBs) as congeners following laboratory Sample Delivery Groups (SDGs):

A844238, A845831, A852960, A855832, A858269, A863358, A861230, A877854 and A884606

Also analyzed were thirty-six (36) glass fiber filters and four (4) filter field duplicates, collected from the Houston Ship Channel System in Houston Texas over the three month period between April 22, 2008 and July 29, 2008. The samples were analyzed for Particulate Organic Carbons (POC) following laboratory Sample Delivery Groups (SDGs):

A884606 and A892224

All samples were collected by the University of Houston and Parsons following the procedures described in the QAPP. All analyses were performed by Maxxam Analytical Inc. in Burlington, Canada following procedures outlined in the QAPP and Method 1668A for PCB congeners and EPA Method 440.0 for POCs.

EVALUATION CRITERIA

The data submitted by the laboratory has been reviewed and verified following the guidelines outlined in the QAPP and National Functional Guidelines for Organic and Inorganic Data (EPA 1994). Information reviewed in the data packages include sample results; the laboratory quality control results; instrument calibrations; blanks; case narrative and chain-of-custody forms. The verification protocol addressed the following parameters: method blanks, laboratory control spike recoveries, recoveries of labeled compounds (internal standards), continuing calibration verifications, laboratory and field duplicate sample percent reproducibility (%RPD), percent recovery (%R), and Level of Quantification (LOQ) standard results. The analyses and findings presented in this report are based on the reviewed information, and meeting guidelines in the QAPP (with the exceptions noted below).

POLYCHLORINATED BIPHENYLS

General

The SDGs included in this report contained the samples listed in Table 1 and analyzed for PCBs. The PCBs analyses were performed using USEPA Method 1668A (lab method: BRL SOP-00408). All samples for this SDG were collected and analyzed following the procedures and protocols outlined in the QAPP. All samples collected were prepared and analyzed within the holding times required by the method. Several water samples required dilution due to high PCBs and/or matrix interference.

Table 1: Data Packages, Sample IDs and Collection Dates and Times

Sample ID	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *	SDG
11287-D-1 Trap	4/21/2008 0:00	5/16/2008 0:00	25.00	Y	A844238
11287-SU-1 Filter	4/21/2008 0:00	5/16/2008 0:00	25.00	Y	
13338-D-1 Trap	4/22/2008 0:00	5/16/2008 0:00	24.00	Y	
13338-SU-1 Filter	4/22/2008 0:00	5/16/2008 0:00	24.00	Y	
13338-D-1-Dup Trap	4/22/2008 0:00	5/16/2008 0:00	24.00	Y	
11280-D-1 Trap	4/23/2008 0:00	5/16/2008 0:00	23.00	Y	
11280-SU-1 Filter	4/23/2008 0:00	5/16/2008 0:00	23.00	Y	
11171-D-1 Trap	4/24/2008 0:00	5/16/2008 0:00	22.00	Y	
11171-SU-1 Filter	4/24/2008 0:00	5/16/2008 0:00	22.00	Y	
11270-D-1 Trap	4/29/2008 0:00	5/16/2008 0:00	17.00	Y	
11270-SU-1 Filter	4/29/2008 0:00	5/16/2008 0:00	17.00	Y	
11274-D-1 Trap	4/29/2008 0:00	5/16/2008 0:00	17.00	Y	
15936-D-1 Trap	4/30/2008 0:00	5/16/2008 0:00	16.00	Y	

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Sample ID	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *	SDG
15979-D-1 Trap	4/30/2008 0:00	5/16/2008 0:00	16.00	Y	
15979-SU-1 Filter	4/30/2008 0:00	5/16/2008 0:00	16.00	Y	
13338-SU-1-Dup Filter	4/22/2008 0:00	5/16/2008 0:00	24.00	Y	
11274-SU-1 Filter	4/29/2008 0:00	5/16/2008 0:00	17.00	Y	
15936-SU-1 Filter	4/30/2008 0:00	5/16/2008 0:00	16.00	Y	
11264-D-1-TRAP	5/1/2008 0:00	5/27/2008 0:00	26.00	Y	A845831
11264-SU-1-FILTER	5/1/2008 0:00	5/27/2008 0:00	26.00	Y	
11193-D-1-TRAP	5/1/2008 0:00	5/27/2008 0:00	26.00	Y	
11193-SU-1-FILTER	5/1/2008 0:00	5/27/2008 0:00	26.00	Y	
16622-D-1-TRAP	5/2/2008 0:00	5/27/2008 0:00	25.00	Y	
16622-SU-1-FILTER	5/2/2008 0:00	5/27/2008 0:00	25.00	Y	A852960
11387-SU-1-FILTER	5/12/2008 0:00	6/16/2008 0:00	35.00	Y	
TBD5-SU-1-FILTER	5/12/2008 0:00	6/16/2008 0:00	35.00	Y	
11387-D-1-TRAP	5/12/2008 0:00	6/17/2008 0:00	36.00	Y	
TBD5-D-1-TRAP	5/12/2008 0:00	6/17/2008 0:00	36.00	Y	
11132-SU-1-FILTER	5/13/2008 0:00	6/16/2008 0:00	34.00	Y	
11132-D-1-TRAP	5/13/2008 0:00	6/17/2008 0:00	35.00	Y	
11368-SU-1-FILTER	5/14/2008 0:00	6/16/2008 0:00	33.00	Y	
11368-D-1-TRAP	5/14/2008 0:00	6/17/2008 0:00	34.00	Y	
TBD6-SU-1-FILTER	5/14/2008 0:00	6/16/2008 0:00	33.00	Y	
TBD6-D-1-TRAP	5/14/2008 0:00	6/17/2008 0:00	34.00	Y	
TBD2-SU-1-FILTER	5/15/2008 0:00	6/16/2008 0:00	32.00	Y	
TBD2-D-1-TRAP	5/15/2008 0:00	6/17/2008 0:00	33.00	Y	
TBD7-SU-1-FILTER	5/15/2008 0:00	6/16/2008 0:00	32.00	Y	
TBD7-D-1-TRAP	5/15/2008 0:00	6/17/2008 0:00	33.00	Y	
11347-SU-1-FILTER	5/21/2008 0:00	6/16/2008 0:00	26.00	Y	A858269
11347-D-1-TRAP	5/21/2008 0:00	6/17/2008 0:00	27.00	Y	
11132-D-1-REC-TRAP	5/13/2008 0:00	6/17/2008 0:00	35.00	Y	
11139-D-1-TRAP	5/13/2008 0:00	6/17/2008 0:00	35.00	Y	
16618-SU-1-FILTER	5/30/2008 0:00	6/25/2008 0:00	26.00	Y	
16618-D-1-TRAP	5/30/2008 0:00	7/2/2008 0:00	33.00	Y	
13342-SU-1-FILTER	5/30/2008 0:00	6/25/2008 0:00	26.00	Y	
13342-D-1-TRAP	5/30/2008 0:00	7/2/2008 0:00	33.00	Y	
11292-SU-1-FILTER	6/2/2008 0:00	6/25/2008 0:00	23.00	Y	
11292-D-1-TRAP	6/2/2008 0:00	7/2/2008 0:00	30.00	Y	
11258-SU-1-FILTER	6/2/2008 0:00	6/25/2008 0:00	23.00	Y	
11258-D-1-TRAP	6/2/2008 0:00	7/2/2008 0:00	30.00	Y	
TRIP1-SU-1-FILTER	6/2/2008 0:00	6/25/2008 0:00	23.00	Y	
TRIP1-D-1-TRAP	6/2/2008 0:00	7/2/2008 0:00	30.00	Y	
13344-SU-1-FILTER	6/3/2008 0:00	6/25/2008 0:00	22.00	Y	
13344-D-1-TRAP	6/3/2008 0:00	7/2/2008 0:00	29.00	Y	
13344-SU-1-DUP-FILTER	6/3/2008 0:00	6/25/2008 0:00	22.00	Y	
13344-D-1-DUP-TRAP	6/3/2008 0:00	7/2/2008 0:00	29.00	Y	

Sample ID	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *	SDG
13340-SU-1-FILTER	6/3/2008 0:00	6/25/2008 0:00	22.00	Y	
13340-D-1-TRAP	6/3/2008 0:00	7/2/2008 0:00	29.00	Y	
13363-SU-1-FILTER	5/27/2008 0:00	6/28/2008 0:00	32.00	Y	A855832
13363-D-1-TRAP	5/27/2008 0:00	6/27/2008 0:00	31.00	Y	
16213-SU-1-FILTER	5/27/2008 0:00	6/28/2008 0:00	32.00	Y	
16213-D-1-TRAP	5/27/2008 0:00	6/27/2008 0:00	31.00	Y	
11252-SU-1-FILTER	5/28/2008 0:00	6/28/2008 0:00	31.00	Y	
11252-D-1-TRAP	5/28/2008 0:00	6/27/2008 0:00	30.00	Y	
14560-SU-1-FILTER	5/28/2008 0:00	6/28/2008 0:00	31.00	Y	
14560-D-1-TRAP	5/28/2008 0:00	6/27/2008 0:00	30.00	Y	
13355-SU-1-FILTER	5/29/2008 0:00	6/28/2008 0:00	30.00	Y	
13355-D-1-TRAP	5/29/2008 0:00	6/27/2008 0:00	29.00	Y	
16499-SU-1-FILTER	5/29/2008 0:00	6/28/2008 0:00	30.00	Y	
16499-D-1-TRAP	5/29/2008 0:00	6/27/2008 0:00	29.00	Y	
11139-SU-1-FILTER	5/13/2008 0:00	6/28/2008 0:00	46.00	Y	
13363A-D-1	6/11/2008 0:00	7/22/2008 0:00	41.00	Y	
13363A-D-1-DUP	6/11/2008 0:00	7/22/2008 0:00	41.00	Y	
13363A-SU-1	6/11/2008 0:00	7/15/2008 0:00	34.00	Y	
13363A-SU-1-DUP	6/11/2008 0:00	7/15/2008 0:00	34.00	Y	
ERB1-D-1	6/11/2008 0:00	7/22/2008 0:00	41.00	Y	
ERB1-SU-1	6/11/2008 0:00	7/15/2008 0:00	34.00	Y	
ERB2-D-1	6/11/2008 0:00	7/22/2008 0:00	41.00	Y	
ERB2-SU-1	6/11/2008 0:00	7/15/2008 0:00	34.00	Y	
11261-D-1	6/4/2008 0:00	7/22/2008 0:00	48.00	Y	A861230
11262-D-1	6/4/2008 0:00	7/22/2008 0:00	48.00	Y	
11262-D-1-DUP	6/4/2008 0:00	7/22/2008 0:00	48.00	Y	
15301-D-1	6/4/2008 0:00	7/22/2008 0:00	48.00	Y	
TRIP2-SU-1	6/4/2008 0:00	7/15/2008 0:00	41.00	Y	
11261-SU-1	6/4/2008 0:00	7/15/2008 0:00	41.00	Y	
11262-SU-1	6/4/2008 0:00	7/15/2008 0:00	41.00	Y	
11262-SU-1-DUP	6/4/2008 0:00	7/15/2008 0:00	41.00	Y	
15301-SU-1	6/4/2008 0:00	7/15/2008 0:00	41.00	Y	
16657-D-1-TRAP	6/20/2008 0:00	9/24/2008 0:00	96.00	Y	A877854
16657-SU-1-FILTER	6/20/2008 0:00	9/12/2008 0:00	84.00	Y	
17149-SU-1 - FILTER	7/29/2008 0:00	9/12/2008 0:00	45.00	Y	A884606
TRIP2-D-1 - TRAP	7/29/2008 0:00	9/23/2008 0:00	56.00	Y	
17149-D-1 - TRAP	7/29/2008 0:00	9/23/2008 0:00	56.00	Y	

Accuracy

Accuracy was evaluated using the %R results for the blank spike samples (BS), Limit of Quantification (LOQ) samples, and labeled compound spikes.

The BS, LOQ and labeled compound spike recoveries %Rs were within method acceptance criteria, except for the congeners listed in “PCB_QC_Sed and Water_UH” worksheet “PCB Water Flags (vol corrected)”. All LOQ failures are flagged “Q”, blank spike failures are flagged “S” and labeled compound spike recovery failures are flagged “R”. All associated congeners are flagged according to the QC failure type.

Precision

Precision was evaluated using the Relative Percent Difference (%RPD) obtained from the parent sample/field duplicate sample results. The following samples were collected and analyzed in duplicate for field duplicate QC purposes: 13338-D-1-Trap (collected 4/22/08), 13338-SU-1-Filter (collected 4/22/08), 13344-D-1-Trap (collected 6/3/08), 13344-SU-1-Filter (collected 6/3/08), 13363A-D-1-Trap (collected 6/11/08), 13363A-SU-1-Filter (collected 6/11/08), 11262-D-1 and 11262-SU-1.

All field duplicate results were within QAPP tolerance except for those listed in “PCB Water Flags (vol corrected)”. Refer to the back up Field Duplicate comparison table attached. Both the parent and field duplicate samples were flagged “F” as estimated due to the out of tolerance % RPD. All associated congeners, that weren’t previously flagged “J”, “U” or “B” by the lab, were flagged “F” by the data verifier.

Laboratory duplicates were not possible for these matrices due to insufficient media.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the chain-of-custody procedures to those described in the QAPP;
- Evaluating holding times; and
- Examining method blanks for contamination of samples during analysis.

The samples in this SDG were collected and analyzed following the QAPP, COC and analytical procedures. All samples were prepared and analyzed with the holding times required for the analysis.

All initial calibration criteria were met.

All continuing calibration criteria (BS) were met.

All LOQ standard criteria were met, with the exception of those listed in the accuracy table.

There was at least one method blank analyzed with each batch associated with the PCBs analyses in each SDG. The method blanks had many PCBs of concern above the RLs. The sample results that were less than five (5) times the amount found in the blank were “B” flagged for having blank contamination.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

No reported results for samples in this SDG have been rejected or invalidated. The completeness for this SDG is 100% compared to the minimum acceptance limit of 90%.

Flag Key:
H = Holding time exceedance
I = Ion ration failure
F = Field dup exceedance
L = Lab dup exceedance
S = Blank spike or lab control spike exceedance
Q = Limit of Quantitation (LOQ) exceedance
R = Surrogate/Internal Standard exceedance
J = Estimated by lab
U = Non-detected above MDL
B = Blank Contamination

PARTICULATE ORGANIC CARBON (POC)

General

The SDGs included in this report contained the samples listed in Table 1 and analyzed for POC. The POC analyses were performed using EPA Method 440.0 (lab method: CAM SOP-00468). All samples for this SDG were collected and analyzed following the procedures and protocols outlined in the QAPP. All samples collected were prepared and analyzed outside of the holding times required by the method, with the exception of 17149-W-1-Filter (collected 7/29/08) See Flag table below.

Table 1: Data Packages, Sample IDs and Collection Dates and Times

SDG	Sample ID	POC Result mg	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
A884606	16213-W-1	1.10	5/27/2008	8/13/2008	78.00	N
	TBD5-W-1	1.00	5/12/2008	8/13/2008	93.00	N
	TBD7-W-1	0.70	5/15/2008	8/13/2008	90.00	N
	16622-W-1	1.60	5/2/2008	8/13/2008	103.00	N
	13342-W-1	1.30	5/30/2008	8/13/2008	75.00	N
	16499-W-1	0.80	5/29/2008	8/13/2008	76.00	N
	13344-W-1	1.00	6/3/2008	8/13/2008	71.00	N
	13338-W-1	1.00	4/22/2008	8/13/2008	113.00	N
	11132-W-1	1.80	5/13/2008	8/13/2008	92.00	N
	16618-W-1	1.10	5/30/2008	8/13/2008	75.00	N
	13363A-W-1	1.50	6/11/2008	8/13/2008	63.00	N
	11258-W-1	1.00	6/2/2008	8/13/2008	72.00	N
	13355-W-1	0.90	5/29/2008	8/13/2008	76.00	N
	14560-W-1	1.10	5/28/2008	8/13/2008	77.00	N
	15301-W-1	0.90	6/4/2008	8/13/2008	70.00	N
	11347-W-1	1.40	5/21/2008	8/13/2008	84.00	N
	11193-W-1	1.40	5/1/2008	8/13/2008	104.00	N
	11387-W-1	1.20	5/12/2008	8/13/2008	93.00	N
	11262-W-1	1.30	6/4/2008	8/13/2008	70.00	N
	11262-W-1-DUP	1.00	6/4/2008	8/13/2008	70.00	N
	11368-W-1	0.90	5/14/2008	8/13/2008	91.00	N
	TBD2-W-1	1.00	5/15/2008	8/13/2008	90.00	N
	TBD6-W-1	1.20	5/14/2008	8/13/2008	91.00	N
	11280-W-1	1.00	4/23/2008	8/13/2008	112.00	N
	11264-W-1	0.90	5/1/2008	8/13/2008	104.00	N
	11139-W-1	1.70	5/13/2008	8/13/2008	92.00	N
	11252-W-1	0.90	5/28/2008	8/13/2008	77.00	N
13363A-W-1-DUP	1.50	6/11/2008	8/13/2008	63.00	N	
11261-W-1	1.00	6/4/2008	8/13/2008	70.00	N	
A892224	11274- W- 1-FILTER	0.70	4/29/2008	9/15/2008	139.00	N
	13344- W- 1- DUP-FILTER	2.60	6/3/2008	9/15/2008	104.00	N
	15979- W- 1-FILTER	0.50	4/30/2008	9/15/2008	138.00	N
	11292- W- 1-FILTER	0.10	6/2/2008	9/15/2008	105.00	N
	TRIP1- W- 1-FILTER	0.40	6/2/2008	9/15/2008	105.00	N
	17149- W- 1-FILTER	1.50	7/29/2008	9/15/2008	48.00	Y
	16657- W- 1-FILTER	0.80	6/20/2008	9/15/2008	87.00	N
	TRIP2- W- 1-FILTER	0.30	6/4/2008	9/15/2008	103.00	N
	13338- W- 1- DUP-FILTER	0.80	4/22/2008	9/15/2008	146.00	N
	15936- W- 1-FILTER	0.70	4/30/2008	9/15/2008	138.00	N

SDG	Sample ID	POC Result mg	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
	13340- W- 1-FILTER	1.50	6/3/2008	9/15/2008	104.00	N

* Holding time criteria for POC as per QAPP is less than 60 days; sample results for POC will not be submitted to TCEQ.

BRL = Below Reporting Limit

The request made to analyze POC on the filter samples was made after most of the hold times were exceeded. The data will not be submitted to TCEQ database. The results will be used for study purposes only.

Accuracy

Accuracy was evaluated using the %R results for the blank spike (BS), blank spike duplicate (BSD) samples and Limit of Quantification (LOQ) samples.

The BS %Rs were within method acceptance criteria for all SDGs.

Blank Spike Recovery Results for POC Samples				
SDG	Date Performed	POC (%)		Accept
		Blank Spike	Blank Spike Dup	
A884606	8/13/2008	106	102	Y
A884606	8/13/2008	105	101	Y
A892224	9/15/2008	78	82	Y

Acceptable criteria for blank spike and blank spike duplicates is < 20%.

SDG = sample data package

The LOQ samples were within acceptance criteria with the exceptions noted in the “flag” table below:

POC Flag Table

Sample ID	Date/Time Collection	Result (mg)	Flag Applied	Reason
16213-W-1	5/27/2008	1.10	H, Q	Hold time & LOQ Exceedance
TBD5-W-1	5/12/2008	1.00	H, Q	Hold time & LOQ Exceedance
TBD7-W-1	5/15/2008	0.70	H, Q	Hold time & LOQ Exceedance

Sample ID	Date/Time Collection	Result (mg)	Flag Applied	Reason
16622-W-1	5/2/2008	1.60	H, Q	Hold time & LOQ Exceedance
13342-W-1	5/30/2008	1.30	H, Q	Hold time & LOQ Exceedance
16499-W-1	5/29/2008	0.80	H, Q	Hold time & LOQ Exceedance
13344-W-1	6/3/2008	1.00	H, Q, F	Hold time & LOQ Exceedance
13338-W-1	4/22/2008	1.00	H, Q	Hold time & LOQ Exceedance
11132-W-1	5/13/2008	1.80	H, Q	Hold time & LOQ Exceedance
16618-W-1	5/30/2008	1.10	H, Q	Hold time & LOQ Exceedance
13363A-W-1	6/11/2008	1.50	H, Q	Hold time & LOQ Exceedance
11258-W-1	6/2/2008	1.00	H, Q	Hold time & LOQ Exceedance
13355-W-1	5/29/2008	0.90	H, Q	Hold time & LOQ Exceedance
14560-W-1	5/28/2008	1.10	H, Q	Hold time & LOQ Exceedance
15301-W-1	6/4/2008	0.90	H, Q	Hold time & LOQ Exceedance
11347-W-1	5/21/2008	1.40	H, Q	Hold time & LOQ Exceedance
11193-W-1	5/1/2008	1.40	H, Q	Hold time & LOQ Exceedance
11387-W-1	5/12/2008	1.20	H, Q	Hold time & LOQ Exceedance
11262-W-1	6/4/2008	1.30	H	Hold time Exceedance
11262-W-1-DUP	6/4/2008	1.00	H	Hold time Exceedance
11368-W-1	5/14/2008	0.90	H	Hold time Exceedance
TBD2-W-1	5/15/2008	1.00	H	Hold time Exceedance
TBD6-W-1	5/14/2008	1.20	H	Hold time Exceedance
11280-W-1	4/23/2008	1.00	H	Hold time Exceedance
11264-W-1	5/1/2008	0.90	H	Hold time Exceedance
11139-W-1	5/13/2008	1.70	H	Hold time Exceedance
11252-W-1	5/28/2008	0.90	H	Hold time Exceedance
13363A-W-1-DUP	6/11/2008	1.50	H	Hold time Exceedance
11261-W-1	6/4/2008	1.00	H	Hold time Exceedance
11274- W- 1-FILTER	4/29/2008	0.70	H	Hold time Exceedance
13344- W- 1- DUP-FILTER	6/3/2008	2.60	H, F	Hold time Exceedance
15979- W- 1-FILTER	4/30/2008	0.50	H	Hold time Exceedance
11292- W- 1-FILTER	6/2/2008	0.10	H	Hold time Exceedance
TRIP1- W- 1-FILTER	6/2/2008	0.40	H	Hold time Exceedance
16657- W- 1-FILTER	6/20/2008	0.80	H	Hold time Exceedance
TRIP2- W- 1-FILTER	6/4/2008	0.30	H	Hold time Exceedance
13338- W- 1- DUP-FILTER	4/22/2008	0.80	H	Hold time Exceedance
15936- W- 1-FILTER	4/30/2008	0.70	H	Hold time Exceedance
13340- W- 1-FILTER	6/3/2008	1.50	H	Hold time Exceedance

The % Rec for the out of control LOQ was 160.1% with acceptance criteria of 50-150%. As previously stated, none of the POC results will be submitted to the TCEQ database.

Precision

Precision was evaluated using the Relative Percent Difference (%RPD) obtained from the parent sample/field duplicate sample results. The following samples were

collected and analyzed in duplicate for field duplicate QC purposes: 11262-W-1 (collected 6/4/08), 13363A-W-1 (collected 6/12/08), 113344-W-1 (collected 6/3/08) and 13338-W-1 (collected 4/22/08). All field duplicate results were within QAPP tolerance, except for the following:

Field Duplicate Results for POC Samples							
SDG	Lab Batch #	Sample ID	Sample Date	POC (mg)		RPD	Accept
				D1	D2		
A884606	1581647	11262-W-1	6/4/2008	1.3	1.0	26.1	Y
A884606	1581647	13363A-W-1	6/12/2008	1.5	1.5	0.0	Y
A884606*	1581647	13344-W-1	6/3/2008	1.0	2.6	88.9	N
A884606*	1581647	13338-W-1	4/22/2008	1.0	0.8	22.2	Y

* The duplicate samples were analyzed in A892224, batch 1609304.

SDG = sample data package

RPD = Relative percent difference

Sample 13344-W-1 and 13344-W-1-Dup were flagged “F” for field duplicate % RPD exceedances.

There were no laboratory duplicates analyzed due to insufficient sample.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the chain-of-custody procedures to those described in the QAPP;
- Evaluating holding times; and
- Examining method blanks for contamination of samples during analysis.

The samples in this SDG were collected and analyzed following the QAPP, COC and analytical procedures. Most of the samples were analyzed outside of holding time as noted above.

All initial calibration criteria were met.

All continuing calibration criteria (BS) were met, with the exception of those listed in the accuracy table.

There was at least one method blank analyzed with each batch associated with the TOC analyses in each SDG. The method blanks were below the RLs.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

No reported results for samples in these SDGs have usable data since most all were out of holding time. All sample results for POC were rejected or invalidated. The completeness for this SDG is 0% compared to the minimum acceptance limit of 90%.

Flag Key:
H = Holding time exceedance
I = Ion ration failure
F = Field dup exceedance
L = Lab dup exceedance
S = Blank spike or lab control spike exceedance
Q = Limit of Quantitation (LOQ) exceedance
R = Surrogate/Internal Standard exceedance
J = Estimated by lab
U = Non-detected above MDL
B = Blank Contamination

DATA VERIFICATION SUMMARY REPORT
for
PCBs and TOC in
SEDIMENT SAMPLES COLLECTED IN THE
HOUSTON SHIP CHANNEL SYSTEM
(Segments 2426, 2436, 2438, and 2421)
HOUSTON, TEXAS

Data Verifier: Sandra de las Fuentes (Parsons - Austin, TX)

INTRODUCTION

The following data verification summary report covers analysis of environmental sediment samples, including ninety (90) sediment samples and ten (10) field duplicate, collected from the Houston Ship Channel System in Houston Texas over the one month period between April 24, 2008 and July 13, 2008. The samples were analyzed for Polychlorinated Biphenyls (PCBs) as congeners and Total Organic Carbon (TOC) following laboratory Sample Delivery Groups (SDGs)

A845781, A855832, A860731, A861230, A877854, A877902 (3 sets), A877812, and A884606

All samples were collected by the University of Houston and Parsons following the procedures described in the QAPP. All analyses were performed by Maxxam Analytical Inc. in Burlington, Canada following procedures outlined in the QAPP and Method 1668A for PCB congeners. Maxxam Analytical Inc. sent the TOC samples to Maxxam Analytic Mississauga in Ontario, Canada for analysis following the LECO Combustion method.

EVALUATION CRITERIA

The data submitted by the laboratory has been reviewed and verified following the guidelines outlined in the QAPP and National Functional Guidelines for Organic and Inorganic Data (EPA 1994). Information reviewed in the data packages include sample results; the laboratory quality control results; instrument calibrations; blanks; case narrative and chain-of-custody forms. The verification protocol addressed the following

parameters: method blanks, laboratory control spike recoveries, recoveries of labeled compounds (internal standards), continuing calibration verifications, laboratory and field duplicate sample percent reproducibility (%RPD), percent recovery (%R), and Level of Quantification (LOQ) standard results. The analyses and findings presented in this report are based on the reviewed information, and meeting guidelines in the QAPP (with the exceptions noted below).

POLYCHLORINATED BIPHENYLS

General

The SDGs included in this report contained the samples listed in Table 1 and analyzed for PCBs. The PCBs analyses were performed using USEPA Method 1668A (lab method: BRL SOP-00408). All samples for this SDG were collected and analyzed following the procedures and protocols outlined in the QAPP. All samples collected were prepared and analyzed within the holding times required by the method. Some sediment samples required dilution due to high PCBs and/or matrix interference.

Table 1: Data Packages, Sample IDs and Collection Dates and Times

SDG	Sample ID	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
A845781	13338-SE-1	4/24/2008 0:00	6/5/2008 0:00	42.00	Y
	11287-SE-1	4/28/2008 0:00	6/9/2008 0:00	42.00	Y
	11274-SE-1	4/28/2008 0:00	6/9/2008 0:00	42.00	Y
	11270-SE-1	4/29/2008 0:00	6/9/2008 0:00	41.00	Y
	15979-SE-1	4/30/2008 0:00	6/9/2008 0:00	40.00	Y
	16622-SE-1	5/1/2008 0:00	6/9/2008 0:00	39.00	Y
	11280-SE-1	4/30/2008 0:00	6/6/2008 0:00	37.00	Y
	11264-SE-1	5/2/2008 0:00	6/9/2008 0:00	38.00	Y
	11193-SE-1-Dup	5/2/2008 0:00	6/8/2008 0:00	37.00	Y
11193-SE-1	5/2/2008 0:00	6/9/2008 0:00	38.00	Y	
A855832	16213-SE-1-SOIL	5/27/2008 0:00	6/18/2008 0:00	22.00	Y
	11252-SE-1-SOIL	5/27/2008 0:00	6/18/2008 0:00	22.00	Y
	14560-SE-1-SOIL	5/27/2008 0:00	6/18/2008 0:00	22.00	Y
	13363-SE-1-SOIL	5/27/2008 0:00	6/18/2008 0:00	22.00	Y
	16499-SE-1-SOIL	5/27/2008 0:00	6/18/2008 0:00	22.00	Y
	16618-SE-1-SOIL	5/29/2008 0:00	6/18/2008 0:00	20.00	Y
	13355-SE-1-SOIL	5/29/2008 0:00	6/18/2008 0:00	20.00	Y
A860731	11347-SE-1	6/2/2008 0:00	7/10/2008 0:00	38.00	Y
	13344-SE-1	6/2/2008 0:00	7/10/2008 0:00	38.00	Y
	15301-SE-1	6/2/2008 0:00	7/10/2008 0:00	38.00	Y
	15301-SE-1-DUP	6/2/2008 0:00	7/10/2008 0:00	38.00	Y
	11258-SE-1	6/2/2008 0:00	7/30/2008 0:00	58.00	Y

SDG	Sample ID	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
	TRIP2-SE-1	6/4/2008 0:00	7/10/2008 0:00	36.00	Y
	TRIP1-SE-1	6/4/2008 0:00	7/10/2008 0:00	36.00	Y
	11132-SE-1	6/4/2008 0:00	7/10/2008 0:00	36.00	Y
	11261-SE-1	6/4/2008 0:00	7/10/2008 0:00	36.00	Y
	11262-SE-1	6/4/2008 0:00	7/10/2008 0:00	36.00	Y
	13342-SE-1	6/4/2008 0:00	7/10/2008 0:00	36.00	Y
A861230	11258-SE-1-DUP - SOIL	6/2/2008 0:00	7/10/2008 0:00	38.00	Y
	11292-SE-1	6/2/2008 0:00	7/10/2008 0:00	38.00	Y
A877854	C-001-Se-1	7/12/2008 0:00	7/30/2008 0:00	18.00	Y
	C-002-Se-1	7/12/2008 0:00	7/30/2008 0:00	18.00	Y
	C-003-Se-1	7/12/2008 0:00	7/30/2008 0:00	18.00	Y
	C-004-Se-1	7/12/2008 0:00	7/30/2008 0:00	18.00	Y
	C-004-Se-1-A	7/12/2008 0:00	7/30/2008 0:00	18.00	Y
	C-004-Se-1-B	7/12/2008 0:00	7/30/2008 0:00	18.00	Y
	C-004-Se-1-C	7/12/2008 0:00	7/30/2008 0:00	18.00	Y
	C-004-Se-1-D	7/12/2008 0:00	7/30/2008 0:00	18.00	Y
	C-004-Se-1-E	7/12/2008 0:00	7/30/2008 0:00	18.00	Y
	C-005-Se-1	7/12/2008 0:00	7/30/2008 0:00	18.00	Y
	C-006-Se-1	7/13/2008 0:00	7/30/2008 0:00	17.00	Y
	T-013-Se-1	7/15/2008 0:00	8/19/2008 0:00	35.00	Y
	T-014-Se-1	7/15/2008 0:00	7/30/2008 0:00	15.00	Y
	T-014-Se-1-Dup	7/15/2008 0:00	7/30/2008 0:00	15.00	Y
	T-015-Se-1	7/15/2008 0:00	7/30/2008 0:00	15.00	Y
	T-016-Se-1	7/15/2008 0:00	7/30/2008 0:00	15.00	Y
	ERS-Se-1	7/12/2008 0:00	7/30/2008 0:00	18.00	Y
	Trip1-Se-1-SI	7/14/2008 0:00	7/30/2008 0:00	16.00	Y
A877902	T-001-Se-1	7/10/2008 0:00	8/19/2008 0:00	40.00	Y
	T-001-Se-1-Dup	7/10/2008 0:00	8/19/2008 0:00	40.00	Y
	T-002-Se-1	7/10/2008 0:00	8/19/2008 0:00	40.00	Y
	T-003-Se-1	7/11/2008 0:00	8/19/2008 0:00	39.00	Y
	W-007-Se-1-C	7/11/2008 0:00	8/19/2008 0:00	39.00	Y
	W-007-Se-1-D	7/11/2008 0:00	8/19/2008 0:00	39.00	Y
	W-007-Se-1-E	7/11/2008 0:00	8/19/2008 0:00	39.00	Y
	W-008-Se-1	7/12/2008 0:00	8/19/2008 0:00	38.00	Y
	W-007-Se-1-A	7/11/2008 0:00	8/19/2008 0:00	39.00	Y
	W-001-Se-1	7/11/2008 0:00	8/19/2008 0:00	39.00	Y
	W-002-Se-1	7/11/2008 0:00	8/19/2008 0:00	39.00	Y
	W-002-Se-1-Dup	7/11/2008 0:00	8/19/2008 0:00	39.00	Y

SDG	Sample ID	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
	W-003-Se-1	7/11/2008 0:00	8/19/2008 0:00	39.00	Y
	W-004-Se-1	7/11/2008 0:00	8/19/2008 0:00	39.00	Y
	W-005-Se-1	7/11/2008 0:00	8/19/2008 0:00	39.00	Y
A877902	T004-SE-1	7/11/2008 0:00	9/17/2008 0:00	68.00	Y
	T005-SE-1	7/10/2008 0:00	9/17/2008 0:00	69.00	Y
	T006-SE-1	7/10/2008 0:00	9/17/2008 0:00	69.00	Y
	T007-SE-1	7/10/2008 0:00	9/17/2008 0:00	69.00	Y
	T008-SE-1	7/10/2008 0:00	9/17/2008 0:00	69.00	Y
	T009-SE-1	7/13/2008 0:00	9/17/2008 0:00	66.00	Y
	W007-SE-1	7/11/2008 0:00	9/17/2008 0:00	68.00	Y
A877812	E008-SE-1	7/9/2008 0:00	9/12/2008 0:00	65.00	Y
	E009-SE-1	7/9/2008 0:00	9/13/2008 0:00	66.00	Y
	E010-SE-1	7/9/2008 0:00	9/13/2008 0:00	66.00	Y
	E011-SE-1	7/9/2008 0:00	9/13/2008 0:00	66.00	Y
	E011-SE-1- DUP	7/9/2008 0:00	9/13/2008 0:00	66.00	Y
	E012-SE-1	7/13/2008 0:00	9/13/2008 0:00	62.00	Y
	E013-SE-1	7/13/2008 0:00	9/13/2008 0:00	62.00	Y
	E014-SE-1	7/13/2008 0:00	9/13/2008 0:00	62.00	Y
	E015-SE-1	7/13/2008 0:00	9/12/2008 0:00	61.00	Y
	E013-SE-1-A	7/13/2008 0:00	9/14/2008 0:00	63.00	Y
	E013-SE-1-A-DUP	7/13/2008 0:00	9/14/2008 0:00	63.00	Y
	E013-SE-1-B-DUP	7/13/2008 0:00	9/14/2008 0:00	63.00	Y
	E013-SE-1-B	7/13/2008 0:00	9/14/2008 0:00	63.00	Y
	E013-SE-1-C	7/13/2008 0:00	9/14/2008 0:00	63.00	Y
	E013-SE-1-D	7/13/2008 0:00	9/15/2008 0:00	64.00	Y
	E013-SE-1-E	7/13/2008 0:00	9/14/2008 0:00	63.00	Y
	T009-SE-1-DUP	7/13/2008 0:00	9/16/2008 0:00	65.00	Y
	T010-SE-1	7/13/2008 0:00	9/15/2008 0:00	64.00	Y
	T011-SE-1	7/13/2008 0:00	9/17/2008 0:00	66.00	Y
	T012-SE-1	7/13/2008 0:00	9/16/2008 0:00	65.00	Y
	E001-SE-1	7/8/2008 0:00	9/16/2008 0:00	70.00	Y
	E002-SE-1	7/8/2008 0:00	9/16/2008 0:00	70.00	Y
	E003-SE-1	7/8/2008 0:00	9/17/2008 0:00	71.00	Y
E004-SE-1	7/8/2008 0:00	9/16/2008 0:00	70.00	Y	
E005-SE-1	7/8/2008 0:00	9/16/2008 0:00	70.00	Y	
E006-SE-1	7/9/2008 0:00	9/16/2008 0:00	69.00	Y	
E007-SE-1	7/9/2008 0:00	9/16/2008 0:00	69.00	Y	

SDG	Sample ID	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
A884606	Trip2-Se-1-SI	7/29/2008 0:00	9/21/2008 0:00	54.00	Y
A877902	W006-SE-1	7/11/2008 0:00	9/21/2008 0:00	72.00	Y
	W007-SE-1-B	7/11/2008 0:00	9/21/2008 0:00	72.00	Y

Accuracy

Accuracy was evaluated using the %R results for the blank spike samples (BS), Limit of Quantification (LOQ) samples, and labeled compound spikes.

The BS, LOQ and labeled compound spike recoveries %Rs were within method acceptance criteria, except for the congeners listed in “PCB_QC_Sed and Water_UH” worksheet “PCB Sed Flags”. All LOQ failures are flagged “Q”, blank spike failures are flagged “S” and labeled compound spike recovery failures are flagged “R”. All associated congeners are flagged according to the QC failure type.

Precision

Precision was evaluated using the Relative Percent Difference (%RPD) obtained from the parent sample/field duplicate sample results. The following samples were collected and analyzed in duplicate for field duplicate QC purposes: 11193-SE-1 (collected 5/2/08), 15301-SE-1 (collected 6/2/08), 11258-SE-1 (collected 6/2/08), T-014-SE-1 (collected 7/15/08), T-001-SE-1 (collected 7/10/08), W-002-SE-1 (collected 7/11/08), E-011-SE-1 (collected 7/9/08), E013-SE-1-A (collected 7/13/08), E013-SE-1-B (collected 7/13/08), and T009-SE-1 (collected 7/13/08).

All field duplicate results were within QAPP tolerance except for the congeners listed in “PCB_QC_Sed and Water_UH” worksheet “PCB Sed Flags”. Both the parent and field duplicate samples were flagged “F” as estimated due to the out of tolerance % RPD. All associated congeners, that weren’t previously flagged “J”, “B” or “U” by the lab, were flagged as estimated (“F”) by the data verifier.

The following samples were analyzed in duplicate for lab duplicate QC purposes: 13338-SE-1, 11262-SE-1, C004-SE-1A, W001-SE-1, E014-SE-1, T009-SE-1. All lab duplicate results were within QAPP tolerance.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- * Comparing the chain-of-custody procedures to those described in the QAPP;
- * Evaluating holding times; and

* Examining method blanks for contamination of samples during analysis.

The samples in this SDG were collected and analyzed following the QAPP, COC and analytical procedures. All samples were prepared and analyzed with the holding times required for the analysis.

All initial calibration criteria were met.

All continuing calibration criteria (BS) were met, with the exception of those listed in the accuracy table.

All LOQ standard criteria were met, with the exception of those listed in the accuracy table.

There was at least one method blank analyzed with each batch associated with the PCBs analyses in each SDG. The method blanks had many PCBs of concern above the RLs. The sample results that were less than five (5) times the amount found in the blank were “B” flagged for having blank contamination.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

No reported results for samples in this SDG have been rejected or invalidated. The completeness for this SDG is 100% compared to the minimum acceptance limit of 90%.

Flag Key:
H = Holding time exceedance
I = Ion ration failure
F = Field dup exceedance
L = Lab dup exceedance
S = Blank spike or lab control spike exceedance
Q = Limit of Quantitation (LOQ) exceedance
R = Surrogate/Internal Standard exceedance
J = Estimated by lab
U = Non-detected above MDL
B = Blank Contamination

TOTAL ORGANIC CARBON**General**

The SDGs included in this report contained the samples listed in Table 1 and analyzed for TOC. The TOC analyses were performed using LECO Combustion Method (lab method: CAM SOP-00468). All samples for this SDG were collected and analyzed following the procedures and protocols outlined in the QAPP. All samples collected were prepared and analyzed within the holding times required by the method, with the exception of 13338 (collected 4/24/08).

Table 1: Data Packages, Sample IDs and Collection Dates and Times

SDG	Sample ID	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
A845781	13338-SE-1	4/24/2008 0:00	5/24/2008 0:00	30.00	N
	11287-SE-1	4/28/2008 0:00	5/24/2008 0:00	26.00	Y
	11274-SE-1	4/28/2008 0:00	5/24/2008 0:00	26.00	Y
	11270-SE-1	4/29/2008 0:00	5/24/2008 0:00	25.00	Y
	15979-SE-1	4/30/2008 0:00	5/24/2008 0:00	24.00	Y
	16622-SE-1	5/1/2008 0:00	5/24/2008 0:00	23.00	Y
	11280-SE-1	4/30/2008 0:00	5/24/2008 0:00	24.00	Y
	11264-SE-1	5/2/2008 0:00	5/24/2008 0:00	22.00	Y
	11193-SE-1-Dup	5/2/2008 0:00	5/24/2008 0:00	22.00	Y
11193-SE-1	5/2/2008 0:00	5/24/2008 0:00	22.00	Y	
A855832	16213-SE-1-SOIL	5/27/2008 0:00	6/11/2008 0:00	15.00	Y
	11252-SE-1-SOIL	5/27/2008 0:00	6/11/2008 0:00	15.00	Y
	14560-SE-1-SOIL	5/27/2008 0:00	6/11/2008 0:00	15.00	Y
	13363-SE-1-SOIL	5/27/2008 0:00	6/11/2008 0:00	15.00	Y
	16499-SE-1-SOIL	5/27/2008 0:00	6/11/2008 0:00	15.00	Y
	16618-SE-1-SOIL	5/29/2008 0:00	6/11/2008 0:00	13.00	Y
	13355-SE-1-SOIL	5/29/2008 0:00	6/11/2008 0:00	13.00	Y
A860731	13342-SE-1-SOIL	6/4/2008 0:00	6/17/2008 0:00	13.00	Y
	11262-SE-1-SOIL	6/4/2008 0:00	6/17/2008 0:00	13.00	Y
	11261-SE-1-SOIL	6/4/2008 0:00	6/17/2008 0:00	13.00	Y
	11132-SE-1-SOIL	6/4/2008 0:00	6/17/2008 0:00	13.00	Y
	TRIP1-SE-1-SOIL	6/4/2008 0:00	6/17/2008 0:00	13.00	Y
	TRIP2-SE-1-SOIL	6/4/2008 0:00	6/17/2008 0:00	13.00	Y
	11258-SE-1-SOIL	6/2/2008 0:00	6/17/2008 0:00	15.00	Y
	15301-SE-1-DUP-SOIL	6/2/2008 0:00	6/17/2008 0:00	15.00	Y
	15301-SE-1-SOIL	6/2/2008 0:00	6/17/2008 0:00	15.00	Y
	13344-SE-1-SOIL	6/2/2008 0:00	6/17/2008 0:00	15.00	Y
11347-SE-1-SOIL	6/2/2008 0:00	6/17/2008 0:00	15.00	Y	

SDG	Sample ID	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
A861230	11292-SE-1	6/2/2008 0:00	6/17/2008 0:00	15.00	Y
	11258-SE-1-DUP	6/2/2008 0:00	6/17/2008 0:00	15.00	Y
A877812	T009-SE-1-DUP-SOIL	7/13/2008 0:00	7/30/2008 0:00	17.00	Y
	T010-SE-1-SOIL	7/13/2008 0:00	7/30/2008 0:00	17.00	Y
	T011-SE-1-SOIL	7/13/2008 0:00	7/30/2008 0:00	17.00	Y
	T012-SE-1-SOIL	7/13/2008 0:00	7/30/2008 0:00	17.00	Y
	E001-SE-1-SOIL	7/8/2008 0:00	7/30/2008 0:00	22.00	Y
	E002-SE-1-SOIL	7/8/2008 0:00	7/30/2008 0:00	22.00	Y
	E003-SE-1-SOIL	7/8/2008 0:00	7/30/2008 0:00	22.00	Y
	E004-SE-1-SOIL	7/8/2008 0:00	7/30/2008 0:00	22.00	Y
	E005-SE-1-SOIL	7/8/2008 0:00	7/30/2008 0:00	22.00	Y
	E006-SE-1-SOIL	7/9/2008 0:00	7/30/2008 0:00	21.00	Y
	E007-SE-1-SOIL	7/9/2008 0:00	7/30/2008 0:00	21.00	Y
	E008-SE-1-SOIL	7/9/2008 0:00	7/30/2008 0:00	21.00	Y
	E009-SE-1-SOIL	7/9/2008 0:00	7/30/2008 0:00	21.00	Y
	E010-SE-1-SOIL	7/9/2008 0:00	7/30/2008 0:00	21.00	Y
	E011-SE-1-SOIL	7/9/2008 0:00	7/30/2008 0:00	21.00	Y
	E011-SE-1-SOIL-DUP	7/9/2008 0:00	7/30/2008 0:00	21.00	Y
	E012-SE-1-SOIL	7/13/2008 0:00	7/30/2008 0:00	17.00	Y
	E013-SE-1-SOIL	7/13/2008 0:00	7/30/2008 0:00	17.00	Y
	E014-SE-1-SOIL	7/13/2008 0:00	7/30/2008 0:00	17.00	Y
	E015-SE-1-SOIL	7/13/2008 0:00	7/30/2008 0:00	17.00	Y
	E013-SE-1-A-SOIL	7/13/2008 0:00	7/29/2008 0:00	16.00	Y
	E013-SE-1-A-DUP-SOIL	7/13/2008 0:00	7/29/2008 0:00	16.00	Y
	E013-SE-1-B-SOIL	7/13/2008 0:00	7/29/2008 0:00	16.00	Y
	E013-SE-1-B-DUP-SOIL	7/13/2008 0:00	7/29/2008 0:00	16.00	Y
E013-SE-1-C-SOIL	7/13/2008 0:00	7/29/2008 0:00	16.00	Y	
E013-SE-1-D-SOIL	7/13/2008 0:00	7/29/2008 0:00	16.00	Y	
E013-SE-1-E-SOIL	7/13/2008 0:00	7/29/2008 0:00	16.00	Y	
A877854	C001-SE-1-SOIL	7/12/2008 0:00	8/6/2008 0:00	25.00	Y
	C002-SE-1-SOIL	7/12/2008 0:00	8/6/2008 0:00	25.00	Y
	C003-SE-1-SOIL	7/12/2008 0:00	8/6/2008 0:00	25.00	Y
	C004-SE-1-SOIL	7/12/2008 0:00	8/6/2008 0:00	25.00	Y
	C005-SE-1-SOIL	7/12/2008 0:00	8/6/2008 0:00	25.00	Y
	C006-SE-1-SOIL	7/13/2008 0:00	8/6/2008 0:00	24.00	Y
	C004-SE-1-A-SOIL	7/12/2008 0:00	8/6/2008 0:00	25.00	Y
	C004-SE-1-B-SOIL	7/12/2008 0:00	8/6/2008 0:00	25.00	Y
	C004-SE-1-C-SOIL	7/12/2008 0:00	8/6/2008 0:00	25.00	Y
	C004-SE-1-D-SOIL	7/12/2008 0:00	8/6/2008 0:00	25.00	Y
	C004-SE-1-E-SOIL	7/12/2008 0:00	8/6/2008 0:00	25.00	Y
	ERS-SE-1-SOIL	7/12/2008 0:00	8/6/2008 0:00	25.00	Y
	T014-SE-1-SOIL	7/15/2008 0:00	8/6/2008 0:00	22.00	Y

SDG	Sample ID	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *
	T016-SE-1-SOIL	7/15/2008 0:00	8/6/2008 0:00	22.00	Y
	T014-SE-1-DUP-SOIL	7/15/2008 0:00	8/6/2008 0:00	22.00	Y
	TRIP1-SE-1-SOIL	7/14/2008 0:00	8/6/2008 0:00	23.00	Y
	T015-SE-1-SOIL	7/15/2008 0:00	8/6/2008 0:00	22.00	Y
	T013-SE-1-SOIL	7/15/2008 0:00	8/6/2008 0:00	22.00	Y
A877902	W007-SE-1-B-SOIL	7/11/2008 0:00	8/7/2008 0:00	27.00	Y
	W007-SE-1-C-SOIL	7/11/2008 0:00	8/7/2008 0:00	27.00	Y
	W007-SE-1-D-SOIL	7/11/2008 0:00	8/7/2008 0:00	27.00	Y
	T008-SE-1-SOIL	7/10/2008 0:00	8/7/2008 0:00	28.00	Y
	T009-SE-1-SOIL	7/13/2008 0:00	8/7/2008 0:00	25.00	Y
	W007-SE-1-SOIL	7/11/2008 0:00	8/7/2008 0:00	27.00	Y
	W001-SE-1-SOIL	7/11/2008 0:00	8/6/2008 0:00	26.00	Y
	W002-SE-1-SOIL	7/11/2008 0:00	8/6/2008 0:00	26.00	Y
	W002-SE-1-DUP-SOIL	7/11/2008 0:00	8/6/2008 0:00	26.00	Y
	W003-SE-1-SOIL	7/11/2008 0:00	8/6/2008 0:00	26.00	Y
	W004-SE-1-SOIL	7/11/2008 0:00	8/6/2008 0:00	26.00	Y
	W005-SE-1-SOIL	7/11/2008 0:00	8/6/2008 0:00	26.00	Y
	W006-SE-1-SOIL	7/11/2008 0:00	8/6/2008 0:00	26.00	Y
	W007-SE-1-A-SOIL	7/11/2008 0:00	8/6/2008 0:00	26.00	Y
	W007-SE-1-E-SOIL	7/11/2008 0:00	8/6/2008 0:00	26.00	Y
	W008-SE-1-SOIL	7/12/2008 0:00	8/6/2008 0:00	25.00	Y
	T001-SE-1-SOIL	7/10/2008 0:00	8/6/2008 0:00	27.00	Y
	T001-SE-1-DUP-SOIL	7/10/2008 0:00	8/6/2008 0:00	27.00	Y
	T002-SE-1-SOIL	7/10/2008 0:00	8/6/2008 0:00	27.00	Y
	T003-SE-1-SOIL	7/11/2008 0:00	8/6/2008 0:00	26.00	Y
T004-SE-1-SOIL	7/11/2008 0:00	8/6/2008 0:00	26.00	Y	
T005-SE-1-SOIL	7/10/2008 0:00	8/6/2008 0:00	27.00	Y	
T006-SE-1-SOIL	7/10/2008 0:00	8/6/2008 0:00	27.00	Y	
T007-SE-1-SOIL	7/10/2008 0:00	8/6/2008 0:00	27.00	Y	
A884606	TRIP2-SE-1 - SOIL	7/29/2008 0:00	8/21/2008 0:00	23.00	Y

Sample 13338 (collected 4/24/08) was analyzed 2 day outside of holding time. This sample was flagged “H” for the minor exceedances of holding time for TOC.

Accuracy

Accuracy was evaluated using the %R results for the blank spike samples (BS). The BS %Rs were within method acceptance criteria for all SDGs.

Precision

Precision was evaluated using the Relative Percent Difference (%RPD) obtained from the parent sample/field duplicate sample results and the lab duplicate results. The following samples were collected and analyzed in duplicate for field duplicate QC purposes: 11193-SE-1 (collected 5/2/08), 15301-SE-1 (collected 6/2/08), 11258-SE-1 (collected 6/2/08), T-014-SE-1 (collected 7/15/08), T-001-SE-1 (collected 7/10/08), W-002-SE-1 (collected 7/11/08), E-011-SE-1 (collected 7/9/08), E013-SE-1-A (collected 7/13/08), E013-SE-1-B (collected 7/13/08), and T009-SE-1 (collected 7/13/08). All field duplicate results were within QAPP tolerance, except for the following:

Field Duplicate Results for TOC Samples							
SDG	Lab Batch #	Sample ID	Sample Date	TOC (mg/Kg)		RPD	Accept
				T1	T2		
A860731 & A861230	1538383	11258-SE-1-DUP	6/2/2008	9400	5100	59.3	N

Samples 11258-SE-1 and 11258-SE-1-Dup were flagged “F” for field duplicate % RPD exceedances.

The following samples were analyzed in duplicate for lab duplicate QC purposes: 13338-SE-1, 16213-SE-1, 13342-SE-1, 11258-SE-1-DUP, E005-SE-1, E013-SE-1-B, C001-SE-1, W001-SE-1, and TRIP2-SE-1.

All lab duplicate results were within QAPP tolerance, with the following exception:

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- * Comparing the chain-of-custody procedures to those described in the QAPP;
- * Evaluating holding times; and
- * Examining method blanks for contamination of samples during analysis.

The samples in this SDG were collected and analyzed following the QAPP, COC and analytical procedures. All samples were prepared and analyzed with the holding times required for the analysis.

All initial calibration criteria were met.

All continuing calibration criteria (BS) were met, with the exception of those listed in the accuracy table.

There was at least one method blank analyzed with each batch associated with the TOC analyses in each SDG. The method blanks were below the RLs.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

No reported results for samples in this SDG have been rejected or invalidated. The completeness for this SDG is 100% compared to the minimum acceptance limit of 90%.

Flag Key:
H = Holding time exceedance
I = Ion ration failure
F = Field dup exceedance
L = Lab dup exceedance
S = Blank spike or lab control spike exceedance
Q = Limit of Quantitation (LOQ) exceedance
R = Surrogate/Internal Standard exceedance
J = Estimated by lab
U = Non-detected above MDL
B = Blank Contamination

DATA VERIFICATION SUMMARY REPORT

for

PCBs in

FISH SAMPLES COLLECTED IN THE

HOUSTON SHIP CHANNEL SYSTEM

(Segments 2426, 2436, 2438, and 2421)

HOUSTON, TEXAS

Data Verifier: Sandra de las Fuentes (Parsons - Austin, TX)

INTRODUCTION

The following data verification summary report covers analysis of environmental samples, including forty-six (46) fish samples, four (4) field duplicate samples and three (3) blank samples collected from the Houston Ship Channel System in Houston Texas over the three month period between April 22, 2008 and August 15, 2008. The samples were analyzed for Polychlorinated Biphenyls (PCBs) as congeners and percent lipid content following laboratory Sample Delivery Group (SDG)

A845862, A856461, A892224 and A860731 (4 sets)

All samples were collected by the University of Houston and Parsons following the procedures described in the QAPP. All analyses were performed by Maxxam Analytical Inc. in Burlington, Canada following procedures outlined in the QAPP and Method 1668A for PCB congeners and an “In-House” Method for % Lipid Content.

EVALUATION CRITERIA

The data submitted by the laboratory has been reviewed and verified following the guidelines outlined in the QAPP and National Functional Guidelines for Organic and Inorganic Data (EPA 1994). Information reviewed in the data packages include sample results; the laboratory quality control results; instrument calibrations; blanks; case narrative and chain-of-custody forms. The verification protocol addressed the following parameters: method blanks, laboratory control spike recoveries, recoveries of labeled compounds (internal standards), continuing calibration verifications, laboratory and field

duplicate sample percent reproducibility (%RPD), percent recovery (%R), and Level of Quantification (LOQ) standard results. The analyses and findings presented in this report are based on the reviewed information, and meeting guidelines in the QAPP (with the exceptions noted below).

POLYCHLORINATED BIPHENYLS

General

The SDGs included in this report contained the samples listed in Table 1 and analyzed for PCBs. The PCBs analyses were performed using USEPA Method 1668A (lab method: BRL SOP-00408). All samples for this SDG were collected and analyzed following the procedures and protocols outlined in the QAPP. All samples collected were prepared and analyzed within the holding times required by the method.

Table 1: Data Packages, Sample IDs and Collection Dates and Times

Sample ID	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *	SDG
15979-F1-1-TISSUE	4/30/2008 0:00	6/9/2008 0:00	40.00	Y	A845862
15979-F1-1-DUP-TISSUE	4/30/2008 0:00	6/9/2008 0:00	40.00	Y	
11264-F1-1-TISSUE	5/1/2008 0:00	6/9/2008 0:00	39.00	Y	
13338-F1-1-TISSUE	4/29/2008 0:00	6/9/2008 0:00	41.00	Y	
11274-F1-1-TISSUE	4/29/2008 0:00	6/9/2008 0:00	41.00	Y	
13338-F2-1-TISSUE	4/30/2008 0:00	6/9/2008 0:00	40.00	Y	
11264-F2-1-TISSUE	5/1/2008 0:00	6/9/2008 0:00	39.00	Y	
16622-F1-1-TISSUE	5/1/2008 0:00	6/9/2008 0:00	39.00	Y	
11270-F2-1-TISSUE	4/29/2008 0:00	6/9/2008 0:00	41.00	Y	
11270-F1-1-TISSUE	4/29/2008 0:00	6/9/2008 0:00	41.00	Y	
11280-F1-1-TISSUE	4/22/2008 0:00	6/9/2008 0:00	48.00	Y	
11287-F1-1-TISSUE	4/22/2008 0:00	6/9/2008 0:00	48.00	Y	
13363-F1-1-DUP-TISSUE	5/29/2008 0:00	9/12/2008 0:00	106.00	Y	
14560-F2-1-TISSUE	5/29/2008 0:00	9/12/2008 0:00	106.00	Y	
13363-F1-1-TISSUE	5/29/2008 0:00	9/12/2008 0:00	106.00	Y	
16618-F2-1-TISSUE	5/29/2008 0:00	9/12/2008 0:00	106.00	Y	
16618-F1-1-TISSUE	5/29/2008 0:00	9/12/2008 0:00	106.00	Y	
16499-F1-1-TISSUE	5/29/2008 0:00	9/12/2008 0:00	106.00	Y	
11252-F1-1-TISSUE	5/29/2008 0:00	9/12/2008 0:00	106.00	Y	
11292-F1-1	6/3/2008 0:00	9/18/2008 0:00	107.00	Y	A860731
BLANK-B-F2-1	6/5/2008 0:00	9/18/2008 0:00	105.00	Y	
BLANK-A-F2-1	6/5/2008 0:00	9/18/2008 0:00	105.00	Y	
BLANK-C-F1-1	6/5/2008 0:00	9/18/2008 0:00	105.00	Y	

Sample ID	Sample Collected Date/Time	Sample Analyzed Date/Time	Holding Time (Days)	Meet DQO for Holding Time *	SDG
11262-F1-1-TISSUE	6/4/2008 0:00	10/2/2008 0:00	120.00	Y	A860731
15936-F1-1-DUP-TISSUE	4/30/2008 0:00	10/3/2008 0:00	156.00	Y	
14560-F1-1-TISSUE	5/28/2008 0:00	10/3/2008 0:00	128.00	Y	
13344-F1-1-TISSUE	5/30/2008 0:00	10/3/2008 0:00	126.00	Y	
15301-F1-1-TISSUE	5/30/2008 0:00	10/3/2008 0:00	126.00	Y	
16213-F1-1-TISSUE	5/28/2008 0:00	10/3/2008 0:00	128.00	Y	
11193-F1-1-TISSUE	5/2/2008 0:00	10/3/2008 0:00	154.00	Y	
15936-F1-1-TISSUE	4/30/2008 0:00	10/3/2008 0:00	156.00	Y	
11258-F1-1-TISSUE	5/30/2008 0:00	10/3/2008 0:00	126.00	Y	
11258-F1-1-DUP-TISSUE	5/30/2008 0:00	10/6/2008 0:00	129.00	Y	
13342-F1-1-TISSUE	5/30/2008 0:00	10/6/2008 0:00	129.00	Y	
11261-F1-1-TISSUE	6/1/2008 0:00	10/6/2008 0:00	127.00	Y	
11347-F1-1-TISSUE	6/3/2008 0:00	10/6/2008 0:00	125.00	Y	
11132-F1-1-TISSUE	6/4/2008 0:00	10/6/2008 0:00	124.00	Y	
14560-F2-1-TISSUE	5/28/2008 0:00	9/19/2008 0:00	114.00	Y	A860731
13363-F2-1-TISSUE	5/28/2008 0:00	9/19/2008 0:00	114.00	Y	
11262-F2-1-TISSUE	6/4/2008 0:00	9/19/2008 0:00	107.00	Y	
13355-F2-1-TISSUE	6/4/2008 0:00	9/19/2008 0:00	107.00	Y	
11258-F2-1-TISSUE	6/3/2008 0:00	9/19/2008 0:00	108.00	Y	
13355-F1-1-TISSUE	5/30/2008 0:00	9/19/2008 0:00	112.00	Y	
11280-F2-1-TISSUE	8/15/2008 0:00	10/8/2008 0:00	54.00	Y	A892224
11261-F2-1-TISSUE	8/15/2008 0:00	10/8/2008 0:00	54.00	Y	
15936-F2-1-TISSUE	8/15/2008 0:00	10/9/2008 0:00	55.00	Y	
16499-F2-1-TISSUE	8/15/2008 0:00	10/9/2008 0:00	55.00	Y	
11252-F2-1-TISSUE	8/12/2008 0:00	10/9/2008 0:00	58.00	Y	
15301-F2-1-TISSUE	8/14/2008 0:00	10/9/2008 0:00	56.00	Y	
11193-F2-1-TISSUE	8/13/2008 0:00	10/9/2008 0:00	57.00	Y	
13342-F2-1-TISSUE	8/12/2008 0:00	10/9/2008 0:00	58.00	Y	
16213-F2-1	5/28/2008 0:00	10/8/2008 0:00	133.00	Y	A860731
13344-F2-1-TISSUE	8/13/2008 0:00	10/30/2008 0:00	78.00	Y	A892224

Accuracy

Accuracy was evaluated using the %R results for the blank spike samples (BS), Limit of Quantification (LOQ) samples, and labeled compound spikes.

The BS, LOQ and labeled compound spike recoveries %Rs were within method acceptance criteria, except for the congeners listed in “PCB_QC_Fish_UH” worksheet “PCB Fish Flags”. All LOQ failures are flagged “Q”, blank spike failures are flagged

“S” and labeled compound spike recovery failures are flagged “R”. All associated congeners are flagged according to the QC failure type.

Precision

Precision was evaluated using the Relative Percent Difference (%RPD) obtained from the parent sample/field duplicate sample results. The following samples were collected and analyzed in duplicate for field duplicate QC purposes: 15979-F1-Tissue (collected 4/30/08), 13363-F1-1-Tissue (collected 5/29/08), 15936-F1-1-Tissue (collected 4/30/08), and 11258-F1-1-Tissue (collected 5/30/08). All field duplicate results were within QAPP tolerance except for the congeners listed in “PCB_QC_Fish_UH” worksheet “PCB Fish Flags”. Both the parent and field duplicate samples were flagged “F” as estimated due to the out of tolerance % RPD. All associated congeners, that weren’t previously flagged “J”, “B” or “U” by the lab, were flagged as estimated (“F”) by the data verifier.

Lab duplicates of fish analyses were not possible due to insufficient media.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- * Comparing the chain-of-custody procedures to those described in the QAPP;
- * Evaluating holding times; and
- * Examining method blanks for contamination of samples during analysis.

The samples in this SDG were collected and analyzed following the QAPP, COC and analytical procedures. All samples were prepared and analyzed with the holding times required for the analysis.

All initial calibration criteria were met.

All continuing calibration criteria (BS) were met.

All LOQ standard criteria were met, with the exception of those listed in the accuracy table.

There was at least one method blank analyzed with each batch associated with the PCBs analyses in each SDG. The method blanks had many PCBs of concern above the RLs. The sample results that were less than five (5) times the amount found in the blank were “B” flagged for having blank contamination.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

No reported results for samples in this SDG have been rejected or invalidated. The completeness for this SDG is 100% compared to the minimum acceptance limit of 90%.

Flag Key:
H = Holding time exceedance
I = Ion ration failure
F = Field dup exceedance
L = Lab dup exceedance
S = Blank spike or lab control spike exceedance
Q = Limit of Quantitation (LOQ) exceedance
R = Surrogate/Internal Standard exceedance
J = Estimated by lab
U = Non-detected above MDL
B = Blank Contamination

APPENDIX C
INTERNAL AUDIT REPORT

**University of Houston/Parsons
Internal Audit Report**

Houston, TX

February 5, 2009

Date: February 5, 2009

Place: University of Houston, Civil and Environmental Engineering Department

Subject: TMDL for PCBs in the Houston Ship Channel

Study on the Effectiveness of BMPs to Control Bacteria Loads

Audit Attendees:

Attendee	Title	Organization
Divagar Lakshmanan	PCB contact/PostDoc	UH
Anu Desai	Graduate Student	UH
Yao Birago Kwakye-Amoah	Analyst/Graduate Student	UH
Sandra de las Fuentes	Principal Scientist	Parsons

INTRODUCTION

An on-site internal audit of the UH facility in Houston, Texas was performed on February 5, 2009 for TMDLs for PCBs in the Houston Ship Channel and the Study on the Effectiveness of BMPs to Control Bacteria Loads conducted in year 2008. The audit included a project chemist from Parsons and staff from UH. The purpose of this internal audit was to verify the accuracy and completeness of the laboratory's performance in accordance with project Quality Assurance Project Plan (QAPP), accuracy of the Standard Operating Procedures (SOP)

involved in these projects, accuracy of subcontractor's reports, processing of the data, and all quality assurance related matters.

This report is organized by the systems audited. Each section includes a list of items that were discussed with laboratory personnel during the audit. During the visit, the auditor did not witness any sample collection or sample analysis related to these projects. All items listed in this report were verbally presented by UH staff during the interview. Each section concludes with any corrective action items that must be addressed by UH staff.

CORRECTIVE ACTION ITEMS

- Items listed below are findings from the audit considered serious enough that UH is required to provide a written response containing a plan for corrective action, and a proposed form of documentation to show that the corrective action has been taken.
- UH must submit a written response containing a plan for corrective action within ten (10) working days of receipt of this report to Parsons for all Corrective Action Items listed in this report.
- UH must provide documentation that demonstrates implementation of the corrective action plan within twenty (20) working days of the approval of the corrective action plan by Parsons.

STANDARD OPERATING PROCEDURES (SOP)

1. All SOPs should have an electronic version available on file.
2. The cover page on the SOP binder does not provide adequate or correct information. Binder cover list should list SOP Name, SOP No., Revision No., and Effective Period.
3. The cover page should list SOPs included in the binder with exactly matching title, SOP #, revision dates, etc.

4. Every SOP requires a page # (see SOP B-4), revision number (see SOP B-15), and approval signature (see SOPs B-4 & G-10). Most SOPs reviewed are missing some or all requirements specified.
5. SOPs should not be too specific or personal. Refer to page 2 of SOP B-3. “Notify Louis and discontinue DI water use...”.
6. SOPs should not contain hand marked corrections. SOP B-19 changed to SOP-B-20 by hand. SOP B-14 has a hand written title.
7. SOP B-3 Step 9: “No more than 30 minutes should pass between the time the reagent is added and the trays are incubated.” When reviewing the lab records, there were several incidences that this was not met. As example, see IDEXX Logbook #11, page 118 reagent added at 17:00, trays incubated at 17:55. Exceptions must be noted.

QUALITY ASSURANCE PROJECT PLAN

1. An electronic copy of the BMP QAPP was not available, only hard copy version. If lost, or damaged, no easily accessible back-up exists.

TRAINING RECORDS

1. Training records do not document actual analytical results.
2. Records of laboratory training offered by the Department were not documented in each attendance training folder.

FIELD NOTEBOOKS

1. Some field sampler’s initials are not defined (i.e. BMP field logbook #2, page 62). A key should be included in beginning of the logbook which includes initials and full name identified.
2. Not all cross outs are initialed and dated (i.e. BMP field logbook #2, pages 73, 92).

3. Many instances where lines are skipped and final pages are not “X” or “Z” out with sampler’s initials and date.

LAB NOTEBOOKS

1. IDEXX Logbook #11 refers to SOP B-3, Revision 6, although current SOP is Revision 7. A note for when and why SOP was updated should be included in logbook.
2. No “Master Logbook” for equipment is kept. An equipment log should exist that includes main lab equipment (balances, incubators, etc.) with pertinent information including manufacturer contact, maintenance schedule, calibration results, etc.

DATA MANAGEMENT

1. Maxxam report A877812 and Xenco report 303276 and 305844 were checked against EDD and project database. The following were noted:
 - (a) All PCB results were reported as is, no %moisture adjustment were performed. It is auditor’s assumption, that final reported PCB results were adjusted by %moisture prior to submissions.
 - (b) %R of surrogates for the PCB analyses were not included in lab’s EDDs.
 - (c) %RPD of MS/MSD calculation formula is incorrect in Xenco’s reports. %RPD should be calculated based on MS and MSD results, not MS/MSD %Rs.
 - (d) There were no EDDs submitted by Xenco
 - (e) MSD is missing from the DOC analysis of report 305844