230 W. Monroe Street
Suite 2300
Chicago, IL 60606

312.578.0870 PHONE
312.578.0877 FAX

www.trcsolutions.com

May 13, 2016

Mr. Steve Faryan, On-Scene Coordinator
U.S. Environmental Protection Agency, Region 5
77 West Jackson Boulevard, SE-5J
Chicago, IL 60604

Re: Monthly Progress Report – April 4, 2016 – May 13, 2016
Sangamon Street Right-of-Way (ROW)
Chicago, Cook County, Illinois
(C54R)

Dear Mr. Faryan:

On behalf of BNSF Railway Company (BNSF), TRC Environmental Corporation (TRC) is submitting three copies of this progress report pursuant to Section 20 of the ***Administrative Settlement Agreement and Order on Consent for Removal Action Docket No. V-W-16-C-007*** (Order), dated March 16, 2016 for actions performed for the BNSF Sangamon ROW Site (Site). This progress report is completed for work dated April 4, 2016, through the date of this report:

Actions Performed:

1) Collected and submitted second composite sample (WCS-1) from the three hazardous soil areas (0 to 2 feet below ground surface [bgs]) to Pace Analytical on April 7, 2016 (laboratory analytical report is included in **Attachment 1**). This sample was analyzed for volatile organic compound (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs) and Toxicity Characteristic Leaching Procedure (TCLP) Resource Conservation and Recovery Act (RCRA) metals to evaluate if the hazardous soil could be treated and disposed of at either US Ecology's Harvey, IL facility or Peoria Disposal Company (PDC). However, due to concentrations of polynuclear aromatic hydrocarbons (PAHs) above acceptable levels, US Ecology Harvey or PDC had indicated they could not accept the material for treatment and disposal. Note, the TCLP lead result from WCS-1 is significantly below 5 milligrams per liter (mg/L) at 0.15 mg/L.

   An earlier composite sample (SHP-1) was collected on March 28, 2016, from the three hazardous soil areas (0 to 2 feet bgs), to begin the treatability process at PDC.

PDC's analytical report is included in **Attachment 2**. These are the results that were completed prior to the stoppage of the study and analysis. Note, the TCLP lead result for this composite sample (SHP-1) is also significantly below 5 mg/L at 0.20 mg/L.

2) Conducted the pre-bid contractor meeting at the Site on April 12, 2016. A copy of the attendance sheet is attached.

3) Completed the non-special waste documentation and profiling approval process. The non-special waste will be disposed of at Waste Management (WM) Laraway in Joliet, Illinois.

4) Prepared and submitted to contractors a Request for Proposal (RFP) Amendment 1 with project clarifications and responses to contractor questions on April 27, 2016.

5) Participated in a conference call with US EPA on May 5, 2016, to discuss management of the hazardous soil areas and a path forward for remediation.

   Based on discussions with the U.S. EPA, BNSF requested to stockpile the soil from the hazardous soil areas and collect a composite sample from each pile to verify whether or not it contains a hazardous concentration of lead. This revised scope was proposed because supplementary analytical results collected from within the hazardous soil areas could not be duplicated (i.e., TCLP lead concentrations were below 5 mg/L). Refer to #1 and #2 above. Based on the phone discussion, this proposed sampling approach was accepted by U.S. EPA.

   The soil material from the three hazardous soil areas will be stockpiled adjacent to each area. The soil will be placed on plastic sheeting and covered (e.g., using weighted tarpaulins or equivalent) when not adding or removing material from the pile.

   Composite soil samples (5 aliquots each) will be collected from each of the three stockpiles and analyzed for TCLP lead. If the TCLP lead results are below 5 mg/L from a stockpile composite soil sample, the associated stockpile will be disposed of at WM Laraway under the existing nonhazardous waste profile. If the TCLP lead results are above 5 mg/L from a stockpile composite soil sample, that stockpile will be flagged for treatment using a TRC-held patent triple superphosphate (TSP) and an alkaline buffer. This material is manufactured by Enviroblend and/or Free Flow Technologies. During this process, TRC will continue to monitor dust levels to ensure action levels are not exceeded. If necessary, application of water or modification of the mixing method will be implemented to suppress dust. Subsequent to treatment, a confirmation sample will be collected from each treated soil stockpile to verify that TCLP lead results are below 5 mg/L. Once the TCLP lead concentration of the stabilized soil is demonstrated to be below 5 mg/L, the soil will be disposed at WM Laraway. Refer to **Attachment 3** for further details on lead treatment experience and project examples.

6) On May 9, 2016, TRC conducted soil sampling at the three hazardous soil areas to obtain the soil required to conduct a treatability study to evaluate the ratio and

mixture of TSP required to stabilize the lead. Results from the treatability study will be provided to U.S. EPA upon completion.

7) Continued the remediation contractor procurement process. Refer to #1 below – Anticipated Action and Schedule to be performed.

8) Prepared and submitted this monthly progress report.

9) Reviewed bids for the fencing installation for the portion of the site located north of West 18th Street.

Anticipated Actions and Schedule to be performed:

1) Review the remediation contractor bids, which are due end of business day on May 4, 2016. Prior to the notice of award, BNSF will provide the contractor information to US EPA for approval. The notice of award is anticipated to occur by May 13, 2016.

2) Obtain an RCRA EPA generator ID for the hazardous waste profiling process and documentation, if necessary. Note, this will not be required if the hazardous soil is treated in-situ, rendered nonhazardous and disposed of as a non-special waste at WM Laraway.

3) The fence contractor will be selected and the installation of the fencing north of West 18th Street will be completed in May 2016.

4) Prepare and submit the next monthly progress report.

Analytical Results:

1) Refer to Action Performed #1 above. Copies of the analytical reports from Pace and PDC are attached to this letter.

Problems Encountered and Planned Resolutions:

1) None

If you have any questions regarding this submittal, please contact me at (312) 578-0870, ext. 11917 or Greg Jeffries with BNSF at (763) 782-3490.

Sincerely,

TRC

Lisa Meagher, PG
Senior Project Manager

Attachment 1: Composite Sample (WCS-1) Results Report
Attachment 2: PDC Composite Sample (SHP-1) Results Report
Attachment 3: Lead Treatment Experience and Project Examples

cc: Dennis Reis, Briggs and Morgan P.A.
Greg Jeffries, BNSF
Brooke Gaede, BNSF

S:\PROJECTS\BNSF\Sangamon ROW Loewenthal Metals Chicago\Correspondence\US EPA\Monthly Status Letters

ATTACHMENT 1

Composite Sample (WCS-1) Results Report

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

April 15, 2016

Lisa Meagher
TRC Environmental
230 West Monroe Street
Suite 2300
Chicago, IL 60606

RE: Project: 256128 SANGANON ROW
Pace Project No.: 40130488

Dear Lisa Meagher:
Enclosed are the analytical results for sample(s) received by the laboratory on April 08, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Laurie Woelfel

Laurie Woelfel
laurie.woelfel@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

CERTIFICATIONS

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

Green Bay Certification IDs
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
Virginia VELAP ID: 460263
North Dakota Certification #: R-150
South Carolina Certification #: 83006001
Texas Certification #: T104704529-14-1
US Dept of Agriculture #: S-76505
Virginia VELAP ID: 460263
Virginia VELAP Certification ID: 460263
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE SUMMARY

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40130488001	**WCS-1**	Solid	04/07/16 08:30	04/08/16 09:55

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE ANALYTE COUNT

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40130488001	**WCS-1**	EPA 8082	BDS	10
		EPA 6010	DLB	7
		EPA 7470	AJT	1
		EPA 8270	RJN	70
		EPA 8260	HNW	38
		ASTM D2974-87	SKW	1

Pace Analytical Services, Inc.
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SUMMARY OF DETECTION

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
40130488001	**WCS-1**					
EPA 8082	PCB-1254 (Aroclor 1254)	199	ug/kg	64.9	04/11/16 19:22	
EPA 8082	PCB-1260 (Aroclor 1260)	178	ug/kg	64.9	04/11/16 19:22	
EPA 8082	PCB, Total	376	ug/kg	64.9	04/11/16 19:22	
EPA 6010	Arsenic	0.032J	mg/L	0.050	04/14/16 14:16	
EPA 6010	Barium	1.7	mg/L	0.50	04/14/16 14:16	
EPA 6010	Cadmium	0.024	mg/L	0.0050	04/14/16 14:16	
EPA 6010	Lead	0.15	mg/L	0.012	04/14/16 14:16	
EPA 8270	2-Methylnaphthalene	3420J	ug/kg	7500	04/14/16 11:46	
EPA 8270	Acenaphthene	6960J	ug/kg	10200	04/14/16 11:46	
EPA 8270	Anthracene	12300	ug/kg	4620	04/14/16 11:46	
EPA 8270	Benzo(a)anthracene	28100	ug/kg	4470	04/14/16 11:46	
EPA 8270	Benzo(a)pyrene	26600	ug/kg	4350	04/14/16 11:46	
EPA 8270	Benzo(b)fluoranthene	24800	ug/kg	4960	04/14/16 11:46	
EPA 8270	Benzo(g,h,i)perylene	16300	ug/kg	7560	04/14/16 11:46	
EPA 8270	Benzo(k)fluoranthene	28600	ug/kg	6920	04/14/16 11:46	
EPA 8270	Carbazole	7610	ug/kg	4520	04/14/16 11:46	
EPA 8270	Chrysene	35900	ug/kg	4320	04/14/16 11:46	
EPA 8270	Dibenz(a,h)anthracene	4030J	ug/kg	7850	04/14/16 11:46	
EPA 8270	Dibenzofuran	6510	ug/kg	3500	04/14/16 11:46	
EPA 8270	Fluoranthene	76400	ug/kg	4090	04/14/16 11:46	
EPA 8270	Fluorene	8810	ug/kg	3380	04/14/16 11:46	
EPA 8270	Indeno(1,2,3-cd)pyrene	15300	ug/kg	6250	04/14/16 11:46	
EPA 8270	Naphthalene	10300	ug/kg	10100	04/14/16 11:46	
EPA 8270	Phenanthrene	72700	ug/kg	3710	04/14/16 11:46	
EPA 8270	Pyrene	75600	ug/kg	6400	04/14/16 11:46	
EPA 8260	Acetone	124	ug/kg	41.6	04/12/16 10:23	
ASTM D2974-87	Percent Moisture	23.0	%	0.10	04/11/16 12:21	

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
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ANALYTICAL RESULTS

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

Sample: WCS-1 **Lab ID: 40130488001** Collected: 04/07/16 08:30 Received: 04/08/16 09:55 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8082 GCS PCB	Analytical Method: EPA 8082 Preparation Method: EPA 3541								
PCB-1016 (Aroclor 1016)	**<32.5**	ug/kg	64.9	32.5	1	04/11/16 10:13	04/11/16 19:22	12674-11-2	
PCB-1221 (Aroclor 1221)	**<32.5**	ug/kg	64.9	32.5	1	04/11/16 10:13	04/11/16 19:22	11104-28-2	
PCB-1232 (Aroclor 1232)	**<32.5**	ug/kg	64.9	32.5	1	04/11/16 10:13	04/11/16 19:22	11141-16-5	
PCB-1242 (Aroclor 1242)	**<32.5**	ug/kg	64.9	32.5	1	04/11/16 10:13	04/11/16 19:22	53469-21-9	
PCB-1248 (Aroclor 1248)	**<32.5**	ug/kg	64.9	32.5	1	04/11/16 10:13	04/11/16 19:22	12672-29-6	
PCB-1254 (Aroclor 1254)	**199**	ug/kg	64.9	32.5	1	04/11/16 10:13	04/11/16 19:22	11097-69-1	
PCB-1260 (Aroclor 1260)	**178**	ug/kg	64.9	32.5	1	04/11/16 10:13	04/11/16 19:22	11096-82-5	
PCB, Total	**376**	ug/kg	64.9	32.5	1	04/11/16 10:13	04/11/16 19:22	1336-36-3	
Surrogates									
Tetrachloro-m-xylene (S)	82	%	63-130		1	04/11/16 10:13	04/11/16 19:22	877-09-8	
Decachlorobiphenyl (S)	72	%	48-130		1	04/11/16 10:13	04/11/16 19:22	2051-24-3	
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Leachate Method/Date: EPA 1311; 04/11/16 00:00								
Arsenic	**0.032J**	mg/L	0.050	0.025	1	04/12/16 10:59	04/14/16 14:16	7440-38-2	
Barium	**1.7**	mg/L	0.50	0.25	1	04/12/16 10:59	04/14/16 14:16	7440-39-3	
Cadmium	**0.024**	mg/L	0.0050	0.0025	1	04/12/16 10:59	04/14/16 14:16	7440-43-9	
Chromium	**<0.025**	mg/L	0.050	0.025	1	04/12/16 10:59	04/14/16 14:16	7440-47-3	
Lead	**0.15**	mg/L	0.012	0.0030	1	04/12/16 10:59	04/14/16 14:16	7439-92-1	
Selenium	**<0.025**	mg/L	0.050	0.025	1	04/12/16 10:59	04/14/16 14:16	7782-49-2	
Silver	**<0.025**	mg/L	0.050	0.025	1	04/12/16 10:59	04/14/16 14:16	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Leachate Method/Date: EPA 1311; 04/11/16 00:00								
Mercury	**<0.10**	ug/L	0.20	0.10	1	04/12/16 10:25	04/12/16 14:37	7439-97-6	
8270 MSSV FULL LIST MICROWAVE	Analytical Method: EPA 8270 Preparation Method: EPA 3546								
1,2,4-Trichlorobenzene	**<980**	ug/kg	3270	980	40	04/14/16 10:36	04/14/16 11:46	120-82-1	
1,2-Dichlorobenzene	**<2730**	ug/kg	9080	2730	40	04/14/16 10:36	04/14/16 11:46	95-50-1	
1,3-Dichlorobenzene	**<1200**	ug/kg	4000	1200	40	04/14/16 10:36	04/14/16 11:46	541-73-1	
1,4-Dichlorobenzene	**<1210**	ug/kg	4020	1210	40	04/14/16 10:36	04/14/16 11:46	106-46-7	
2,2'-Oxybis(1-chloropropane)	**<2240**	ug/kg	7450	2240	40	04/14/16 10:36	04/14/16 11:46	108-60-1	
2,4,5-Trichlorophenol	**<1530**	ug/kg	5100	1530	40	04/14/16 10:36	04/14/16 11:46	95-95-4	
2,4,6-Trichlorophenol	**<1320**	ug/kg	4400	1320	40	04/14/16 10:36	04/14/16 11:46	88-06-2	
2,4-Dichlorophenol	**<2320**	ug/kg	7720	2320	40	04/14/16 10:36	04/14/16 11:46	120-83-2	
2,4-Dimethylphenol	**<1710**	ug/kg	5710	1710	40	04/14/16 10:36	04/14/16 11:46	105-67-9	
2,4-Dinitrophenol	**<2640**	ug/kg	8800	2640	40	04/14/16 10:36	04/14/16 11:46	51-28-5	
2,4-Dinitrotoluene	**<1240**	ug/kg	4130	1240	40	04/14/16 10:36	04/14/16 11:46	121-14-2	
2,6-Dinitrotoluene	**<1650**	ug/kg	5480	1650	40	04/14/16 10:36	04/14/16 11:46	606-20-2	
2-Chloronaphthalene	**<1110**	ug/kg	3710	1110	40	04/14/16 10:36	04/14/16 11:46	91-58-7	
2-Chlorophenol	**<2160**	ug/kg	7210	2160	40	04/14/16 10:36	04/14/16 11:46	95-57-8	
2-Methylnaphthalene	**3420J**	ug/kg	7500	2250	40	04/14/16 10:36	04/14/16 11:46	91-57-6	
2-Methylphenol(o-Cresol)	**<1570**	ug/kg	5250	1570	40	04/14/16 10:36	04/14/16 11:46	95-48-7	
2-Nitroaniline	**<2470**	ug/kg	8230	2470	40	04/14/16 10:36	04/14/16 11:46	88-74-4	
2-Nitrophenol	**<2740**	ug/kg	9120	2740	40	04/14/16 10:36	04/14/16 11:46	88-75-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

Sample: WCS-1 **Lab ID: 40130488001** Collected: 04/07/16 08:30 Received: 04/08/16 09:55 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV FULL LIST MICROWAVE	Analytical Method: EPA 8270 Preparation Method: EPA 3546								
3&4-Methylphenol(m&p Cresol)	**<1590**	ug/kg	5290	1590	40	04/14/16 10:36	04/14/16 11:46		
3,3'-Dichlorobenzidine	**<2350**	ug/kg	7840	2350	40	04/14/16 10:36	04/14/16 11:46	91-94-1	
3-Nitroaniline	**<1470**	ug/kg	4910	1470	40	04/14/16 10:36	04/14/16 11:46	99-09-2	
4,6-Dinitro-2-methylphenol	**<2670**	ug/kg	8900	2670	40	04/14/16 10:36	04/14/16 11:46	534-52-1	
4-Bromophenylphenyl ether	**<1820**	ug/kg	6050	1820	40	04/14/16 10:36	04/14/16 11:46	101-55-3	
4-Chloro-3-methylphenol	**<2700**	ug/kg	8990	2700	40	04/14/16 10:36	04/14/16 11:46	59-50-7	
4-Chloroaniline	**<1420**	ug/kg	4750	1420	40	04/14/16 10:36	04/14/16 11:46	106-47-8	
4-Chlorophenylphenyl ether	**<1610**	ug/kg	5380	1610	40	04/14/16 10:36	04/14/16 11:46	7005-72-3	
4-Nitroaniline	**<3600**	ug/kg	12000	3600	40	04/14/16 10:36	04/14/16 11:46	100-01-6	
4-Nitrophenol	**<2180**	ug/kg	7270	2180	40	04/14/16 10:36	04/14/16 11:46	100-02-7	
Acenaphthene	**6960J**	ug/kg	10200	3070	40	04/14/16 10:36	04/14/16 11:46	83-32-9	
Acenaphthylene	**<3090**	ug/kg	10300	3090	40	04/14/16 10:36	04/14/16 11:46	208-96-8	
Anthracene	**12300**	ug/kg	4620	1390	40	04/14/16 10:36	04/14/16 11:46	120-12-7	
Benzo(a)anthracene	**28100**	ug/kg	4470	1340	40	04/14/16 10:36	04/14/16 11:46	56-55-3	
Benzo(a)pyrene	**26600**	ug/kg	4350	1300	40	04/14/16 10:36	04/14/16 11:46	50-32-8	
Benzo(b)fluoranthene	**24800**	ug/kg	4960	1490	40	04/14/16 10:36	04/14/16 11:46	205-99-2	
Benzo(g,h,i)perylene	**16300**	ug/kg	7560	2270	40	04/14/16 10:36	04/14/16 11:46	191-24-2	
Benzo(k)fluoranthene	**28600**	ug/kg	6920	2080	40	04/14/16 10:36	04/14/16 11:46	207-08-9	
Butylbenzylphthalate	**<1390**	ug/kg	4630	1390	40	04/14/16 10:36	04/14/16 11:46	85-68-7	
Carbazole	**7610**	ug/kg	4520	1360	40	04/14/16 10:36	04/14/16 11:46	86-74-8	
Chrysene	**35900**	ug/kg	4320	1300	40	04/14/16 10:36	04/14/16 11:46	218-01-9	
Di-n-butylphthalate	**<1300**	ug/kg	4320	1300	40	04/14/16 10:36	04/14/16 11:46	84-74-2	
Di-n-octylphthalate	**<1950**	ug/kg	6500	1950	40	04/14/16 10:36	04/14/16 11:46	117-84-0	
Dibenz(a,h)anthracene	**4030J**	ug/kg	7850	2350	40	04/14/16 10:36	04/14/16 11:46	53-70-3	
Dibenzofuran	**6510**	ug/kg	3500	1050	40	04/14/16 10:36	04/14/16 11:46	132-64-9	
Diethylphthalate	**<1440**	ug/kg	4790	1440	40	04/14/16 10:36	04/14/16 11:46	84-66-2	
Dimethylphthalate	**<1130**	ug/kg	3760	1130	40	04/14/16 10:36	04/14/16 11:46	131-11-3	
Fluoranthene	**76400**	ug/kg	4090	1230	40	04/14/16 10:36	04/14/16 11:46	206-44-0	
Fluorene	**8810**	ug/kg	3380	1010	40	04/14/16 10:36	04/14/16 11:46	86-73-7	
Hexachloro-1,3-butadiene	**<2210**	ug/kg	7360	2210	40	04/14/16 10:36	04/14/16 11:46	87-68-3	
Hexachlorobenzene	**<1460**	ug/kg	4860	1460	40	04/14/16 10:36	04/14/16 11:46	118-74-1	
Hexachlorocyclopentadiene	**<2050**	ug/kg	6840	2050	40	04/14/16 10:36	04/14/16 11:46	77-47-4	
Hexachloroethane	**<1390**	ug/kg	4620	1390	40	04/14/16 10:36	04/14/16 11:46	67-72-1	
Indeno(1,2,3-cd)pyrene	**15300**	ug/kg	6250	1880	40	04/14/16 10:36	04/14/16 11:46	193-39-5	
Isophorone	**<1330**	ug/kg	4440	1330	40	04/14/16 10:36	04/14/16 11:46	78-59-1	
N-Nitroso-di-n-propylamine	**<1370**	ug/kg	4580	1370	40	04/14/16 10:36	04/14/16 11:46	621-64-7	
N-Nitrosodiphenylamine	**<11800**	ug/kg	39200	11800	40	04/14/16 10:36	04/14/16 11:46	86-30-6	
Naphthalene	**10300**	ug/kg	10100	3030	40	04/14/16 10:36	04/14/16 11:46	91-20-3	
Nitrobenzene	**<1760**	ug/kg	5860	1760	40	04/14/16 10:36	04/14/16 11:46	98-95-3	
Pentachlorophenol	**<1910**	ug/kg	6360	1910	40	04/14/16 10:36	04/14/16 11:46	87-86-5	
Phenanthrene	**72700**	ug/kg	3710	1110	40	04/14/16 10:36	04/14/16 11:46	85-01-8	
Phenol	**<2060**	ug/kg	6860	2060	40	04/14/16 10:36	04/14/16 11:46	108-95-2	
Pyrene	**75600**	ug/kg	6400	1920	40	04/14/16 10:36	04/14/16 11:46	129-00-0	
bis(2-Chloroethoxy)methane	**<2330**	ug/kg	7780	2330	40	04/14/16 10:36	04/14/16 11:46	111-91-1	
bis(2-Chloroethyl) ether	**<2710**	ug/kg	9020	2710	40	04/14/16 10:36	04/14/16 11:46	111-44-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

Sample: WCS-1 **Lab ID: 40130488001** Collected: 04/07/16 08:30 Received: 04/08/16 09:55 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV FULL LIST MICROWAVE	Analytical Method: EPA 8270 Preparation Method: EPA 3546								
bis(2-Ethylhexyl)phthalate	**<1440**	ug/kg	4800	1440	40	04/14/16 10:36	04/14/16 11:46	117-81-7	
Surrogates									
Nitrobenzene-d5 (S)	55	%	32-130		40	04/14/16 10:36	04/14/16 11:46	4165-60-0	
2-Fluorobiphenyl (S)	59	%	33-130		40	04/14/16 10:36	04/14/16 11:46	321-60-8	
Terphenyl-d14 (S)	74	%	27-143		40	04/14/16 10:36	04/14/16 11:46	1718-51-0	
Phenol-d6 (S)	27	%	35-130		40	04/14/16 10:36	04/14/16 11:46	13127-88-3	S4
2-Fluorophenol (S)	37	%	31-130		40	04/14/16 10:36	04/14/16 11:46	367-12-4	
2,4,6-Tribromophenol (S)	37	%	10-130		40	04/14/16 10:36	04/14/16 11:46	118-79-6	
8260 MSV 5035 Low Level	Analytical Method: EPA 8260 Preparation Method: EPA 8260								
Acetone	**124**	ug/kg	41.6	12.5	1	04/12/16 05:00	04/12/16 10:23	67-64-1	
Benzene	**<6.2**	ug/kg	20.5	6.2	1	04/12/16 05:00	04/12/16 10:23	71-43-2	
Bromodichloromethane	**<4.3**	ug/kg	14.5	4.3	1	04/12/16 05:00	04/12/16 10:23	75-27-4	
Bromoform	**<5.5**	ug/kg	18.2	5.5	1	04/12/16 05:00	04/12/16 10:23	75-25-2	
Bromomethane	**<10**	ug/kg	33.2	10	1	04/12/16 05:00	04/12/16 10:23	74-83-9	
2-Butanone (MEK)	**<6.1**	ug/kg	20.3	6.1	1	04/12/16 05:00	04/12/16 10:23	78-93-3	
Carbon disulfide	**<6.3**	ug/kg	21.0	6.3	1	04/12/16 05:00	04/12/16 10:23	75-15-0	
Carbon tetrachloride	**<6.6**	ug/kg	22.1	6.6	1	04/12/16 05:00	04/12/16 10:23	56-23-5	
Chlorobenzene	**<4.8**	ug/kg	15.9	4.8	1	04/12/16 05:00	04/12/16 10:23	108-90-7	
Chloroethane	**<5.8**	ug/kg	19.2	5.8	1	04/12/16 05:00	04/12/16 10:23	75-00-3	
Chloroform	**<6.9**	ug/kg	23.1	6.9	1	04/12/16 05:00	04/12/16 10:23	67-66-3	
Chloromethane	**<5.5**	ug/kg	18.2	5.5	1	04/12/16 05:00	04/12/16 10:23	74-87-3	
Dibromochloromethane	**<4.2**	ug/kg	14.1	4.2	1	04/12/16 05:00	04/12/16 10:23	124-48-1	
1,1-Dichloroethane	**<6.0**	ug/kg	20.0	6.0	1	04/12/16 05:00	04/12/16 10:23	75-34-3	
1,2-Dichloroethane	**<6.8**	ug/kg	22.6	6.8	1	04/12/16 05:00	04/12/16 10:23	107-06-2	
1,1-Dichloroethene	**<6.8**	ug/kg	22.7	6.8	1	04/12/16 05:00	04/12/16 10:23	75-35-4	
cis-1,2-Dichloroethene	**<6.9**	ug/kg	22.9	6.9	1	04/12/16 05:00	04/12/16 10:23	156-59-2	
trans-1,2-Dichloroethene	**<7.0**	ug/kg	23.2	7.0	1	04/12/16 05:00	04/12/16 10:23	156-60-5	
1,2-Dichloropropane	**<4.2**	ug/kg	13.9	4.2	1	04/12/16 05:00	04/12/16 10:23	78-87-5	
cis-1,3-Dichloropropene	**<3.3**	ug/kg	11.0	3.3	1	04/12/16 05:00	04/12/16 10:23	10061-01-5	
trans-1,3-Dichloropropene	**<3.1**	ug/kg	10.5	3.1	1	04/12/16 05:00	04/12/16 10:23	10061-02-6	
Ethylbenzene	**<4.9**	ug/kg	16.3	4.9	1	04/12/16 05:00	04/12/16 10:23	100-41-4	
2-Hexanone	**<3.9**	ug/kg	13.0	3.9	1	04/12/16 05:00	04/12/16 10:23	591-78-6	
Methylene Chloride	**<6.4**	ug/kg	21.3	6.4	1	04/12/16 05:00	04/12/16 10:23	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<4.3**	ug/kg	14.3	4.3	1	04/12/16 05:00	04/12/16 10:23	108-10-1	
Methyl-tert-butyl ether	**<6.6**	ug/kg	22.0	6.6	1	04/12/16 05:00	04/12/16 10:23	1634-04-4	
Styrene	**<5.4**	ug/kg	18.1	5.4	1	04/12/16 05:00	04/12/16 10:23	100-42-5	
1,1,2,2-Tetrachloroethane	**<4.5**	ug/kg	14.9	4.5	1	04/12/16 05:00	04/12/16 10:23	79-34-5	
Tetrachloroethene	**<5.9**	ug/kg	19.6	5.9	1	04/12/16 05:00	04/12/16 10:23	127-18-4	
Toluene	**<4.7**	ug/kg	15.6	4.7	1	04/12/16 05:00	04/12/16 10:23	108-88-3	
1,1,1-Trichloroethane	**<7.1**	ug/kg	23.6	7.1	1	04/12/16 05:00	04/12/16 10:23	71-55-6	
1,1,2-Trichloroethane	**<5.0**	ug/kg	16.8	5.0	1	04/12/16 05:00	04/12/16 10:23	79-00-5	
Trichloroethene	**<4.6**	ug/kg	15.3	4.6	1	04/12/16 05:00	04/12/16 10:23	79-01-6	
Vinyl chloride	**<6.0**	ug/kg	19.9	6.0	1	04/12/16 05:00	04/12/16 10:23	75-01-4	
Xylene (Total)	**<15.7**	ug/kg	52.4	15.7	1	04/12/16 05:00	04/12/16 10:23	1330-20-7	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

Sample: WCS-1 **Lab ID: 40130488001** Collected: 04/07/16 08:30 Received: 04/08/16 09:55 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5035 Low Level	Analytical Method: EPA 8260 Preparation Method: EPA 8260								
Surrogates									
Dibromofluoromethane (S)	127	%	70-130		1	04/12/16 05:00	04/12/16 10:23	1868-53-7	
Toluene-d8 (S)	114	%	70-130		1	04/12/16 05:00	04/12/16 10:23	2037-26-5	
4-Bromofluorobenzene (S)	75	%	69-130		1	04/12/16 05:00	04/12/16 10:23	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**23.0**	%	0.10	0.10	1		04/11/16 12:21		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
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QUALITY CONTROL DATA

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

QC Batch: MERP/5681 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury TCLP
Associated Lab Samples: 40130488001

METHOD BLANK: 1318423 Matrix: Water
Associated Lab Samples: 40130488001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.10	0.20	0.10	04/12/16 14:08	

METHOD BLANK: 1318091 Matrix: Water
Associated Lab Samples: 40130488001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.10	0.20	0.10	04/12/16 14:40	

LABORATORY CONTROL SAMPLE: 1318424

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.7	115	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1318425 1318426

Parameter	Units	40130371001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	0.11J	5	5	5.9	5.7	115	112	85-115	3	20	

MATRIX SPIKE SAMPLE: 1318427

Parameter	Units	40130456001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	0.11J	5	5.7	112	85-115	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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QUALITY CONTROL DATA

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

QC Batch: MPRP/13596
QC Batch Method: EPA 3010
Analysis Method: EPA 6010
Analysis Description: 6010 MET TCLP
Associated Lab Samples: 40130488001

METHOD BLANK: 1318901 Matrix: Water
Associated Lab Samples: 40130488001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/L	<0.025	0.050	0.025	04/14/16 13:45	
Barium	mg/L	<0.25	0.50	0.25	04/14/16 13:45	
Cadmium	mg/L	<0.0025	0.0050	0.0025	04/14/16 13:45	
Chromium	mg/L	<0.025	0.050	0.025	04/14/16 13:45	
Lead	mg/L	<0.0030	0.012	0.0030	04/14/16 13:45	
Selenium	mg/L	<0.025	0.050	0.025	04/14/16 13:45	
Silver	mg/L	<0.025	0.050	0.025	04/14/16 13:45	

METHOD BLANK: 1318090 Matrix: Solid
Associated Lab Samples: 40130488001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/L	<0.025	0.050	0.025	04/14/16 14:25	
Barium	mg/L	<0.25	0.50	0.25	04/14/16 14:25	
Cadmium	mg/L	<0.0025	0.0050	0.0025	04/14/16 14:25	
Chromium	mg/L	<0.025	0.050	0.025	04/14/16 14:25	
Lead	mg/L	<0.0030	0.012	0.0030	04/14/16 14:25	
Selenium	mg/L	<0.025	0.050	0.025	04/14/16 14:25	
Silver	mg/L	<0.025	0.050	0.025	04/14/16 14:25	

LABORATORY CONTROL SAMPLE: 1318902

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.5	0.50	99	80-120	
Barium	mg/L	.5	0.49J	97	80-120	
Cadmium	mg/L	.5	0.51	101	80-120	
Chromium	mg/L	.5	0.49	97	80-120	
Lead	mg/L	.5	0.49	98	80-120	
Selenium	mg/L	.5	0.50	101	80-120	
Silver	mg/L	.25	0.24	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1318903 1318904

Parameter	Units	40130371001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	<0.025	.5	.5	0.55	0.51	106	99	75-125	7	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
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(920)469-2436

QUALITY CONTROL DATA

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1318903 1318904

Parameter	Units	40130371001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	mg/L	0.39J	.5	.5	0.91	0.86	105	94	75-125	6	20	
Cadmium	mg/L	0.0048J	.5	.5	0.56	0.53	111	104	75-125	6	20	
Chromium	mg/L	<0.025	.5	.5	0.50	0.46	99	92	75-125	7	20	
Lead	mg/L	<0.0030	.5	.5	0.49	0.47	98	93	75-125	5	20	
Selenium	mg/L	<0.025	.5	.5	0.56	0.52	111	102	75-125	8	20	
Silver	mg/L	<0.025	.25	.25	0.28	0.26	111	106	75-125	5	20	

MATRIX SPIKE SAMPLE: 1319388

Parameter	Units	40130456001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	<0.025	.5	0.53	106	75-125	
Barium	mg/L	<0.25	.5	0.74	101	75-125	
Cadmium	mg/L	<0.0025	.5	0.55	109	75-125	
Chromium	mg/L	<0.025	.5	0.50	99	75-125	
Lead	mg/L	<0.0030	.5	0.50	100	75-125	
Selenium	mg/L	<0.025	.5	0.55	110	75-125	
Silver	mg/L	<0.025	.25	0.26	106	75-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

QC Batch: MSV/32994
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV Low
Associated Lab Samples: 40130488001

METHOD BLANK: 1319152
Matrix: Solid
Associated Lab Samples: 40130488001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/kg	<5.4	18.1	5.4	04/12/16 08:00	
1,1,2,2-Tetrachloroethane	ug/kg	<3.4	11.4	3.4	04/12/16 08:00	
1,1,2-Trichloroethane	ug/kg	<3.9	12.9	3.9	04/12/16 08:00	
1,1-Dichloroethane	ug/kg	<4.6	15.3	4.6	04/12/16 08:00	
1,1-Dichloroethene	ug/kg	<5.2	17.4	5.2	04/12/16 08:00	
1,2-Dichloroethane	ug/kg	<5.2	17.3	5.2	04/12/16 08:00	
1,2-Dichloropropane	ug/kg	<3.2	10.7	3.2	04/12/16 08:00	
2-Butanone (MEK)	ug/kg	<4.7	15.6	4.7	04/12/16 08:00	
2-Hexanone	ug/kg	<3.0	10	3.0	04/12/16 08:00	
4-Methyl-2-pentanone (MIBK)	ug/kg	<3.3	10.9	3.3	04/12/16 08:00	
Acetone	ug/kg	<9.6	31.9	9.6	04/12/16 08:00	
Benzene	ug/kg	<4.7	15.7	4.7	04/12/16 08:00	
Bromodichloromethane	ug/kg	<3.3	11.1	3.3	04/12/16 08:00	
Bromoform	ug/kg	<4.2	13.9	4.2	04/12/16 08:00	
Bromomethane	ug/kg	<7.6	25.4	7.6	04/12/16 08:00	
Carbon disulfide	ug/kg	<4.8	16.1	4.8	04/12/16 08:00	
Carbon tetrachloride	ug/kg	<5.1	16.9	5.1	04/12/16 08:00	
Chlorobenzene	ug/kg	<3.6	12.2	3.6	04/12/16 08:00	
Chloroethane	ug/kg	<4.4	14.7	4.4	04/12/16 08:00	
Chloroform	ug/kg	<5.3	17.7	5.3	04/12/16 08:00	
Chloromethane	ug/kg	<4.2	13.9	4.2	04/12/16 08:00	
cis-1,2-Dichloroethene	ug/kg	<5.3	17.5	5.3	04/12/16 08:00	
cis-1,3-Dichloropropene	ug/kg	<2.5	8.4	2.5	04/12/16 08:00	
Dibromochloromethane	ug/kg	<3.2	10.8	3.2	04/12/16 08:00	
Ethylbenzene	ug/kg	<3.7	12.5	3.7	04/12/16 08:00	
Methyl-tert-butyl ether	ug/kg	<5.0	16.8	5.0	04/12/16 08:00	
Methylene Chloride	ug/kg	<4.9	16.3	4.9	04/12/16 08:00	
Styrene	ug/kg	<4.2	13.9	4.2	04/12/16 08:00	
Tetrachloroethene	ug/kg	<4.5	15.0	4.5	04/12/16 08:00	
Toluene	ug/kg	<3.6	11.9	3.6	04/12/16 08:00	
trans-1,2-Dichloroethene	ug/kg	<5.3	17.8	5.3	04/12/16 08:00	
trans-1,3-Dichloropropene	ug/kg	<2.4	8.0	2.4	04/12/16 08:00	
Trichloroethene	ug/kg	<3.5	11.7	3.5	04/12/16 08:00	
Vinyl chloride	ug/kg	<4.6	15.2	4.6	04/12/16 08:00	
Xylene (Total)	ug/kg	<12.0	40.1	12.0	04/12/16 08:00	
4-Bromofluorobenzene (S)	%	85	69-130		04/12/16 08:00	
Dibromofluoromethane (S)	%	110	70-130		04/12/16 08:00	
Toluene-d8 (S)	%	103	70-130		04/12/16 08:00	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

LABORATORY CONTROL SAMPLE & LCSD: 1319153 1319154

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,1,1-Trichloroethane	ug/kg	50	54.9	57.3	110	115	70-130	4	20	
1,1,2,2-Tetrachloroethane	ug/kg	50	62.9	65.1	126	130	70-130	3	20	
1,1,2-Trichloroethane	ug/kg	50	47.7	50.7	95	101	70-133	6	20	
1,1-Dichloroethane	ug/kg	50	54.8	54.2	110	108	60-130	1	20	
1,1-Dichloroethene	ug/kg	50	53.3	56.2	107	112	57-131	5	20	
1,2-Dichloroethane	ug/kg	50	59.9	57.9	120	116	67-135	4	20	
1,2-Dichloropropane	ug/kg	50	49.7	51.5	99	103	70-130	4	20	
Benzene	ug/kg	50	55.8	55.7	112	111	70-130	0	20	
Bromodichloromethane	ug/kg	50	51.5	52.2	103	104	70-132	1	20	
Bromoform	ug/kg	50	41.6	46.4	83	93	70-130	11	20	
Bromomethane	ug/kg	50	51.5	52.6	103	105	45-130	2	20	
Carbon disulfide	ug/kg	50	66.4	66.6	133	133	63-139	0	20	
Carbon tetrachloride	ug/kg	50	53.6	53.4	107	107	70-130	0	20	
Chlorobenzene	ug/kg	50	49.1	54.7	98	109	70-130	11	20	
Chloroethane	ug/kg	50	46.7	47.9	93	96	37-133	3	23	
Chloroform	ug/kg	50	54.5	56.8	109	114	70-130	4	20	
Chloromethane	ug/kg	50	37.5	41.0	75	82	38-130	9	20	
cis-1,2-Dichloroethene	ug/kg	50	51.1	52.6	102	105	70-130	3	20	
cis-1,3-Dichloropropene	ug/kg	50	58.7	58.7	117	117	70-130	0	20	
Dibromochloromethane	ug/kg	50	49.6	53.9	99	108	70-130	8	20	
Ethylbenzene	ug/kg	50	44.2	47.4	88	95	70-130	7	20	
Methyl-tert-butyl ether	ug/kg	50	57.0	55.6	114	111	62-130	3	20	
Methylene Chloride	ug/kg	50	58.4	62.8	117	126	47-151	7	20	
Styrene	ug/kg	50	48.1	51.6	96	103	70-130	7	20	
Tetrachloroethene	ug/kg	50	45.2	47.0	90	94	70-130	4	21	
Toluene	ug/kg	50	48.9	53.8	98	108	70-130	9	20	
trans-1,2-Dichloroethene	ug/kg	50	51.5	52.1	103	104	63-130	1	20	
trans-1,3-Dichloropropene	ug/kg	50	50.5	56.1	101	112	70-130	11	20	
Trichloroethene	ug/kg	50	51.0	51.1	102	102	70-130	0	20	
Vinyl chloride	ug/kg	50	47.6	47.3	95	95	51-130	1	20	
Xylene (Total)	ug/kg	150	147	161	98	107	70-130	9	20	
4-Bromofluorobenzene (S)	%				91	94	69-130			
Dibromofluoromethane (S)	%				110	112	70-130			
Toluene-d8 (S)	%				98	104	70-130			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1319155 1319156

Parameter	Units	40130291003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/kg	<3.9	37.3	35.6	30.3	29.8	81	84	40-155	1	37	
1,1,2,2-Tetrachloroethane	ug/kg	<2.5	37.3	35.6	30.0	36.9	80	104	11-166	21	50	
1,1,2-Trichloroethane	ug/kg	<2.8	37.3	35.6	24.0	27.4	64	77	15-171	13	46	
1,1-Dichloroethane	ug/kg	<3.3	37.3	35.6	29.4	30.0	79	84	31-149	2	35	
1,1-Dichloroethene	ug/kg	<3.8	37.3	35.6	31.0	30.5	83	86	42-145	2	41	
1,2-Dichloroethane	ug/kg	<3.7	37.3	35.6	28.5	31.5	76	88	12-177	10	36	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1319155 1319156

Parameter	Units	40130291003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,2-Dichloropropane	ug/kg	<2.3	37.3	35.6	26.5	26.0	71	73	22-158	2	31	
Benzene	ug/kg	<3.4	37.3	35.6	28.9	29.3	78	82	27-150	1	37	
Bromodichloromethane	ug/kg	<2.4	37.3	35.6	26.0	27.6	70	77	10-176	6	29	
Bromoform	ug/kg	<3.0	37.3	35.6	19.1	24.1	51	68	10-184	23	41	
Bromomethane	ug/kg	<5.5	37.3	35.6	28.2	29.6	76	83	18-146	5	36	
Carbon disulfide	ug/kg	<3.5	37.3	35.6	36.0	34.8	96	97	33-152	3	39	
Carbon tetrachloride	ug/kg	<3.7	37.3	35.6	29.1	28.5	78	80	38-162	2	43	
Chlorobenzene	ug/kg	<2.6	37.3	35.6	27.3	26.8	73	75	10-167	2	40	
Chloroethane	ug/kg	<3.2	37.3	35.6	27.3	27.2	73	76	34-146	0	35	
Chloroform	ug/kg	<3.8	37.3	35.6	30.1	30.6	81	86	26-158	2	36	
Chloromethane	ug/kg	<3.0	37.3	35.6	27.8	25.5	75	72	38-130	8	38	
cis-1,2-Dichloroethene	ug/kg	<3.8	37.3	35.6	28.0	28.3	75	79	22-158	1	35	
cis-1,3-Dichloropropene	ug/kg	<1.8	37.3	35.6	29.0	30.3	78	85	10-176	5	30	
Dibromochloromethane	ug/kg	<2.3	37.3	35.6	25.2	27.9	68	78	10-179	10	40	
Ethylbenzene	ug/kg	<2.7	37.3	35.6	24.5	23.8	66	67	17-164	3	48	
Methyl-tert-butyl ether	ug/kg	<3.7	37.3	35.6	24.4	30.3	66	85	27-156	22	36	
Methylene Chloride	ug/kg	<3.5	37.3	35.6	31.0	32.0	83	90	23-158	3	41	
Styrene	ug/kg	<3.0	37.3	35.6	27.9	27.9	75	78	10-175	0	33	
Tetrachloroethene	ug/kg	<3.2	37.3	35.6	24.9	24.5	67	69	31-163	2	46	
Toluene	ug/kg	<2.6	37.3	35.6	27.7	26.9	74	76	28-157	3	47	
trans-1,2-Dichloroethene	ug/kg	<3.9	37.3	35.6	30.8	28.9	83	81	34-151	6	41	
trans-1,3-Dichloropropene	ug/kg	<1.7	37.3	35.6	26.5	29.4	71	82	10-181	10	42	
Trichloroethene	ug/kg	<2.5	37.3	35.6	27.8	25.7	75	72	26-160	8	33	
Vinyl chloride	ug/kg	<3.3	37.3	35.6	30.5	29.4	82	83	44-130	4	38	
Xylene (Total)	ug/kg	<8.7	112	107	81.5	80.1	73	75	13-164	2	50	
4-Bromofluorobenzene (S)	%						88	91	69-130			
Dibromofluoromethane (S)	%						104	115	70-130			
Toluene-d8 (S)	%						105	105	70-130			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
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(920)469-2436

QUALITY CONTROL DATA

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

QC Batch: OEXT/30127
QC Batch Method: EPA 3541
Analysis Method: EPA 8082
Analysis Description: 8082 GCS PCB
Associated Lab Samples: 40130488001

METHOD BLANK: 1318108 Matrix: Solid
Associated Lab Samples: 40130488001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
PCB-1016 (Aroclor 1016)	ug/kg	<25.0	50.0	25.0	04/11/16 15:57	
PCB-1221 (Aroclor 1221)	ug/kg	<25.0	50.0	25.0	04/11/16 15:57	
PCB-1232 (Aroclor 1232)	ug/kg	<25.0	50.0	25.0	04/11/16 15:57	
PCB-1242 (Aroclor 1242)	ug/kg	<25.0	50.0	25.0	04/11/16 15:57	
PCB-1248 (Aroclor 1248)	ug/kg	<25.0	50.0	25.0	04/11/16 15:57	
PCB-1254 (Aroclor 1254)	ug/kg	<25.0	50.0	25.0	04/11/16 15:57	
PCB-1260 (Aroclor 1260)	ug/kg	<25.0	50.0	25.0	04/11/16 15:57	
Decachlorobiphenyl (S)	%	92	48-130		04/11/16 15:57	
Tetrachloro-m-xylene (S)	%	88	63-130		04/11/16 15:57	

LABORATORY CONTROL SAMPLE: 1318109

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
PCB-1016 (Aroclor 1016)	ug/kg		<25.0			
PCB-1221 (Aroclor 1221)	ug/kg		<25.0			
PCB-1232 (Aroclor 1232)	ug/kg		<25.0			
PCB-1242 (Aroclor 1242)	ug/kg		<25.0			
PCB-1248 (Aroclor 1248)	ug/kg		<25.0			
PCB-1254 (Aroclor 1254)	ug/kg		<25.0			
PCB-1260 (Aroclor 1260)	ug/kg	500	494	99	55-130	
Decachlorobiphenyl (S)	%			93	48-130	
Tetrachloro-m-xylene (S)	%			89	63-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1318110 1318111

Parameter	Units	40130516001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
PCB-1016 (Aroclor 1016)	ug/kg	<26.8			<26.8	<26.8					20	
PCB-1221 (Aroclor 1221)	ug/kg	<26.8			<26.8	<26.8					20	
PCB-1232 (Aroclor 1232)	ug/kg	<26.8			<26.8	<26.8					20	
PCB-1242 (Aroclor 1242)	ug/kg	146			216	205				5	20	
PCB-1248 (Aroclor 1248)	ug/kg	<26.8			<26.8	<26.8					20	
PCB-1254 (Aroclor 1254)	ug/kg	<26.8			<26.8	<26.8					20	
PCB-1260 (Aroclor 1260)	ug/kg	<26.8	537	537	449	440	84	82	40-130	2	20	
Decachlorobiphenyl (S)	%						75	74	48-130			
Tetrachloro-m-xylene (S)	%						86	83	63-130			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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QUALITY CONTROL DATA

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

QC Batch: OEXT/30164
QC Batch Method: EPA 3546
Analysis Method: EPA 8270
Analysis Description: 8270 Solid MSSV Microwave
Associated Lab Samples: 40130488001

METHOD BLANK: 1319672
Matrix: Solid
Associated Lab Samples: 40130488001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,2,4-Trichlorobenzene	ug/kg	<18.9	62.9	18.9	04/14/16 10:40	
1,2-Dichlorobenzene	ug/kg	<52.5	175	52.5	04/14/16 10:40	
1,3-Dichlorobenzene	ug/kg	<23.1	77.0	23.1	04/14/16 10:40	
1,4-Dichlorobenzene	ug/kg	<23.3	77.5	23.3	04/14/16 10:40	
2,2'-Oxybis(1-chloropropane)	ug/kg	<43.0	143	43.0	04/14/16 10:40	
2,4,5-Trichlorophenol	ug/kg	<29.5	98.3	29.5	04/14/16 10:40	
2,4,6-Trichlorophenol	ug/kg	<25.5	84.8	25.5	04/14/16 10:40	
2,4-Dichlorophenol	ug/kg	<44.6	149	44.6	04/14/16 10:40	
2,4-Dimethylphenol	ug/kg	<33.0	110	33.0	04/14/16 10:40	
2,4-Dinitrophenol	ug/kg	<50.8	169	50.8	04/14/16 10:40	
2,4-Dinitrotoluene	ug/kg	<23.9	79.6	23.9	04/14/16 10:40	
2,6-Dinitrotoluene	ug/kg	<31.7	106	31.7	04/14/16 10:40	
2-Chloronaphthalene	ug/kg	<21.4	71.4	21.4	04/14/16 10:40	
2-Chlorophenol	ug/kg	<41.7	139	41.7	04/14/16 10:40	
2-Methylnaphthalene	ug/kg	<43.3	144	43.3	04/14/16 10:40	
2-Methylphenol(o-Cresol)	ug/kg	<30.3	101	30.3	04/14/16 10:40	
2-Nitroaniline	ug/kg	<47.6	159	47.6	04/14/16 10:40	
2-Nitrophenol	ug/kg	<52.7	176	52.7	04/14/16 10:40	
3&4-Methylphenol(m&p Cresol)	ug/kg	<30.6	102	30.6	04/14/16 10:40	
3,3'-Dichlorobenzidine	ug/kg	<45.3	151	45.3	04/14/16 10:40	
3-Nitroaniline	ug/kg	<28.4	94.6	28.4	04/14/16 10:40	
4,6-Dinitro-2-methylphenol	ug/kg	<51.4	171	51.4	04/14/16 10:40	
4-Bromophenylphenyl ether	ug/kg	<35.0	117	35.0	04/14/16 10:40	
4-Chloro-3-methylphenol	ug/kg	<51.9	173	51.9	04/14/16 10:40	
4-Chloroaniline	ug/kg	<27.4	91.4	27.4	04/14/16 10:40	
4-Chlorophenylphenyl ether	ug/kg	<31.1	104	31.1	04/14/16 10:40	
4-Nitroaniline	ug/kg	<69.3	231	69.3	04/14/16 10:40	
4-Nitrophenol	ug/kg	<42.0	140	42.0	04/14/16 10:40	
Acenaphthene	ug/kg	<59.2	197	59.2	04/14/16 10:40	
Acenaphthylene	ug/kg	<59.5	198	59.5	04/14/16 10:40	
Anthracene	ug/kg	<26.7	88.9	26.7	04/14/16 10:40	
Benzo(a)anthracene	ug/kg	<25.9	86.2	25.9	04/14/16 10:40	
Benzo(a)pyrene	ug/kg	<25.1	83.7	25.1	04/14/16 10:40	
Benzo(b)fluoranthene	ug/kg	<28.7	95.6	28.7	04/14/16 10:40	
Benzo(g,h,i)perylene	ug/kg	<43.7	146	43.7	04/14/16 10:40	
Benzo(k)fluoranthene	ug/kg	<40.0	133	40.0	04/14/16 10:40	
bis(2-Chloroethoxy)methane	ug/kg	<45.0	150	45.0	04/14/16 10:40	
bis(2-Chloroethyl) ether	ug/kg	<52.1	174	52.1	04/14/16 10:40	
bis(2-Ethylhexyl)phthalate	ug/kg	<27.8	92.5	27.8	04/14/16 10:40	
Butylbenzylphthalate	ug/kg	<26.8	89.2	26.8	04/14/16 10:40	
Carbazole	ug/kg	<26.1	87.1	26.1	04/14/16 10:40	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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(920)469-2436

QUALITY CONTROL DATA

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

METHOD BLANK: 1319672 Matrix: Solid
Associated Lab Samples: 40130488001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chrysene	ug/kg	<25.0	83.2	25.0	04/14/16 10:40	
Di-n-butylphthalate	ug/kg	<24.9	83.2	24.9	04/14/16 10:40	
Di-n-octylphthalate	ug/kg	<37.5	125	37.5	04/14/16 10:40	
Dibenz(a,h)anthracene	ug/kg	<45.3	151	45.3	04/14/16 10:40	
Dibenzofuran	ug/kg	<20.2	67.4	20.2	04/14/16 10:40	
Diethylphthalate	ug/kg	<27.7	92.3	27.7	04/14/16 10:40	
Dimethylphthalate	ug/kg	<21.7	72.4	21.7	04/14/16 10:40	
Fluoranthene	ug/kg	<23.6	78.7	23.6	04/14/16 10:40	
Fluorene	ug/kg	<19.5	65.0	19.5	04/14/16 10:40	
Hexachloro-1,3-butadiene	ug/kg	<42.5	142	42.5	04/14/16 10:40	
Hexachlorobenzene	ug/kg	<28.1	93.6	28.1	04/14/16 10:40	
Hexachlorocyclopentadiene	ug/kg	<39.5	132	39.5	04/14/16 10:40	
Hexachloroethane	ug/kg	<26.7	89.0	26.7	04/14/16 10:40	
Indeno(1,2,3-cd)pyrene	ug/kg	<36.1	120	36.1	04/14/16 10:40	
Isophorone	ug/kg	<25.7	85.5	25.7	04/14/16 10:40	
N-Nitroso-di-n-propylamine	ug/kg	<26.5	88.2	26.5	04/14/16 10:40	
N-Nitrosodiphenylamine	ug/kg	<226	755	226	04/14/16 10:40	
Naphthalene	ug/kg	<58.4	195	58.4	04/14/16 10:40	
Nitrobenzene	ug/kg	<33.8	113	33.8	04/14/16 10:40	
Pentachlorophenol	ug/kg	<36.8	123	36.8	04/14/16 10:40	
Phenanthrene	ug/kg	<21.4	71.4	21.4	04/14/16 10:40	
Phenol	ug/kg	<39.6	132	39.6	04/14/16 10:40	
Pyrene	ug/kg	<37.0	123	37.0	04/14/16 10:40	
2,4,6-Tribromophenol (S)	%	94	10-130		04/14/16 10:40	
2-Fluorobiphenyl (S)	%	73	33-130		04/14/16 10:40	
2-Fluorophenol (S)	%	75	31-130		04/14/16 10:40	
Nitrobenzene-d5 (S)	%	85	32-130		04/14/16 10:40	
Phenol-d6 (S)	%	88	35-130		04/14/16 10:40	
Terphenyl-d14 (S)	%	103	27-143		04/14/16 10:40	

LABORATORY CONTROL SAMPLE: 1319673

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trichlorobenzene	ug/kg	1670	1500	90	63-130	
1,2-Dichlorobenzene	ug/kg	1670	1400	84	61-130	
1,3-Dichlorobenzene	ug/kg	1670	1390	83	57-130	
1,4-Dichlorobenzene	ug/kg	1670	1410	85	59-130	
2,2'-Oxybis(1-chloropropane)	ug/kg	1670	1470	88	57-130	
2,4,5-Trichlorophenol	ug/kg	1670	1460	88	65-130	
2,4,6-Trichlorophenol	ug/kg	1670	1430	86	67-130	
2,4-Dichlorophenol	ug/kg	1670	1500	90	67-130	
2,4-Dimethylphenol	ug/kg	1670	1530	92	67-130	
2,4-Dinitrophenol	ug/kg	1670	1550	93	30-130	
2,4-Dinitrotoluene	ug/kg	1670	1870	112	68-130	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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(920)469-2436

QUALITY CONTROL DATA

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

LABORATORY CONTROL SAMPLE: 1319673

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2,6-Dinitrotoluene	ug/kg	1670	1780	107	69-130	
2-Chloronaphthalene	ug/kg	1670	1370	82	69-130	
2-Chlorophenol	ug/kg	1670	1490	89	64-130	
2-Methylnaphthalene	ug/kg	1670	1530	92	68-130	
2-Methylphenol(o-Cresol)	ug/kg	1670	1560	93	70-130	
2-Nitroaniline	ug/kg	1670	1480	89	61-132	
2-Nitrophenol	ug/kg	1670	1620	97	64-130	
3&4-Methylphenol(m&p Cresol)	ug/kg	1670	1620	97	68-130	
3,3'-Dichlorobenzidine	ug/kg	1670	1070	64	40-130	
3-Nitroaniline	ug/kg	1670	1510	91	50-130	
4,6-Dinitro-2-methylphenol	ug/kg	1670	1810	109	55-130	
4-Bromophenylphenyl ether	ug/kg	1670	1610	96	70-130	
4-Chloro-3-methylphenol	ug/kg	1670	1660	100	67-130	
4-Chloroaniline	ug/kg	1670	1660	99	57-130	
4-Chlorophenylphenyl ether	ug/kg	1670	1540	92	70-130	
4-Nitroaniline	ug/kg	1670	1800	108	41-133	
4-Nitrophenol	ug/kg	1670	1660	100	40-130	
Acenaphthene	ug/kg	1670	1390	84	70-130	
Acenaphthylene	ug/kg	1670	1430	86	70-130	
Anthracene	ug/kg	1670	1650	99	70-130	
Benzo(a)anthracene	ug/kg	1670	1580	95	70-130	
Benzo(a)pyrene	ug/kg	1670	1600	96	64-130	
Benzo(b)fluoranthene	ug/kg	1670	1480	89	63-130	
Benzo(g,h,i)perylene	ug/kg	1670	1240	75	29-130	
Benzo(k)fluoranthene	ug/kg	1670	1930	116	65-130	
bis(2-Chloroethoxy)methane	ug/kg	1670	1680	101	70-130	
bis(2-Chloroethyl) ether	ug/kg	1670	1490	89	64-130	
bis(2-Ethylhexyl)phthalate	ug/kg	1670	1530	92	70-130	
Butylbenzylphthalate	ug/kg	1670	1700	102	69-130	
Carbazole	ug/kg	1670	1610	96	70-130	
Chrysene	ug/kg	1670	1610	96	35-130	
Di-n-butylphthalate	ug/kg	1670	1590	96	70-130	
Di-n-octylphthalate	ug/kg	1670	1150	69	56-130	
Dibenz(a,h)anthracene	ug/kg	1670	1190	72	10-130	
Dibenzofuran	ug/kg	1670	1570	94	70-130	
Diethylphthalate	ug/kg	1670	1600	96	70-130	
Dimethylphthalate	ug/kg	1670	1540	93	70-130	
Fluoranthene	ug/kg	1670	1550	93	64-130	
Fluorene	ug/kg	1670	1500	90	70-130	
Hexachloro-1,3-butadiene	ug/kg	1670	1500	90	60-130	
Hexachlorobenzene	ug/kg	1670	1580	95	67-130	
Hexachlorocyclopentadiene	ug/kg	1670	1330	80	29-130	
Hexachloroethane	ug/kg	1670	1500	90	59-130	
Indeno(1,2,3-cd)pyrene	ug/kg	1670	1240	74	34-130	
Isophorone	ug/kg	1670	1800	108	70-130	
N-Nitroso-di-n-propylamine	ug/kg	1670	1680	101	68-130	
N-Nitrosodiphenylamine	ug/kg	1670	1480	89	69-130	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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(920)469-2436

QUALITY CONTROL DATA

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

LABORATORY CONTROL SAMPLE: 1319673

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Naphthalene	ug/kg	1670	1530	92	70-130	
Nitrobenzene	ug/kg	1670	1620	97	64-130	
Pentachlorophenol	ug/kg	1670	1670	100	47-130	
Phenanthrene	ug/kg	1670	1530	92	70-130	
Phenol	ug/kg	1670	1620	97	63-130	
Pyrene	ug/kg	1670	2020	121	63-130	
2,4,6-Tribromophenol (S)	%			98	10-130	
2-Fluorobiphenyl (S)	%			74	33-130	
2-Fluorophenol (S)	%			85	31-130	
Nitrobenzene-d5 (S)	%			87	32-130	
Phenol-d6 (S)	%			89	35-130	
Terphenyl-d14 (S)	%			108	27-143	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1319674 1319675

Parameter	Units	40130692005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,2,4-Trichlorobenzene	ug/kg	<18.9	1670	1670	1250	1300	75	78	47-130	4	22	
1,2-Dichlorobenzene	ug/kg	<52.5	1670	1670	1160	1170	70	70	43-130	1	32	
1,3-Dichlorobenzene	ug/kg	<23.1	1670	1670	1200	1230	72	74	41-130	3	34	
1,4-Dichlorobenzene	ug/kg	<23.3	1670	1670	1210	1260	73	76	42-130	4	31	
2,2'-Oxybis(1-chloropropane)	ug/kg	<43.0	1670	1670	1210	1250	72	75	32-130	4	24	
2,4,5-Trichlorophenol	ug/kg	<29.5	1670	1670	1030	1130	62	68	25-130	9	32	
2,4,6-Trichlorophenol	ug/kg	<25.5	1670	1670	1080	1190	65	71	31-130	9	32	
2,4-Dichlorophenol	ug/kg	<44.6	1670	1670	1170	1250	70	75	33-130	7	25	
2,4-Dimethylphenol	ug/kg	<33.0	1670	1670	1050	1090	63	65	39-130	3	27	
2,4-Dinitrophenol	ug/kg	<50.8	1670	1670	234	277	14	17	10-130	17	49	
2,4-Dinitrotoluene	ug/kg	<23.9	1670	1670	1440	1600	86	96	25-134	11	26	
2,6-Dinitrotoluene	ug/kg	<31.7	1670	1670	1400	1490	84	89	41-130	6	26	
2-Chloronaphthalene	ug/kg	<21.4	1670	1670	1120	1190	67	72	51-130	6	25	
2-Chlorophenol	ug/kg	<41.7	1670	1670	1210	1260	72	76	39-130	4	29	
2-Methylnaphthalene	ug/kg	<43.3	1670	1670	1300	1360	78	82	34-130	5	26	
2-Methylphenol(o-Cresol)	ug/kg	<30.3	1670	1670	1230	1280	74	77	18-130	4	30	
2-Nitroaniline	ug/kg	<47.6	1670	1670	1220	1320	73	79	21-138	8	27	
2-Nitrophenol	ug/kg	<52.7	1670	1670	1260	1430	76	86	26-130	13	29	
3&4-Methylphenol(m&p Cresol)	ug/kg	<30.6	1670	1670	1110	1260	67	76	19-130	13	29	
3,3'-Dichlorobenzidine	ug/kg	<45.3	1670	1670	435	701	26	42	10-130	47	50	
3-Nitroaniline	ug/kg	<28.4	1670	1670	1290	1390	77	83	10-137	8	34	
4,6-Dinitro-2-methylphenol	ug/kg	<51.4	1670	1670	447	646	27	39	10-130	36	50	
4-Bromophenylphenyl ether	ug/kg	<35.0	1670	1670	1330	1470	80	88	49-130	10	30	
4-Chloro-3-methylphenol	ug/kg	<51.9	1670	1670	1220	1400	73	84	30-130	13	24	
4-Chloroaniline	ug/kg	<27.4	1670	1670	1260	1480	76	89	11-130	16	24	
4-Chlorophenylphenyl ether	ug/kg	<31.1	1670	1670	1280	1350	77	81	52-130	6	27	
4-Nitroaniline	ug/kg	<69.3	1670	1670	1030	1260	62	75	10-158	20	47	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1319674 1319675

Parameter	Units	40130692005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
4-Nitrophenol	ug/kg	<42.0	1670	1670	745	936	45	56	10-130	23	50	
Acenaphthene	ug/kg	<59.2	1670	1670	1180	1240	71	74	54-130	5	26	
Acenaphthylene	ug/kg	<59.5	1670	1670	1200	1250	72	75	51-130	4	24	
Anthracene	ug/kg	<26.7	1670	1670	1330	1440	80	86	50-130	8	35	
Benzo(a)anthracene	ug/kg	<25.9	1670	1670	1280	1420	75	84	41-130	11	30	
Benzo(a)pyrene	ug/kg	<25.1	1670	1670	1270	1380	76	83	40-130	8	27	
Benzo(b)fluoranthene	ug/kg	<28.7	1670	1670	1320	1230	79	74	30-130	8	31	
Benzo(g,h,i)perylene	ug/kg	<43.7	1670	1670	1000	1050	60	63	28-130	5	38	
Benzo(k)fluoranthene	ug/kg	<40.0	1670	1670	1340	1660	80	99	29-136	21	34	
bis(2-Chloroethoxy)methane	ug/kg	<45.0	1670	1670	1340	1440	80	86	41-130	7	25	
bis(2-Chloroethyl) ether	ug/kg	<52.1	1670	1670	1190	1300	71	78	34-130	9	23	
bis(2-Ethylhexyl)phthalate	ug/kg	<27.8	1670	1670	1360	1500	81	90	10-196	10	31	
Butylbenzylphthalate	ug/kg	<26.8	1670	1670	1550	1740	93	104	10-198	12	32	
Carbazole	ug/kg	<26.1	1670	1670	1220	1370	73	82	25-131	11	32	
Chrysene	ug/kg	<25.0	1670	1670	1300	1420	78	85	23-130	9	31	
Di-n-butylphthalate	ug/kg	<24.9	1670	1670	1330	1440	80	87	44-133	8	26	
Di-n-octylphthalate	ug/kg	<37.5	1670	1670	1050	1120	63	67	30-148	6	30	
Dibenz(a,h)anthracene	ug/kg	<45.3	1670	1670	937	989	56	59	10-130	5	43	
Dibenzofuran	ug/kg	<20.2	1670	1670	1310	1380	79	83	49-130	5	25	
Diethylphthalate	ug/kg	<27.7	1670	1670	1340	1380	80	83	50-130	3	26	
Dimethylphthalate	ug/kg	<21.7	1670	1670	1240	1390	74	83	47-130	11	28	
Fluoranthene	ug/kg	<23.6	1670	1670	1190	1200	70	71	30-130	1	35	
Fluorene	ug/kg	<19.5	1670	1670	1270	1280	76	77	43-130	0	33	
Hexachloro-1,3-butadiene	ug/kg	<42.5	1670	1670	1220	1300	73	78	45-130	6	26	
Hexachlorobenzene	ug/kg	<28.1	1670	1670	1340	1440	81	86	44-130	7	28	
Hexachlorocyclopentadiene	ug/kg	<39.5	1670	1670	832	985	50	59	10-130	17	38	
Hexachloroethane	ug/kg	<26.7	1670	1670	1220	1240	73	74	24-131	1	38	
Indeno(1,2,3-cd)pyrene	ug/kg	<36.1	1670	1670	956	1050	57	63	21-130	9	44	
Isophorone	ug/kg	<25.7	1670	1670	1480	1580	89	95	45-130	7	23	
N-Nitroso-di-n-propylamine	ug/kg	<26.5	1670	1670	1410	1450	85	87	35-130	3	25	
N-Nitrosodiphenylamine	ug/kg	<226	1670	1670	1410	1540	85	93	36-130	9	28	
Naphthalene	ug/kg	<58.4	1670	1670	1290	1340	78	80	31-130	3	27	
Nitrobenzene	ug/kg	<33.8	1670	1670	1380	1420	83	85	38-130	3	25	
Pentachlorophenol	ug/kg	<36.8	1670	1670	345	524	21	31	10-130	41	50	
Phenanthrene	ug/kg	<21.4	1670	1670	1320	1370	79	82	50-130	4	35	
Phenol	ug/kg	<39.6	1670	1670	1240	1370	75	82	33-130	10	29	
Pyrene	ug/kg	<37.0	1670	1670	1680	2000	99	118	22-160	18	37	
2,4,6-Tribromophenol (S)	%						63	68	10-130			
2-Fluorobiphenyl (S)	%						63	67	33-130			
2-Fluorophenol (S)	%						67	68	31-130			
Nitrobenzene-d5 (S)	%						73	77	32-130			
Phenol-d6 (S)	%						75	76	35-130			
Terphenyl-d14 (S)	%						89	105	27-143			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

QC Batch: PMST/12587
QC Batch Method: ASTM D2974-87
Analysis Method: ASTM D2974-87
Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 40130488001

SAMPLE DUPLICATE: 1318191

Parameter	Units	40130446001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	5.6	5.5	1	10	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALIFIERS

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

S4 Surrogate recovery not evaluated against control limits due to sample dilution.

Pace Analytical Services, Inc.
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 256128 SANGANON ROW
Pace Project No.: 40130488

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40130488001	**WCS-1**	EPA 3541	OEXT/30127	EPA 8082	GCSV/14259
40130488001	**WCS-1**	EPA 3010	MPRP/13596	EPA 6010	ICP/12074
40130488001	**WCS-1**	EPA 7470	MERP/5681	EPA 7470	MERC/8006
40130488001	**WCS-1**	EPA 3546	OEXT/30164	EPA 8270	MSSV/8932
40130488001	**WCS-1**	EPA 8260	MSV/32994	EPA 8260	MSV/32996
40130488001	**WCS-1**	ASTM D2974-87	PMST/12587		

Pace Analytical®
www.pacelabs.com

CHAIN OF COUNTY

UPPER MIDWEST REGION
MN: 612-607-1700 WI: 920-469-2436

40130488

(Please Print Clearly)

Company Name:	TRC
Branch/Location:	Chicago
Project Contact:	Lisa Meagher
Phone:	312-578-0870
Project Number:	256128
Project Name:	Sangamon Row
Project State:	IL
Sampled By (Print):	Tyler Gomoll
Sampled By (Sign):	[signature]
PO #:	
Regulatory Program:	

Quote #:	
Mail To Contact:	
Mail To Company:	
Mail To Address:	
Invoice To Contact:	
Invoice To Company:	BNSF
Invoice To Address:	
Invoice To Phone:	

*Preservation Codes
A=None B=HCL C=H2SO4 D=HNO3 E=DI Water F=Methanol G=NaOH
H=Sodium Bisulfate Solution I=Sodium Thiosulfate J=Other

Data Package Options (billable)
☐ EPA Level III
☐ EPA Level IV

MS/MSD
☐ On your sample (billable)
☐ NOT needed on your sample

Matrix Codes
A = Air, B = Biota, C = Charcoal, O = Oil, S = Soil, Sl = Sludge
W = Water, DW = Drinking Water, GW = Ground Water, SW = Surface Water, WW = Waste Water, WP = Wipe

FILTERED? (YES/NO) — Y/N
PRESERVATION (CODE)* — Pick Letter

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	VOCs	SVOCs	PCBs	TCLP Metals RCRA	% moisture	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
001	WCS-1	4/7/16	0830	S	X	X	X	X	X	3-40mlv MeOH F,	2-8ozcg A, 1-250mlcg A	

Rush Turnaround Time Requested - Prelims
(Rush TAT subject to approval/surcharge)
Date Needed:

Transmit Prelim Rush Results by (complete what you want):

Email #1:	
Email #2:	
Telephone:	
Fax:	

Samples on HOLD are subject to special pricing and release of liability

Relinquished By:	Date/Time:	Received By:	Date/Time:
Tyler Gomoll	4/7/2016 1000		
FedEx	4.8.16 0955	[signature] Pace	4816 0955

PACE Project No. 40130488

Receipt Temp = 1.5 °C

Sample Receipt pH
OK / Adjusted

Cooler Custody Seal
Present / Not Present
Intact / Not Intact

Version 6.0 06/14/06

C019a(27Jun2006)

ORIGINAL

Sample Condition Upon Receipt

Pace Analytical Services, Inc.
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Project #: **WO# : 40130488**

40130488

Client Name: TRC

Courier: ☑ Fed Ex ☐ UPS ☐ Client ☐ Pace Other:

Tracking #: 7827 6835 0052

Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals intact: ☑ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☑ no

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other

Thermometer Used SR-167 **Type of Ice:** (Wet) Blue Dry None ☑ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 1 /Corr: 1.5 **Biological Tissue is Frozen:** ☐ yes ☐ no

Temp Blank Present: ☐ yes ☑ no

Person examining contents:
Date: 4.8.16
Initials: mm

Temp should be above freezing to 6°C for all sample except Biota.
Frozen Biota Samples should be received ≤ 0°C.

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☑Yes ☑No ☐N/A	
-Pace IR Containers Used: 4-8-16 mm	☑Yes ☐No ☑N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☐Yes ☑No ☐N/A	12. 50ml glass no date. mm 4.8.16
-Includes date/time/ID/Analysis Matrix: S		
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	☐Yes ☐No ☑N/A	13. ☐ HNO3 ☐ H2SO4 ☐ NaOH ☐ NaOH +ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	☐Yes ☐No ☑N/A	
exceptions: VOA, coliform, TOC, TOX, TOH, O&G, WIDROW, Phenolics, OTHER:	☐Yes ☑No	Initial when completed / Lab Std #ID of preservative / Date/ Time:
Headspace in VOA Vials (>6mm):	☐Yes ☐No ☑N/A	14.
Trip Blank Present:	☐Yes ☐No ☑N/A	15.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: LW **Date:** 4/8/16

F-GB-C-031-Rev.03 (9April2015) SCUR Form

ATTACHMENT 2

PDC Composite Sample (SHP-1) Results Report

April 06, 2016

Lisa Meagher
TRC Solutions
230 W Monroe Street Suite 2300
Chicago, IL 60606

Dear Lisa Meagher:

Please find enclosed the analytical results for the sample(s) the laboratory received on **3/29/16 9:25 am** and logged in under work order **6033952**. All testing is performed according to our current TNI certifications unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of PDC Laboratories, Inc.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

PDC Laboratories, Inc. appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the Vice President , John LaPayne with any feedback you have about your experience with our laboratory.

Sincerely,

Lisa Grant
Project Manager
(309) 692-9688 x1764
lgrant@pdclab.com

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

ANALYTICAL RESULTS

Sample: 6033952-01
Name: SHP-1
Matrix: Solid - Composite

Sampled: 03/28/16 09:15
Received: 03/29/16 09:25
PO #: 93785

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
General Chemistry - PIA							
Cyanide	< 1.2	mg/kg		04/05/16 13:20	04/05/16 14:41	lgsjf	SW 9010 - 9012
Cyanide - reactive	< 2.0	mg/kg		04/05/16 13:25	04/05/16 15:17	lgsjf	SW 9010 - 9012 - 7.3.3.2
Halide-extractable organic (EOX)	< 50	mg/kg		04/01/16 13:21	04/01/16 13:21	TAS	SW 9023
Phenolics	< 0.10	mg/kg	Q3	03/31/16 14:11	04/01/16 10:16	lgsjf	SW 9066 - EPA 420.4 - QC 10-210-00-1-A
Reactive Sulfide	< 20	mg/kg		03/30/16 10:00	03/30/16 10:00	JMD	SW 9034 & 7.3.4.1*
Reactivity to Water	NO			04/04/16 13:00	04/04/16 13:00	TCH	SW 7.3.2.1*
Solids - total solids (TS)	82	%		03/31/16 09:38	03/31/16 10:00	DMB	SM 2540G*
TCLP Metals - PIA							
Arsenic	< 0.040	mg/L		03/31/16 05:30	03/31/16 08:20	KMC	SW 6020
Barium	< 2.0	mg/L		03/31/16 05:30	03/31/16 08:20	KMC	SW 6020
Cadmium	0.016	mg/L		03/31/16 05:30	03/31/16 08:20	KMC	SW 6020
Chromium	< 0.0080	mg/L		03/31/16 05:30	03/31/16 08:20	KMC	SW 6020
Final pH	5.42			03/30/16 11:30	03/31/16 07:01	JEM	SW 1311*
Final pH	5.42			03/30/16 11:30	03/31/16 07:01	JEM	SW 1311*
Lead	0.20	mg/L		03/31/16 05:30	03/31/16 08:20	KMC	SW 6020
Mercury	< 0.0020	mg/L		03/31/16 05:30	04/01/16 08:18	KMC	SW 6020
Selenium	< 0.010	mg/L		03/31/16 05:30	03/31/16 08:20	KMC	SW 6020
Silver	< 0.020	mg/L		03/31/16 05:30	03/31/16 08:20	KMC	SW 6020
Total Metals - PIA							
Mercury	0.37	mg/kg		03/30/16 10:51	03/31/16 09:42	JMW	SW 6020

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

NOTES

Specific method revisions used for analysis are available upon request.

Certifications

PIA - Peoria, IL
- TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100230
- Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17553
- Missouri Department of Natural Resources Certificate of Approval for Microbiological Laboratory Service No. 870
- Drinking Water Certifications: Iowa (240); Kansas (E-10338); Missouri (870)
- Wastewater Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)
- Hazardous/Solid Waste Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO
- USEPA DMR-QA Program

STL - St. Louis, MO
- TNI Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS Lab No. E-10389
- Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 171050
- Drinking Water Certifications: Missouri (1050)
- Missouri Department of Natural Resources

* Not a TNI accredited analyte

Qualifiers

Q3 Matrix Spike/Matrix Spike Duplicate both failed % Recovery

Certified by: Lisa Grant, Project Manager

PDC LABORATORIES, INC.
2231 WEST ALTORFER DRIVE
PEORIA, IL 61615

PHONE # 800-752-6651
FAX # 309-692-9689

State where samples collected IL

CHAIN OF CUSTODY RECORD

*ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT) - **(SAMPLE ACCEPTANCE POLICY ON REVERSE)***

1 CLIENT	PROJECT NUMBER	P.O. NUMBER	MEANS SHIPPED
TRC for BIEF	230807		FedEx
ADDRESS	**PHONE NUMBER**	**FAX NUMBER**	**DATE SHIPPED**
230 W. Monroe St.	312-578-0870	312-578-0877	3/28/2016
CITY STATE ZIP	**SAMPLER (PLEASE PRINT)**		
Chicago, IL 60606	Tyler Gonnell		
CONTACT PERSON	**SAMPLER'S SIGNATURE**		
Lisa Meagher			

MATRIX TYPES:
WW-WASTEWATER
DW-DRINKING WATER
GW-GROUND WATER
WWSL-SLUDGE
NAS-SOLID
LCHT-LEACHATE
OTHER:

3 ANALYSIS REQUESTED: IEPA Release + Tract study

4 (FOR LAB USE ONLY)
LOGIN # 6033952-1
LOGGED BY: VM
LAB PROJ. #
TEMPLATE:
PROJ. MGR.:

2 SAMPLE DESCRIPTION AS YOU WANT ON REPORT	DATE COLLECTED	TIME COLLECTED	SAMPLE GRAB	TYPE COMP	MATRIX TYPE	BOTTLE COUNT	REMARKS
SHP-1	3/28/2016	0915		X	NAS	5	

5 TURNAROUND TIME REQUESTED (PLEASE CIRCLE) (RUSH TAT IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE)
NORMAL RUSH DATE RESULTS NEEDED
RUSH RESULTS VIA (PLEASE CIRCLE) FAX PHONE E-MAIL
FAX # PHONE # EMAIL ADDRESS

6 *The sample temperature will be measured upon receipt at the lab. By initialing this area you request that the lab notify you, before proceeding with analysis, if the sample temperature is outside of the range of 0.1-6.0°C. By not initialing this area you allow the lab to proceed with analytical testing regardless of the sample temperature.* _____

7				
RELINQUISHED BY: (SIGNATURE)	DATE 3/28 TIME 1100	RECEIVED BY: (SIGNATURE)	DATE	TIME
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE TIME
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED AT LAB BY: (SIGNATURE) Amanda Sch	DATE 3/29/16 TIME 9:25

8 COMMENTS: (FOR LAB USE ONLY)

SAMPLE TEMPERATURE UPON RECEIPT 7 °C
CHILL PROCESS STARTED PRIOR TO RECEIPT Y OR N
SAMPLE(S) RECEIVED ON ICE Y OR N
PROPER BOTTLES RECEIVED IN GOOD CONDITION Y OR N
BOTTLES FILLED WITH ADEQUATE VOLUME Y OR N
SAMPLES RECEIVED WITHIN HOLD TIME(S) Y OR N
(EXCLUDES TYPICAL FIELD PARAMETERS)
DATE AND TIME TAKEN FROM SAMPLE BOTTLE

PAGE 1 OF 1

Copies: white should accompany samples to PDC Labs. **Yellow copy to be retained by the client.**

ATTACHMENT 3

Lead Treatment Experience and Project Examples

Lead Experience

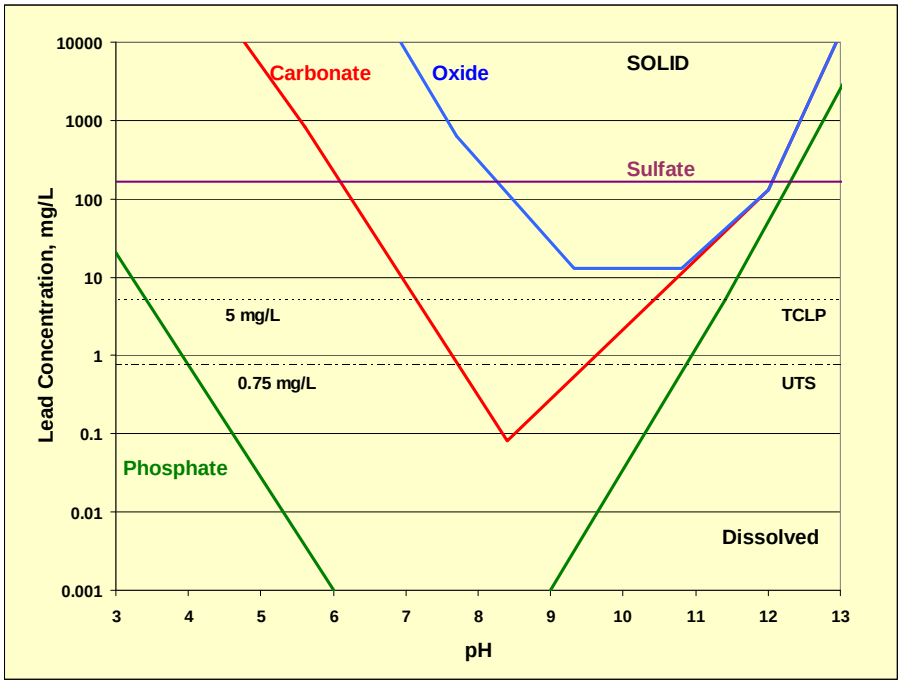
Chemistry

TRC's (formerly RMT's) Applied Chemistry team is unique in its approach to developing site-specific stabilization chemistries for all RCRA metals, as well as the additional metals listed in the Phase IV Land Disposal Regulations. Relying on the resources of TRC's state-of- the-art Applied Chemistry laboratory, the TRC metals treatment team has developed stabilization approaches that convert metals to forms that do not leach in either the environment or regulatory tests. With an understanding of the potential for both short- and long-term stability within specific treatment scenarios, TRC's skilled chemists provide solutions that balance environmental protection, health and safety, and cost-effectiveness.

Different metals require different treatment chemistries. To illustrate our approach, we can look at lead. Lead is one of the most frequently encountered metal contaminants of concern. However, it is typically treated with a focus on passing the TCLP test only. TRC offers a different approach. Understanding that the solubility of lead is pH-dependent (Figure 1), and that lead phosphate compounds are very stable, TRC's treatment forms lead phosphates while buffering pH in the range of 6 to 10. This combination of treatment goals ensures that the lead will remain in a stable form for a long time. In fact, the lead compounds formed generally become even more stable over time. Another commonly found contaminant is arsenic, which is treated by adding iron-based reagents to form insoluble iron arsenic species.

The treatment reagent is added to the waste matrix with simple mixing techniques. Because the treatment reagent is specifically formulated for the waste being treated, chemical dosage rates remain comparatively low, compared with conventional treatments such as Portland cement or lime. Furthermore, because our goal is to modify the nature of the waste matrix chemically, and not to simply form a hardened mass, no addition of water is required. The result is significantly lower bulking and lower transportation and disposal costs.

Figure 1
Solubility of Lead Species as a Function of pH



Comparison with Conventional Chemistries

Dosage rates for stabilizing soil with Portland Cement and lime generally lie in the 10 percent to 20 percent range. With the TRC reagent, soil is typically stabilized with dosages of less than 5 percent. For industrial wastes, where cement dosages may be as high as 30 percent, the reagent is typically effective at dosage rates of 2.5 percent to 10 percent. Besides providing for a more cost-effective stabilization, the reagent provides for a more sound stabilization chemistry than lime or Portland Cement. Because these lime-based reagents contain highly alkaline material, they raise the pH of water to values in excess of 12. So, even though they can "treat" wastes by neutralizing the acid in the TCLP and meet a regulatory criterion, they can mobilize lead in treated wastes that contact rainwater or groundwater. With the reagent, the lead remains stable under all reasonable leaching scenarios. Table 1 shows the superior performance of TRC's treatment reagent compared to conventional treatment methods.

Table 1

Treatment of a TCLP-Hazardous Metal Processing Waste

	TCLP (Acid) Leach Test		Hazardous Waste Criterion (mg/L)	SPLP Acid Rain (Water) Test	
	Lead (mg/L)	Final pHf		Lead (mg/L)	Final pHf
Untreated	600	6.0	5.0	<0.003	8.2
Lime (Calcium Hydroxide) (% by weight)					
+5%	76	6.5	5.0	290	12.2
+10%	0.2	8.6	5.0	540	12.5
+15%	6.2	10.4	5.0	510	12.5
Portland Cement (% by weight)					
+5%	450	5.3	5.0	19	11.5
+15%	< 0.2	10.4	5.0	11	11.9
+25%	1.2	11.6	5.0	12	11.9
+50%	10.0	12.0	5.0	3.0	12.1
EnviroBlend® (% by weight)					
+4%	2.4	5.8	5.0	<0.003	10.6
+6%	0.4	5.5	5.0	<0.003	10.3
+8%	< 0.2	5.6	5.0	<0.003	8.5

Lead Remediation

East Penn Manufacturing – Pennsylvania

- Managed construction activities, including excavation, stabilization, placement, and structural compaction of over 30,000 tons of lead-contaminated soil and battery casings at an acid battery manufacturing plant.
- Managed remedial closure of two solid waste units.
- Placed stabilized soil and battery casings into the former ore pit and structurally compacted the material to accommodate future upgrades to the facility. This saved the expense and liability of disposing these materials off-site. (#70999)

Wausau Battery Site – Wisconsin

- Remediated 55,000 cu. yd. of battery reclaiming residue *in situ*.
- Used conventional construction equipment to mix materials, including some material below the water table. Monitoring has confirmed that treatment chemicals have not affected the groundwater.
- Reduced costs by approximately 55% by utilizing approved field screening method and a mobile lab for determining lead and treatment additive concentrations.
- Avoided RCRA hazardous waste permitting requirements.
- Reduced overall remediation costs by $10-15 million compared to traditional (dig and haul) alternatives. (#10001)

Diamond State Salvage Superfund Site – Delaware

- Treated over 11,000 tons of lead-hazardous soil *ex situ* using TRC's treatment reagent at a former salvage yard.
- Reduced the cost for transportation and disposal of the treated soil by using a low dosage rate.
- Disposed treated material off-site in a Subtitle D and TSCA landfill.
- Completed project in less than 7 working days. (#5352)

Lead Treatment

GNB Technologies, Inc. – Illinois

- Remediated 30,000 tons of soil, initially *ex situ* with a pugmill, with subsequent phases treated *in situ*.
- Used the treated material to construct a surface water diversion berm, saving the time and expense of hauling the treated material to a Subtitle D landfill.
- After the Illinois DOT identified impacted soil at another area of the facility due to a right-of-way expansion project, also treated this area *in situ* with IEPA and IDOT approval.
- Saved the client approximately $600,000. (#3083)

Speakman Company Foundry Sand Site – Delaware

- Remediated over 5,000 tons of lead-impacted soil *in situ* at an operating manufacturing facility.
- Performed work under the Voluntary Cleanup Program (VCP), which required the preparation of a remedial action workplan and a documentation report subject to public comment and review.
- Completed work on a 0.5-acre site in a mixed residential and commercial area without affecting neighboring properties.
- Completed the project at a total project cost that was over 60 percent less than the cost of hazardous waste disposal. (#4811)

Columbia Development Corporation – South Carolina

- Remediated over 500 tons of lead-impacted soil at a potential brownfield redevelopment site.
- Rendered the soil nonhazardous without additional treatment.
- Met the client's 2-week time frame, completing the project prior to implementation of UTS standards.
- Performed the project at one half the cost of the alternative—disposal in a hazardous waste landfill. (#4820)

Lead Treatment

Fairmont Battery Site – Riley County, Kansas

- Conducted a time-critical removal action to clean up a site purchased as part of a residential relocation program.
- Provided construction management for *in situ* treatment and stabilization of 3,700 cubic yards of soil impacted with lead from crushed batteries.
- Removed impacted soil and disposed it in an off-site landfill, and backfilled excavations with general fill.
- Completed the project within 1 month of authorization, enabling the client to meet the regulatory deadline.

The state agency was "very appreciative of the cooperative efforts by the County and its contractor TRC in addressing this site, and the work was performed in a quality manner." (#4742)

Former Manufacturing Facility – Southeastern U.S.

- Provided construction management for the treatment and off-site disposal of over 3,000 tons of foreign materials and adjacent soil that were impacted by total concentrations of lead that averaged over 48,000 ppm.
- Determined that a reasonably low dosage would be effective, which resulted in treatment bulking of less than 8 percent additional weight.
- Performed treatment, confirmation sampling, site restoration, and disposal of the treated material at a Subtitle D permitted landfill in less than 4 weeks.
- Performed work in accordance with the governing agency's Voluntary Cleanup program and with limited agency involvement.
- Performed total treatment and nonhazardous disposal for less than half of the cost of hazardous waste disposal. (#70227)

LeMac Foundry – Pennsylvania

- Rendered over 350 tons of lead-affected soil nonhazardous using TRC's treatment chemical.
- Transported and disposed the treated soil at a Subtitle D landfill, which provided significant savings over disposing at a hazardous waste landfill. (#5320)

Lead Treatment

Home Depot – Pennsylvania

- Treated over 500 tons of lead-impacted soil from a former police pistol range to render the soil nonhazardous.
- Placed treated soil on-site under the direction of the PaDEP under the new progressive Act II guidelines.
- Placed soil 20 feet below the parking lot of the new Home depot constructed at the property, which saved transportation and disposal costs. (#4761)

C&R Battery Superfund Site – Virginia

- Used TRC's treatment reagent to remediate 38,000 cu. yd. of soil with a pugmill. Treated material was disposed off-site at a Subtitle D landfill.
- Averaged throughput of 1,000 tons per day.
- Reduced bulking of treated material by over 7,500 tons compared to treatment with Portland cement.
- Saved $300,000 compared to alternative technologies. (#70048)

Langley Air Force Base – Virginia

- Treated contaminated soil and sediment from a skeet-shooting range on the shore of Chesapeake Bay.
- Developed stabilization process that simultaneously rendered lead-contaminated soil and sediment nonhazardous and controlled phosphorus leaching to limit impact on the Bay.
- Constructed 1,850 foot–long barrier in Bay to allow removal of 4 million gallons of water from cove to facilitate treatment of contaminated sediment.
- Treated 14,000 cubic yards of contaminated soil and sediment *in situ.*
- Placed treated material in on-site disposal area constructed by TRC.
- Restored shoreline, cove, and remediated upland area in this environmentally sensitive location. (#7802)