Sparrows Point LLC

December 31, 2012

Mr. Andrew Fan
US EPA Region III, 3WC23
1650 Arch Street
Philadelphia, PA 19103-2029

Ms. Barbara Brown
Project Coordinator
Maryland Department of the Environment
1800 Washington Blvd.
Baltimore, Maryland 21230

Re: Consent Decree, Civil Action Nos. JFM-97-558, JFM-97-559
Coke Oven Area Interim Measures Progress Report November 2012

Dear Mr. Fan and Ms. Brown:

Enclosed with this correspondence is the ***Coke Oven Area Interim Measures Progress Report November 2012*** completed for the Sparrows Point Facility in accordance with the requirements outlined in US EPA's September 2, 2010 approval letter for the Coke Oven Area Interim Measures work associated with the referenced Consent Decree. This report was distributed electronically on December 31st, 2012 in accordance with the outlined reporting requirements; this correspondence provides paper copies for your use.

The report summarizes implementation progress for the approved interim measures (IMs) that have been developed to address identified environmental conditions at the Coke Oven Area through November 30, 2012. Please contact me at (314) 686-5611 should questions arise during your review of the enclosed progress report.

Sincerely,

Russell Becker
Site Manager
Sparrows Point, LLC

Enclosure

COKE OVEN AREA INTERIM MEASURES PROGRESS REPORT

(November 2012)

Prepared for

Sparrows Point, LLC

Sparrows Point LLC

December 31, 2012

ENVIRONMENTAL ENGINEERING & CONTRACTING, INC.
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Introduction

In accordance with the United States Environmental Protection Agency's (US EPA)'s September 2, 2010 letter, this document is the monthly progress report for September 2012 for the US EPA approved interim measures (IMs) that have been developed to address identified environmental conditions at the Coke Oven Area (COA) Special Study Area at the Sparrows Point LLC facility (formerly owned by RG Steel Sparrows Point LLC) located in Sparrows Point, Maryland. This progress report summarizes IM progress for November 2012.

The following designations are applied in this document to the operating IM "Cells" (**Figure 1**) at the COA:

- Cell 1: Prototype Air Sparge/Soil Vapor Extraction (AS/SVE) System in the Former Benzol Processing Area,
- Cell 3: AS/SVE System in "Cove" Area,
- Cell 4: In-Situ Anaerobic Bio-treatment Area,
- Cell 6: Light Non-Aqueous Phase Liquid (LNAPL) Recovery at the Former Benzol Processing Area.

As of November 2012, Cells 1, 3, 4 and 6 continue to be operational. Groundwater and soil gas sampling to assess current conditions was performed during November 2012. The results of these sampling events including trending graphs from IM startup are detailed in this report.

Cell 1: Prototype AS/SVE System in the Former Benzol Processing Area

Cell 1 consists of a prototype IM, which includes AS/SVE coupled with vapor destruction via an electric catalytic oxidation (CATOX) unit. **Figure 2** shows the system layout of Cell 1 and locations of the major design components including the air sparging wells and vapor collection trenches.

November 2012 Operational Performance

Operational performance of Cell 1 during this reporting period is summarized in **Table 1**. In summary, the CATOX unit operated for 651.6 hours (90.5 %) during this reporting period. Cell 1 was down for two (2) days in November due to an electrical issue. Operations were in conformance with the manufacturer's specifications at all times that soil gases were collected in accordance with the May 20, 2011 modified permit-to-construct conditions.

The hydrocarbon removal rate was calculated to be approximately 0.10 pounds per operating hour (estimated monthly total of 65.2 pounds). **Table 1** also includes a cumulative summary of operational performance since system startup on August 3, 2010. In total, Cell 1 has destroyed approximately 9,578 pounds of recovered hydrocarbons.

Soil gas samples were collected for laboratory and/or field instrument (e.g., photoionization detector [PID]) analysis to monitor CATOX unit performance. One (1) untreated soil gas sample was collected in a Tedlar® bag and submitted to TestAmerica Laboratories, Inc. in Knoxville, Tennessee (TestAmerica) for analysis by US EPA Method TO-15. The influent soil gas hydrocarbon concentration collected on November 29, 2012 was 37.0 parts per million by volume (ppmv) as summarized in **Table 2**.

Hydrocarbon removal calculations were based entirely on the analytical results and the average daily field-measured influent flow rates. The mass removal calculations assume that the sample collected on November 29, 2012 is representative of hydrocarbon concentrations for the entire month of November. This assumption is based on the fact that the same air sparge wells (AS-1 thru AS-8) and extraction wells (V-1 thru V-6) were online when the system was operational.

November 2012 Groundwater Monitoring Results

Groundwater samples were collected on November 8, 2012 from the following wells:

- BP-MW-09 (upgradient of Cell 1),
- CO18-PZM006 (upgradient of Cell 1 at edge of berm), and
- CO02-PZM006 (downgradient of Cell 1).

The groundwater samples were submitted to Microbac Laboratories, Inc. of Baltimore, Maryland (Microbac) for the analyses shown in **Table 3**. These data indicate benzene is the most prevalent volatile organic compound (VOC) constituent. Since system startup in August 2010, a decreasing total VOC concentration trend is documented at well CO18-PZM006 while a generally decreasing trend is observed at wells BP-MW-09 and C002-PZM006. The identified trend for these monitoring wells will continue to be monitored and assessed during system operation in future months.

Cell 3: AS/SVE System in the "Cove" Area

Cell 3 consists of an AS/SVE system coupled with vapor destruction via an electric CATOX unit. **Figure 1** shows the location of the Cell 3 AS/SVE treatment area at the COA. The major design components are described in the Cell 3 final design report (*Coke Oven Area Interim Measures Cell 3 "Cove" Area Air Sparge/Soil Vapor Extraction System Design*), submitted to US EPA on March 1, 2011.

November 2012 Operational Performance

Operational performance of Cell 3 during this reporting period is summarized in **Table 4**. In summary, the CATOX unit operated for 717.6 hours (99.7 %) during September. Operations were in conformance with the manufacturer's specifications at all times that soil gases were collected in accordance with the May 20, 2011 modified permit-to-construct conditions.

The hydrocarbon removal rate was calculated to be approximately 0.01 pounds per operating hour (estimated monthly total of 7.2 pounds). **Table 4** also includes a cumulative summary of operational performance since system startup on June 24, 2011. In total, Cell 3 has destroyed approximately 609 pounds of recovered hydrocarbons.

Soil gas samples were collected for laboratory and/or field instrument (e.g., PID) analysis to monitor CATOX unit performance. One (1) untreated soil gas sample was collected in a Tedlar® bag and submitted to TestAmerica. The influent soil gas hydrocarbon concentration collected on September 27, 2012 was 2.8 ppmv as summarized in **Table 5**.

Hydrocarbon removal calculations were based entirely on the analytical results and the average daily field-measured influent flow rates. The mass removal calculations assume that the sample collected on November 29, 2012 is representative of hydrocarbon concentrations for the entire month of September. This assumption is based on the fact that the same air sparge wells (AS-2 thru AS-12) and extraction wells (V-2 thru V-4) were online when the system was operational.

November 2012 Cell 3 Groundwater Monitoring

Groundwater samples were collected on November 8, 2012 from the following wells (**Figure 1**):

- MW-CELL3-1 (downgradient of Cell 3),
- MW-CELL3-2 (upgradient of Cell 3),
- MW-CELL3-3 (upgradient of Cell 3), and
- CO30-PZM015 (downgradient of Cell 3).

The groundwater samples were submitted to Microbac for the analyses shown in **Table 6**. These data indicate that benzene is the most prevalent VOC constituent. Since system startup on June 24, 2011, a generally decreasing VOC concentration trend is documented for each of the sampled wells. The trends for these monitoring wells will continue to be monitored and assessed during system operation in future months.

Cell 4: In-Situ Anaerobic Bio-treatment Area

Cell 4 consists of an in-situ anaerobic bio-treatment system including extraction and mixing of groundwater in an above ground storage tank containing a nutrient amendment solution and reinjection of groundwater. A schematic layout of the Cell 4 system is shown on **Figure 6**. The major design components are described in the Cell 4 final design report (*Coke Oven Area Interim Measures Cell 4 In-Situ Anaerobic Bio-Treatment System Design*), submitted to US EPA on March 31, 2011.

November 2012 Operations

The seventh amendment dosing event occurred in September.

November 2012 Groundwater Monitoring Results

Groundwater samples were collected on November 7, 2012. Groundwater samples were collected from the following wells (**Figure 7**):

- OBS-6 MW-CELL 4-3
- EXT-2 MW-CELL 4-5
- AS-2 MW-CELL 4-6
- MW-CELL 4-1
- MW-CELL 4-5
- MW-CELL 4-7

The groundwater samples were submitted to Microbac for the analyses shown in **Table 7**. These data indicate naphthalene is the most prevalent VOC constituent. **Figure 8** presents a graph of the total VOC concentrations in Cell 4 groundwater on a monthly basis, as well as before and after the dosing events. With the exception of MW-CELL 4-1, a generally decreasing trend is observed at all monitored Cell 4 wells since system dosing was initiated in July 2011. Trends for these monitoring wells will continue to be monitored and assessed during system operation in future months.

Cell 6: LNAPL Extraction at the Former Benzol Processing Area

The Cell 6 LNAPL monitoring and recovery system was monitored weekly during November 2012). **Table 8** summarizes LNAPL occurrence and recovery observed during the reporting period, the start date of extraction from recovery wells and cumulative LNAPL recovered since the beginning of the interim measure. **Figure 9** illustrates the well locations. An estimated 411 gallons (3,008 pounds) of LNAPL were recovered during October and November, bringing the total recovered LNAPL to 8,163 gallons (59,806 pounds) as of November 30, 2012. The LNAPL was recovered from the following wells:

Well	LNAPL Recovery (gal/lbs)		Notes
	During October-November 2012	Total thru November 30, 2012	
BP-MW-05	140/1,026	6,478/47,463	c
RW-04	26/191	1,016/7,446	c
BP-MW-08	245/1,792	640/4,683	c
BP-MW-11	0/0	8/57	a
RW-03	0/0	19/141	d
RW-01	0/0	1/10	b
RW-02	0/0	0.8/5.9	b

(a) Recovery system moved from BP-MW-11 to BP-MW-08 on September 8, 2010

(b) Manual bailing

(c) Cumulative totals included estimated recovery from 12/28/11 to 1/18/12 as well as 5/24 to 6/22/12

(d) Began pumping RW-03 with a skimmer pump on August 6, 2012

The wells are presented in **Table 8**. LNAPL thicknesses during the reporting period are summarized below (wells are not listed if LNAPL was not present):

- RW-04 (2.2 ft),
- BP-MW-05 (0.88 ft),
- BP-MW-08 (0.17 ft),
- BP-MW-11 (0.68 ft),
- BP-MW-10 (0.18 ft),
- RW-02 (0.16 ft),
- RW-03 (0.46 ft)

- RW-01 (0.06 ft), and
- BP-MW-07 (0.68 ft).

No LNAPL was observed in wells RW-05, BP-MW-06, BP-MW-09, or CO19-PZM004. For all wells in which LNAPL accumulated, **Table 9** provides well-specific details concerning the measured depths to LNAPL, the water table, and calculated LNAPL thicknesses.

TABLES

Table 1
Summary of Operation Conditions
Cell 1: Prototype AS/SVE System for Former Benzol Processing Area
Former Coke Oven Area Interim Remedial Measures
Sparrows Point, LLC

Cell 1 November 2012 Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total CATOX Operating Time (November 1 - November 30, 2012)	hours	651.6
Overall CATOX Operational Time	%	90.5%
Estimated Total Hydrocarbons Destroyed	pounds	65.2
Estimated Hydrocarbon Removal Rate	pounds/hour	0.1

Cell 1 Cumulative Summary of Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total ICE/CATOX Operating Time (August 3, 2010 -November 30, 2012)	hours	16,513
Overall CATOX Operational Time	%	77.8%
Estimated Total Hydrocarbons Destroyed	pounds	9,578
Estimated Hydrocarbon Removal Rate	pounds/hour	0.6

Table 2
Summary of Soil Gas Analytical Results (November 2012)
Cell 1: Prototype AS/SVE System in the "Cove" Area
Former Coke Oven Area Interim Remedial Measures
Sparrows Point, LLC

Analyte	Units	Sample ID: CATOX Influent Date: 11/29/2012 Time: 11:45 Dilution Factor: 1535.72
TO-15 Volatile Organics		
trans-1,3-Dichloropropene	ppb	< 310 U
Acetone	ppb	< 7,700 U
Ethylbenzene	ppb	< 310 U
2-Hexanone	ppb	< 770 U
Methylene Chloride	ppb	< 770 U
Benzene	**ppb**	**35,000**
1,1,2,2-Tetrachloroethane	ppb	< 310 U
Tetrachloroethene	ppb	< 310 U
Toluene	**ppb**	**2,000**
1,1,1-Trichloroethane	ppb	< 310 U
1,1,2-Trichloroethane	ppb	< 310 U
Trichloroethene	ppb	< 310 U
Vinyl Chloride	ppb	< 310 U
o-Xylene	ppb	< 310 U
m-Xylene & p-Xylene	ppb	< 310 U
2-Butanone (MEK)	ppb	< 1,500 U
4-Methyl-2-pentanone (MIBK)	ppb	< 770 U
Bromoform	ppb	< 310 U
Carbon Disulfide	ppb	< 770 U
Carbon tetrachloride	ppb	< 310 U
Chlorobenzene	ppb	< 310 U
Chloroethane	ppb	< 310 U
Chloroform	ppb	< 310 U
1,1-Dichloroethane	ppb	< 310 U
1,2-Dichloroethane	ppb	< 310 U
1,1-Dichloroethene	ppb	< 310 U
trans-1,2-Dichloroethene	ppb	< 310 U
1,2-Dichloropropane	ppb	< 310 U
cis-1,3-Dichloropropene	ppb	< 310 U
Total Volatile Organics	ppb	**37,000**

Notes:

BOLD = Analyte detected

ppb = parts per billion

</U = Analyte not detected above corresponding laboratory reporting limit

Table 3
Summary of Groundwater Analytical Results (November 2012)
Cell 1: Prototype AS/SVE System in Former Benzol Processing Area
Former Coke Oven Area Interim Remedial Measures
Sparrows Point, LLC

	Sample ID	CO02-PZM006	CO18-PZM006	BP-MW-09
	Date	11/8/2012	11/8/2012	11/8/2012
Analyte	Units			
Volatile Organics				
Vinyl Chloride	µg/L	< 100 U	< 100 U	< 100 U
Chloroethane	µg/L	< 100 U	< 100 U	< 100 U
1,1-Dichloroethene	µg/L	< 100 U	< 100 U	< 100 U
Acetone	µg/L	< 2,500 U	< 2,500 U	< 2,500 U
Carbon Disulfide	µg/L	< 100 U	< 100 U	< 100 U
Methylene Chloride	µg/L	< 500 U	< 500 U	< 500 U
trans-1,2-Dichloroethene	µg/L	< 100 U	< 100 U	< 100 U
1,1-Dichloroethane	µg/L	< 100 U	< 100 U	< 100 U
2-Butanone (MEK)	µg/L	< 500 U	< 500 U	< 500 U
Chloroform	µg/L	< 100 U	< 100 U	< 100 U
1,1,1-Trichloroethane	µg/L	< 100 U	< 100 U	< 100 U
Carbon Tetrachloride	µg/L	< 100 U	< 100 U	< 100 U
Benzene	µg/L	**170,000**	**13,000**	**290,000**
1,2-Dichloroethane	µg/L	< 100 U	< 100 U	< 100 U
Trichloroethene	µg/L	< 100 U	< 100 U	< 100 U
1,2-Dichloropropane	µg/L	< 100 U	< 100 U	< 100 U
Methyl Isobutyl Ketone (MIBK)	µg/L	< 500 U	< 500 U	< 500 U
cis-1,3-Dichloropropene	µg/L	< 100 U	< 100 U	< 100 U
Toluene	µg/L	**3,800**	**1,400**	**65,000**
trans-1,3-Dichloropropene	µg/L	< 100 U	< 100 U	< 100 U
1,1,2-Trichloroethane	µg/L	< 100 U	< 100 U	< 100 U
2-Hexanone (MBK)	µg/L	< 500 U	< 500 U	< 500 U
Tetrachloroethene	µg/L	< 100 U	< 100 U	< 100 U
Chlorobenzene	µg/L	< 100 U	< 100 U	< 100 U
1,1,1,2-Tetrachloroethane	µg/L	< 100 U	< 100 U	< 100 U
Ethylbenzene	µg/L	**610**	< 100 U	**3,900**
Bromoform	µg/L	< 100 U	< 100 U	< 100 U
1,1,2,2-Tetrachloroethane	µg/L	< 100 U	< 100 U	< 100 U
1,3,5-Trimethylbenzene	µg/L	**110**	< 100 U	**630**
1,2,4-Trimethylbenzene	µg/L	**360**	< 100 U	**1,100**
Total Xylenes	µg/L	**3,400**	**420**	**44,000**
Total Volatile Organics	µg/L	**177,670**	**14,820**	**400,730**

Table 4
Summary of Operation Conditions
Cell 3: AS/SVE System in the "Cove" Area
Former Coke Oven Area Interim Remedial Measures
Sparrows Point, LLC

Cell 3 November 2012 Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total CATOX Operating Time (November 1 - November 30, 2012)	hours	717.6
Overall CATOX Operational Time	%	99.7%
Estimated Total Hydrocarbons Destroyed	pounds	7.2
Estimated Hydrocarbon Removal Rate	pounds/hour	0.01

Cell 3 Cumulative Summary of Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total ICE/CATOX Operating Time (August 3, 2010 - November 30, 2012)	hours	11,232
Overall CATOX Operational Time	%	85.2%
Estimated Total Hydrocarbons Destroyed	pounds	608.5
Estimated Hydrocarbon Removal Rate	pounds/hour	0.05

Table 5
Summary of Soil Gas Analytical Results (November 2012)
Cell 3: AS/SVE System in the "Cove" Area
Former Coke Oven Area Interim Remedial Measures
Sparrows Point, LLC

	Sample ID	CATOX Influent
	Date	11/29/2012
	Time	12:00
	Dilution Factor	147.7
Analyte	Units	
TO-15 Volatile Organics		
trans-1,3-Dichloropropene	ppb	< 30 U
Acetone	ppb	< 740 U
Ethylbenzene	ppb	< 30 U
2-Hexanone	ppb	< 74 U
Methylene Chloride	ppb	< 74 U
Benzene	**ppb**	**2,500**
1,1,2,2-Tetrachloroethane	ppb	< 30 U
Tetrachloroethene	ppb	< 30 U
Toluene	**ppb**	**210**
1,1,1-Trichloroethane	ppb	< 30 U
1,1,2-Trichloroethane	ppb	< 30 U
Trichloroethene	ppb	< 30 U
Vinyl Chloride	ppb	< 30 U
o-Xylene	ppb	< 30 U
m-Xylene & p-Xylene	**ppb**	**52**
2-Butanone (MEK)	ppb	< 150 U
4-Methyl-2-pentanone (MIBK)	ppb	< 150 U
Bromoform	ppb	< 30 U
Carbon Disulfide	ppb	< 74 U
Carbon tetrachloride	ppb	< 30 U
Chlorobenzene	ppb	< 30 U
Chloroethane	ppb	< 30 U
Chloroform	ppb	< 30 U
1,1-Dichloroethane	ppb	< 30 U
1,2-Dichloroethane	ppb	< 30 U
1,1-Dichloroethene	ppb	< 30 U
trans-1,2-Dichloroethene	ppb	< 30 U
1,2-Dichloropropane	ppb	< 30 U
cis-1,3-Dichloropropene	ppb	< 30 U
Total Volatile Organics	ppb	**2,762**

Notes:

BOLD = Analyte detected

ppb = parts per billion

</U = Analyte not detected above corresponding laboratory reporting limit

Table 6
Summary of Groundwater Analytical Results (November 2012)
Cell 3: Prototype AS/SVE System in Former Benzol Processing Area
Former Coke Oven Area Interim Remedial Measures
RG Steel Sparrows Point, LLC

	Sample ID	CO30-PZM015	MW-CELL 3-1	MW-CELL 3-2	MW-CELL 3-3
	Date	11/8/2012	11/8/2012	11/8/2012	11/8/2012
Analyte	Units				
Volatile Organics					
Vinyl Chloride	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
Chloroethane	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
1,1-Dichloroethene	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
Acetone	µg/L	< 2,500 U	< 1,200 U	< 12,000 U	< 12,000 U
Carbon Disulfide	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
Methylene Chloride	µg/L	< 500 U	< 250 U	< 2,500 U	< 2,500 U
trans-1,2-Dichloroethene	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
1,1-Dichloroethane	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
2-Butanone (MEK)	µg/L	< 500 U	< 250 U	< 2,500 U	< 2,500 U
Chloroform	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
1,1,1-Trichloroethane	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
Carbon Tetrachloride	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
Benzene	µg/L	**48,000**	**9,100**	**13,000**	**11,000**
1,2-Dichloroethane	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
Trichloroethene	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
1,2-Dichloropropane	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
Methyl Isobutyl Ketone (MIBK)	µg/L	< 500 U	< 250 U	< 2,500 U	< 2,500 U
cis-1,3-Dichloropropene	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
Toluene	µg/L	**3,000**	**560**	**700**	**1,000**
trans-1,3-Dichloropropene	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
1,1,2-Trichloroethane	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
2-Hexanone (MBK)	µg/L	< 500 U	< 250 U	<2,500 U	<2,500 U
Tetrachloroethene	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
Chlorobenzene	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
1,1,1,2-Tetrachloroethane	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
Ethylbenzene	**µg/L**	**150**	< 50 U	< 500 U	< 500 U
Bromoform	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
1,1,2,2-Tetrachloroethane	µg/L	< 100 U	< 50 U	< 500 U	< 500 U
1,3,5-Trimethylbenzene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U
1,2,4-Trimethylbenzene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U
Total Xylenes	µg/L	**2,200**	**170**	< 1,500 U	<1,500 U
Total Volatile Organics	µg/L	**53,350**	**9,830**	**13,700**	**12,000**

Table 7
Summary of Groundwater Analytical Results (November 2012)
Cell 4: In-Situ Anaerobic Bio-Treatment Area
Former Coke Oven Area Interim Remedial Measures
Sparrows Point, LLC

	Sample ID	4-1	4-5	4-7	AS-2	EXT-2	OBS-6
	Date	11/7/2012	11/8/2012	11/7/2012	11/8/2012	11/8/2012	11/7/2012
	Time	15:08	8:54	16:10	8:16	10:16	14:00
	Units						
Volatile Organics							
Vinyl Chloride	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
Chloroethane	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
1,1-Dichloroethene	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
Acetone	µg/L	< 2,500 U	< 12,000 U	< 2,500 U	< 12,000 U	< 2,500 U	< 12,000 U
Carbon Disulfide	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
Methylene Chloride	µg/L	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U
trans-1,2-Dichloroethene	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
1,1-Dichloroethane	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
2-Butanone (MEK)	µg/L	< 500 U	< 2,500 U	< 500 U	< 2,500 U	< 500 U	< 2,500 U
Chloroform	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
1,1,1-Trichloroethane	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
Carbon Tetrachloride	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
Benzene	µg/L	**1,500**	**2,800**	**1,100**	**4,400**	**1,100**	**1,500**
1,2-Dichloroethane	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
Trichloroethene	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
1,2-Dichloropropane	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
Methyl Isobutyl Ketone (MIBK)	µg/L	< 500 U	< 2,500 U	< 500 U	< 2,500 U	< 500 U	< 2,500 U
cis-1,3-Dichloropropene	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
Toluene	µg/L	**1,400**	**1,700**	**690**	**3,700**	**780**	**980**
trans-1,3-Dichloropropene	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
1,1,2-Trichloroethane	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
2-Hexanone (MBK)	µg/L	< 500 U	< 2,500 U	< 500 U	< 2,500 U	< 500 U	< 2,500 U
Tetrachloroethene	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
Chlorobenzene	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
1,1,1,2-Tetrachloroethane	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
Ethylbenzene	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
Bromoform	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
1,1,2,2-Tetrachloroethane	µg/L	< 100 U	< 500 U	< 100 U	< 500 U	< 100 U	< 500 U
1,3,5-Trimethylbenzene	µg/L	< 100 U	< 500 U	**130**	< 500 U	< 100 U	< 500 U
1,2,4-Trimethylbenzene	µg/L	**160**	< 500 U	**270**	< 500 U	**110**	< 500 U
Xylenes, Total	µg/L	**1,100**	< 1,500 U	**1,100**	**2,100**	**830**	< 1,500 U
Semi-Volatiles							
Naphthalene	µg/L	**8,700**	**11,000**	**20,000**	**18,000**	**6,900**	**7,700**
Total Volatile Organics	µg/L	**12,860**	**15,500**	**23,290**	**28,200**	**9,720**	**10,180**
Wet Chemistry							
Ferric Iron	mg/L	**0.66**	**0.73**	**0.31**	**0.33**	**0.81**	**0.53**
Ferrous Iron	mg/L	< 0.10	**0.17**	< 0.10	**0.15**	< 0.10	< 0.10
Nitrite-N	mg/L	**0.06**	**0.23**	**0.80**	**0.094**	**0.060**	**0.18**
Nitrate-N	mg/L	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U
Nitrate/Nitrite-N	mg/L	< 0.050 U	**0.23**	**0.26**	< 0.050 U	< 0.050 U	< 0.050 U
Orthophosphate as P	mg/L	**0.61**	**0.018**	**0.037**	**0.028**	**0.62**	**0.022**
Sulfate as SO4	mg/L	**310**	**980**	**170**	**1,300**	**730**	**180**
Total Kjeldahl Nitrogen	mg/L	**47**	**46**	**33**	**45**	**97**	**670**
Metals							
Iron, Total	mg/L	**0.66**	**0.89**	**0.31**	**0.48**	**0.81**	**0.53**

Notes:

-- = Not Measured

Bold = Analyte Detected

mg/L =Milligram per liter

</U = Analyte not detected above corresponding laboratory reporting limit

µg/L = Micrograms per liter

Table 8
LNAPL Occurrence and Recovery
Cell 6: LNAPL Recovery System in Former Benzol Processing Area
Former Coke Oven Area Interim Remedial Measures
Sparrows Point, LLC

Well	LNAPL Occurrence During November 2012 (ft)	Total LNAPL Recovery Period		Cumulative Total LNAPL Recovered		Estimate LNAPL Recovered During November 2012	
		Begin	End	(gal)	(lbs) (a)	(gal)	(lbs) (a)
RW-04	2.2	23-Jul-10	On-going (b)	1,016	7,446	26	191
BP-MW-05	0.88	28-Jan-10	On-going (b)	6,478	47,463	140	1,026
BP-MW-08	0.17	8-Sep-10	On-going (b)	640	4,683	245	1,792
BP-MW-11	0.68	23-Jul-10	9/8/2010	7.8	57	0	0
RW-02	0.16	28-Jan-11	On-going (c)	0.8	5.9	0	0
RW-03	0.46	24-Nov-10	On-going (c)	19.3	141	0	0
RW-01	0.06	28-Oct-11	On-going (c)	1.3	10	0	0
BP-MW-10	0.18	na	na	0	0	0	0
BP-MW-07	0.68	na	na	0	0	0	0
BP-MW-06	none	na	na	0	0	0	0
RW-05	none	na	na	0	0	0	0
BP-MW-09	none	na	na	0	0	0	0
CO19-PZM004	none	na	na	0	0	0	0
			Total Recovery:	**8,163**	**59,806**	**411**	**3,008**

Notes:

(a) Weight is calculated based on average BP-MW-05 and BP-MW-08 oil density of 0.878 grams per cubic centimeter, measured by EA (2009) by ASTM Method D1481

(b) Skimmer

(c) Bailing

(d) Cumulative recovery volumes are calculated using an estimated recovery from 12/28/11 to 1/18/12 as well as 5/24/12 to 6/22/12.

Table 9
Depths (feet) to Water and LNAPL
Cell 6: LNAPL Recovery System in Former Benzol Processing Area
Former Coke Oven Area Interim Remedial Measures
Sparrows Point, LLC

Date	RW-01			RW-02			RW-03		
	Depth to LNAPL	Depth to Water	LNAPL Thickness	Depth to LNAPL	Depth to Water	LNAPL Thickness	Depth to LNAPL	Depth to Water	LNAPL Thickness
11/30/2012	10.59	10.65	0.06	10.29	10.45	0.16	8.64	9.1	0.46

Date	RW-04			BP-MW-05			BP-MW-07		
	Depth to LNAPL	Depth to Water	LNAPL Thickness	Depth to LNAPL	Depth to Water	LNAPL Thickness	Depth to LNAPL	Depth to Water	LNAPL Thickness
11/30/2012	9.28	11.48	2.2	11.05	11.93	0.88	10.23	10.49	0.26

Date	BP-MW-08			BP-MW-10			BP-MW-11		
	Depth to LNAPL	Depth to Water	LNAPL Thickness	Depth to LNAPL	Depth to Water	LNAPL Thickness	Depth to LNAPL	Depth to Water	LNAPL Thickness
11/30/2012	12.08	12.25	0.17	8.95	9.13	0.18	11.03	11.71	0.68

All measurement are presented in feet

FIGURES