

September 30, 2011

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 August 2011**

Dear Mr. Fan and Ms. Brown:

Enclosed with this correspondence is the ***Coke Oven Area Interim Measures Progress Report August 2011*** completed for the RG Steel (formerly Severstal) 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 September 30th, 2011 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 August 31, 2011.

Please contact me at (410) 388-6622 should questions arise during your review of the enclosed progress report.

Sincerely,



Russell Becker
Division Manager, Environmental Engineering and Affairs

Enclosure

COKE OVEN AREA INTERIM MEASURES PROGRESS REPORT (AUGUST 2011)

Prepared for

RG Steel Sparrows Point, LLC
Sparrows Point, Maryland



September 30, 2011

URS

URS Corporation
200 Orchard Ridge Drive, Suite 101
Gaithersburg, MD 20878
Project no. 15302745

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 August 2011 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 RG Steel Sparrows Point Facility (formerly Severstal Sparrows Point Facility) located in Sparrows Point, Maryland. This progress report summarizes IM progress for August 2011.

For mutual ease of understanding, and as agreed during the June 3, 2010 teleconference with US EPA, the following designations are applied in this document to the six (6) 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 2: AS/SVE and Dual Phase Groundwater Extraction System in Former Coal Storage Area,
- Cell 3: AS/SVE System in "Cove" Area,
- Cell 4: In-Situ Anaerobic Bio-treatment Area,
- Cell 5: Groundwater Extraction at the Turning Basin Area, and
- Cell 6: Light Non-Aqueous Phase Liquid (LNAPL) Recovery at the Former Benzol Processing Area.

As of August 31, 2011, Cells 1, 3, 4 and 6 continue to be operational. Groundwater samples were collected from Cell 4 on August 5, 2011 to evaluate the effects of the first amendment dosing event which occurred in early July 2011. The remaining Cells (Cells 2 and 5) are in various stages of evaluation, design, and under permitting considerations by Maryland Department of the Environment (MDE).

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.

August 2011 Operational Performance

Operational performance of Cell 1 during this reporting period is summarized in **Table 1**. In summary, the CATOX unit operated for 711 hours (95.6 %) during this reporting period. 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.

Hydrocarbon removal rates ranged from approximately 0.4 to 0.6 pounds per operating hour (approximately 10.6 to 15.1 pounds per operating day for an estimated monthly total of 398 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 8,873 pounds of recovered hydrocarbons. **Figure 3** presents a graph of the cumulative estimated monthly hydrocarbon recovery in Cell 1 since the startup of the IM system.

Soil gas samples were collected for laboratory and/or field instrument (e.g., photoionization detector [PID]) analysis to monitor CATOX unit performance. Untreated soil gas samples were collected in Tedlar[®] bags, which were submitted to TestAmerica Laboratories, Inc. in Knoxville, Tennessee (TestAmerica) for analysis by US EPA Method TO-15. Influent soil gas hydrocarbon concentrations, collected on August 11 and 31, 2011, were 274 and 378 parts per million by volume (ppmv), respectively, as summarized in **Table 2**.

Hydrocarbon removal calculations were based entirely on the analytical results and the corresponding field-measured influent flow rate at the time of sampling. Calculations were based on the following two (2) assumptions:

- The analytical sample from August 11, 2011 is representative of soil vapor concentrations during the first 11 operating days of August because the same extraction wells (V-1 thru V-6) and sparge wells (AS-1 thru AS-8) were online during system operation. Also, the CATOX unit operated within the manufacturer's specifications with operational temperatures generally stable and within normal ranges.

Coke Oven Area Interim Remedial Measures Progress Report

- The analytical sample from August 31, 2011 represents soil vapor concentrations during the last 20 operating days of August because the same extraction wells (V-1, -2, -4, -5) and sparge wells (AS-1 thru AS-6) were online during system operation. Also, the CATOX unit operated within the manufacturer's specifications with operational temperatures generally stable and within normal ranges.

August 2011 Groundwater Monitoring Results

Groundwater samples were collected on August 3, 2011 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.

Figure 4 presents a graph of the total measured VOC concentration in Cell 1 groundwater for each well by month since the startup of the IM system. A generally decreasing total VOC concentration trend is documented at wells CO18-PZM006 and BP-MW-09 since system startup in August 2010. The VOC concentration trend at well C002-PZM006 remains relatively unchanged for the last several months. 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.

August 2011 Operational Performance

Operational performance of Cell 3 during this reporting period is summarized in **Table 4**. In summary, the CATOX unit operated for 718 hours (96.5 %) during August. 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.

Hydrocarbon removal rates averaged approximately 0.06 to 0.16 pounds per operating hour (approximately 1.3 to 3.9 pounds per operating day for a total of 104 pounds) during this reporting period. **Table 4** also includes a cumulative summary of operational performance since system startup on June 24, 2011. In total, Cell 3 has destroyed approximately 187 pounds of recovered hydrocarbons. **Figure 3** presents a graph of the cumulative estimated monthly hydrocarbon recovery in Cell 3 since the startup of the IM system.

Soil gas samples were collected for laboratory and/or field instrument (e.g., PID) analysis to monitor CATOX unit performance. Untreated soil gas samples were collected in Tedlar[®] bags, which were submitted to TestAmerica. Influent soil gas hydrocarbon concentrations collected on August 11 and 31, 2011, were 23.3 and 95 ppmv, respectively, as summarized in **Table 5**.

Hydrocarbon removal calculations were based entirely on the analytical results and the corresponding field-measured influent flow rate at the time of sampling. The mass removal calculations assume that the average of the two (2) analytical samples is representative of hydrocarbon concentrations for the entire month of August. This assumption is based on the fact that the same sparge wells (AS-3 thru AS-13) and extraction wells (V-2 thru V-4) were online when the system was operational.

August 2011 Cell 3 Groundwater Monitoring

Groundwater samples were collected on August 3, 2011 from the following wells (**Figure 1**):

- MW-CELL3-1 (downgradient of Cell 3),

Coke Oven Area Interim Remedial Measures Progress Report

- 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.

Figure 5 presents a graph of the total measured VOC concentration in Cell 3 groundwater for each well by month relative to the baseline concentrations collected in February 2011. 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 in **Figure 7**. 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.

August 2011 Operations

The first amendment dosing event occurred on July 6 and 7, 2011 and was summarized in the *July 2011 Monthly Progress Report*. As per the approved design concept, groundwater in Cell 4 was monitored in August 2011 to document potential impacts of the July 2011 dosing event.

August 2011 Groundwater Monitoring Results

Groundwater samples were collected on August 5, 2011 (approximately four [4] weeks after the initial nutrient amendment) for comparison to the baseline samples collected on June 28 (approximately one [1] week prior to nutrient amendment). Groundwater samples were collected from the following wells (**Figure 6**):

- OBS-6
- OBS-8
- EXT-2
- AS-2
- Cell 4-1
- Cell 4-3
- Cell 4-4
- Cell 4-5
- Cell 4-6
- 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 before and after the dosing event. 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 approximately weekly during August (four [4] site visits). **Table 8** summarizes LNAPL occurrence and recovery observed during the reporting period along with the cumulative LNAPL recovery since the beginning of the project. **Figure 9** illustrates the well locations. During August, approximately 184 gallons (1,346 pounds) of LNAPL was recovered, bringing the total recovered LNAPL to 5,959 gallons (43,664 pounds) as of August 31, 2011. The LNAPL was recovered from the following wells:

Well	LNAPL Recovery (gal / lbs)		Notes
	During August 2011	Total thru August 31, 2011	
BP-MW-05	96 / 703	5,125 / 37,552	
RW-04	93 / 678	597 / 4,317	
BP-MW-08	-4.8 / -35	224 / 1,640	(a)
BP-MW-11	0 / 0	7.8 / 57	(b)
RW-03	0 / 0	4.0 / 29	(c)
RW-01	0 / 0	1.3 / 10	(c)
RW-02	0 / 0	0.8 / 5	(c)

(a) Tank measurement variability

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

(c) Manual bailing.

During the reporting period, the range of LNAPL thicknesses varied as summarized below (wells are not listed if LNAPL was not present):

- RW-04 (0.31 to 2.55 ft),
- BP-MW-05 (0.72 to 1.21 ft),
- BP-MW-08 (0.32 to 3.62 ft),
- BP-MW-11 (0.16 to 0.50 ft),
- RW-02 (0.10 to 0.17 ft),
- BP-MW-10 (0.09 to 0.31 ft),
- RW-03 (0.03 to 0.53 ft),
- RW-01 (0.10 to 0.44 ft), and
- BP-MW-07 (0.00 to 0.01 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 Operating Conditions
Cell 1: Prototype AS/SVE System in Former Benzol Processing Area
Former Coke Oven Area Interim Remedial Measures
RG Steel Sparrows Point, LLC

Cell 1 August 2011 Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total CATOX Operating Time (August 1 - August 31, 2011)	hours	711
Overall CATOX Operational Time	%	96
Estimated Total Hydrocarbons Destroyed	pounds	398
Estimated Hydrocarbon Removal Rate	pounds/hour	0.4 to 0.6

Cell 1 Cumulative Summary of Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total ICE/CATOX Operating Time (August 3, 2010 - August 31, 2011)	hours	6,082
Overall ICE/CATOX Operational Time	%	64.0
Estimated Total Hydrocarbons Destroyed	pounds	8,874
Estimated Average Hydrocarbon Removal Rate	pounds/hour	1.46

Table 2
Summary of Soil Gas Analytical Results
Cell 1: Prototype AS/SVE System in Former Benzol Processing Area
Former Coke Oven Area Interim Remedial Measures
RG Steel Sparrows Point, LLC

		Sample ID	CATOX Influent	CATOX Influent
		Date	8/11/2011	8/31/2011
		Time	10:40	11:00
		Dilution Factor	26240.69	9312.80
Analyte	Units			
TO-15 Volatile Organics				
trans-1,3-Dichloropropene	ppb		< 5,200 U	< 1,900 U
Acetone	ppb		< 130,000 U	< 47,000 U
Ethylbenzene	ppb		< 5,200 U	< 1,900 U
2-Hexanone	ppb		< 13,000 U	< 4,700 U
Methylene Chloride	ppb		< 13,000 U	18,000
Benzene	ppb		230,000	300,000
1,1,2,2-Tetrachloroethane	ppb		< 5,200 U	< 1,900 U
Tetrachloroethene	ppb		< 5,200 U	< 1,900 U
Toluene	ppb		37,000	48,000
1,1,1-Trichloroethane	ppb		< 5,200 U	< 1,900 U
1,1,2-Trichloroethane	ppb		< 5,200 U	< 1,900 U
Trichloroethene	ppb		< 5,200 U	< 1,900 U
Vinyl Chloride	ppb		< 5,200 U	< 1,900 U
o-Xylene	ppb		< 5,200 U	3,300
m-Xylene & p-Xylene	ppb		7,200	9,000
2-Butanone (MEK)	ppb		< 26,000 U	< 9,300 U
4-Methyl-2-pentanone (MIBK)	ppb		< 13,000 U	< 4,700 U
Bromoform	ppb		< 5,200 U	< 1,900 U
Carbon Disulfide	ppb		< 13,000 U	< 4,700 U
Carbon tetrachloride	ppb		< 5,200 U	< 1,900 U
Chlorobenzene	ppb		< 5,200 U	< 1,900 U
Chloroethane	ppb		< 5,200 U	< 1,900 U
Chloroform	ppb		< 5,200 U	< 1,900 U
1,1-Dichloroethane	ppb		< 5,200 U	< 1,900 U
1,2-Dichloroethane	ppb		< 5,200 U	< 1,900 U
1,1-Dichloroethene	ppb		< 5,200 U	< 1,900 U
trans-1,2-Dichloroethene	ppb		< 5,200 U	< 1,900 U
1,2-Dichloropropane	ppb		< 5,200 U	< 1,900 U
cis-1,3-Dichloropropene	ppb		< 5,200 U	< 1,900 U
Total Volatile Organics	ppb		274,200	378,300
Hydrocarbons				

Notes:

<Blank> = Not Measured

BOLD = Analyte detected

ppb = parts per billion

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

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

Sample ID		CO02-PZM006	CO18-PZM006	BP-MW-09
Date		8/4/2011	8/4/2011	8/4/2011
Time		11:15	10:30	15:17
Analyte	Units			
Water Quality Parameters				
Temperature	deg C	20.56	27.79	18.95
pH	std units	7.91	6.78	11.41
ORP	mV	--	-53	-371
Conductivity	mS/cm	1.86	3.02	2.06
Turbidity	NTU	221	217	202
Dissolved Oxygen	mg/L	4.41	0.93	0.00
Volatile Organics				
Vinyl Chloride	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
Chloroethane	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
1,1-Dichloroethene	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
Acetone	µg/L	< 120,000 U	< 120,000 U	< 120,000 U
Carbon Disulfide	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
Methylene Chloride	µg/L	< 25,000 U	< 25,000 U	< 25,000 U
trans-1,2-Dichloroethene	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
1,1-Dichloroethane	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
2-Butanone (MEK)	µg/L	< 25,000 U	< 25,000 U	< 25,000 U
Chloroform	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
1,1,1-Trichloroethane	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
Carbon Tetrachloride	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
Benzene	µg/L	600,000	240,000	220,000
1,2-Dichloroethane	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
Trichloroethene	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
1,2-Dichloropropane	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
Methyl Isobutyl Ketone (MIBK)	µg/L	< 25,000 U	< 25,000 U	< 25,000 U
cis-1,3-Dichloropropene	µg/L	< 5,000	< 5,000	< 5,000
Toluene	µg/L	52,000	35,000	56,000
trans-1,3-Dichloropropene	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
1,1,2-Trichloroethane	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
2-Hexanone (MBK)	µg/L	< 25,000 U	< 25,000 U	< 25,000 U
Tetrachloroethene	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
Chlorobenzene	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
1,1,1,2-Tetrachloroethane	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
Ethylbenzene	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
Bromoform	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
1,1,2,2-Tetrachloroethane	µg/L	< 5,000 U	< 5,000 U	< 5,000 U
Total Xylenes	µg/L	< 15,000 U	< 15,000 U	36,000
Total Volatile Organics	µg/L	652,000	275,000	312,000

Notes:

-- = Not Measured

Bold = Analyte Detected

deg C = degrees Celcius

mg/L = Milligram per liter

mS/cm = Microsiemens per Centimeter

mV = Millivolts

NA = Standard not available or not currently established

NTU = Nephelometric Turbidity Units

ORP = Oxidation Reduction Potential

std units = standard units

<U = Analyte not detected above corresponding laboratory reporting limit

µg/L = Micrograms per liter

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

Cell 3 August 2011 Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total CATOX Operating Time (August 1 - August 31, 2011)	hours	718
Overall CATOX Operational Time	%	96.5
Estimated Total Hydrocarbons Destroyed	pounds	104
Estimated Hydrocarbon Removal Rate	pounds/hour	0.06 to 0.16

Cell 3 Cumulative Summary of Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total ICE/CATOX Operating Time (June 24, 2011 - August 31, 2011)	hours	1,455
Overall ICE/CATOX Operational Time	%	89.0
Estimated Total Hydrocarbons Destroyed	pounds	187
Estimated Hydrocarbon Removal Rate	pounds/hour	0.13

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

Sample ID	CATOX Influent	CATOX Influent
Date	8/11/2011	8/31/2011
Time	11:40	10:30
Dilution Factor	1917.33	10211.13
Analyte	Units	
TO-15 Volatile Organics		
trans-1,3-Dichloropropene	ppb	< 380 U
Acetone	ppb	< 9,600 U
Ethylbenzene	ppb	< 380 U
2-Hexanone	ppb	< 380 U
Methylene Chloride	ppb	1,400
Benzene	ppb	20,000
1,1,2,2-Tetrachloroethane	ppb	< 380 U
Tetrachloroethene	ppb	< 380 U
Toluene	ppb	1,500
1,1,1-Trichloroethane	ppb	< 380 U
1,1,2-Trichloroethane	ppb	< 380 U
Trichloroethene	ppb	< 380 U
Vinyl Chloride	ppb	< 380 U
o-Xylene	ppb	< 380 U
m-Xylene & p-Xylene	ppb	430
2-Butanone (MEK)	ppb	< 1,900 U
4-Methyl-2-pentanone (MIBK)	ppb	< 960 U
Bromoform	ppb	< 380 U
Carbon Disulfide	ppb	< 380 U
Carbon tetrachloride	ppb	< 380 U
Chlorobenzene	ppb	< 380 U
Chloroethane	ppb	< 380 U
Chloroform	ppb	< 380 U
1,1-Dichloroethane	ppb	< 380 U
1,2-Dichloroethane	ppb	< 380 U
1,1-Dichloroethene	ppb	< 380 U
trans-1,2-Dichloroethene	ppb	< 380 U
1,2-Dichloropropane	ppb	< 380 U
cis-1,3-Dichloropropene	ppb	< 380 U
Total Volatile Organics	ppb	23,330
Hydrocarbons		

Notes:

[1] Laboratory error - cross-contamination of Methylene Chloride
(laboratory cleaning agent)

<Blank> = Not Measured

BOLD = Analyte detected

ppb = parts per billion

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

Table 3
Summary of Groundwater Analytical Results
Cell 3: AS/SVE System in the "Cove" 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		8/3/2011	8/3/2011	8/3/2011	8/3/2011
Analyte	Units				
Water Quality Parameters					
Temperature	deg C	18.95	18.30	18.05	19.14
pH	std units	12.26	12.15	12.82	12.52
ORP	mV	-308	-335	-311	-334
Conductivity	mS/cm	3.11	3.16	2.45	4.97
Turbidity	NTU	167	222	304	229
Dissolved Oxygen	mg/L	0.00	4.01	0.00	0.00
Volatile Organics					
Vinyl Chloride	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
Chloroethane	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
1,1-Dichloroethene	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
Acetone	µg/L	< 25,000 U	< 2,500 U	< 2,500 U	< 25,000 U
Carbon Disulfide	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
Methylene Chloride	µg/L	< 5,000 U	< 500 U	< 500 U	< 5,000 U
trans-1,2-Dichloroethene	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
1,1-Dichloroethane	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
2-Butanone (MEK)	µg/L	< 5,000 U	< 500 U	< 500 U	< 5,000 U
Chloroform	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
1,1,1-Trichloroethane	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
Carbon Tetrachloride	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
Benzene	µg/L	58,000	17,000	22,000	34,000
1,2-Dichloroethane	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
Trichloroethene	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
1,2-Dichloropropane	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
Methyl Isobutyl Ketone (MIBK)	µg/L	< 5,000 U	< 500 U	< 500 U	< 5,000 U
cis-1,3-Dichloropropene	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
Toluene	µg/L	4,200	1,600	2,000	2,900
trans-1,3-Dichloropropene	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
1,1,2-Trichloroethane	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
2-Hexanone (MBK)	µg/L	< 5,000 U	< 500 U	< 500 U	< 5,000 U
Tetrachloroethene	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
Chlorobenzene	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
1,1,1,2-Tetrachloroethane	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
Ethylbenzene	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
Bromoform	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
1,1,1,2,2-Tetrachloroethane	µg/L	< 1,000 U	< 100 U	< 100 U	< 1,000 U
Xylenes, Total	µg/L	< 3,000 U	480	540	< 3,000 U
Total Volatile Organics	µg/L	62,200	19,080	24,540	36,900

Notes:

- = Not Measured
- Bold** = Analyte Detected
- deg C = degrees Celcius
- mg/L = Milligram per liter
- mS/cm = Microsiemens per Centimeter
- mV = Millivolts
- NA = Standard not available or not currently established
- NTU = Nephelometric Turbidity Units
- ORP = Oxidation Reduction Potential
- std units = standard units
- </U = Analyte not detected above corresponding laboratory reporting limit
- µg/L = Micrograms per liter

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

Sample ID	OBS-6	OBS-8	EXT-2	AS-2	Cell 4-3	Cell 4-4	Cell 4-5	Cell 4-6	Cell 4-7	
Date	08/05/11	08/05/11	08/05/11	08/05/11	08/05/11	08/04/11	08/05/11	08/05/11	08/05/11	
Units										
Water Quality Parameters										
Temperature	deg C	18.31	17.94	18.52	17.56	18.37	17.80	11.74	17.95	18.40
pH	std units	12.17	11.80	11.81	11.24	11.27	11.70	11.80	12.17	12.31
ORP	mV	-224	-300	-329.0	-300	-402	-283	-295	-250	-281
Conductivity	mS/cm	2.940	2.070	2.600	3.570	2.010	1.910	2.340	3.350	4.180
Turbidity	NTU	231	268	198	345	201	197	181	232	258
Dissolved Oxygen	mg/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Field Sampling										
Nitrate	mg/L	--	--	--	--	--	--	--	--	--
Sulfate	mg/L	--	--	--	--	--	--	--	--	--
Volatile Organics										
Vinyl Chloride	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Chloroethane	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
1,1-Dichloroethene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Acetone	µg/L	< 2,500 U	< 2,500 U	< 2,500 U	< 2,500 U	< 2,500 U	< 2,500 U	< 2,500 U	< 2,500 U	< 2,500 U
Carbon Disulfide	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Methylene Chloride	µg/L	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U
trans-1,2-Dichloroethene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
1,1-Dichloroethane	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
2-Butanone (MEK)	µg/L	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U
Chloroform	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
1,1,1-Trichloroethane	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Carbon Tetrachloride	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Benzene	µg/L	1,000	830	700	7,500	780	970	1,100	880	1,700
1,2-Dichloroethane	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Trichloroethene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
1,2-Dichloropropane	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Methyl Isobutyl Ketone (MIBK)	µg/L	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U
cis-1,3-Dichloropropene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Toluene	µg/L	810	560	490	5,500	610	650	840	720	1,200
trans-1,3-Dichloropropene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
1,1,2-Trichloroethane	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
2-Hexanone (MBK)	µg/L	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U
Tetrachloroethene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Chlorobenzene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
1,1,1,2-Tetrachloroethane	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Ethylbenzene	µg/L	< 100 U	< 100 U	< 100 U	120	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Bromoform	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
1,1,2,2-Tetrachloroethane	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U

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

Sample ID	OBS-6	OBS-8	EXT-2	AS-2	Cell 4-3	Cell 4-4	Cell 4-5	Cell 4-6	Cell 4-7	
Date	08/05/11	08/05/11	08/05/11	08/05/11	08/05/11	08/04/11	08/05/11	08/05/11	08/05/11	
Units										
Xylenes, Total	µg/L	910	760	800	3,400	760	880	1,000	820	1,800
Naphthalene	µg/L	17,000	7,300	12,000	15,000	8,600	7,400	12,000	8,400	21,000
Total Volatile Organics	µg/L	19,720	9,450	13,990	31,520	10,750	9,900	14,940	10,820	25,700
Microbiology										
Heterotrophic Plate Count	CFU/ml	--	--	1,100	--	--	< 1.0 U	--	< 1.0 U	--
Wet Chemistry										
Ferric Iron	mg/L	< 0.015 U								
Ferrous Iron	mg/L	1.3	0.60	0.47	1.1	< 0.010 U	0.47	0.47	0.31	0.81
Nitrite-N	mg/L	0.29	0.034	0.028	0.13	< 0.012 U	0.044	0.031	0.035	0.17
Nitrate-N	mg/L	< 0.050 U								
Nitrate/Nitrite-N	mg/L	< 0.050 U	< 0.050 U	< 0.050 U	0.052	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U	0.17
Orthophosphate as P	mg/L	< 0.010 U	0.011	< 0.010 U	0.019	< 0.010 U	0.015	0.043	0.082	0.012
Sulfate as SO4	mg/L	210	370	450	1,500	470	400	440	300	540
Sulfite as SO3	mg/L	--	--	--	--	--	--	--	--	--
Total Kjeldahl Nitrogen	mg/L	16	29	74	310	57	< 1.0 U	36	28	52
Metals										
Iron, Total	mg/L	0.31	0.59	0.27	0.66	0.22	0.44	0.35	0.19	0.41

Notes:

- = Not Measured
- Bold** = Analyte Detected
- deg C = degrees Celcius
- E = Exceeds Instrument Calibration
- mg/L = Milligram per liter
- mS/cm = Microsiemens per Centimeter
- mV = Millivolts
- NA = Standard not available or not currently established
- NTU = Nephelometric Turbidity Units
- ORP = Oxidation Reduction Potential
- std units = standard units
- <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
RG Steel Sparrows Point, LLC

Well	LNAPL Occurrence During August 2011 (ft)	Total LNAPL Recovery Period		Cumulative Total LNAPL Recovered thru August 31, 2011		LNAPL Recovered During August 2011	
		Begin	End	(gal)	(lbs) (a)	(gal)	(lbs) (a)
BP-MW-05	0.72 to 1.21	28-Jan-10	On-going (b)	5,125	37,552	96	703
RW-04	0.31 to 2.55	23-Jul-10	On-going (b)	597	4,371	93	678
BP-MW-08	0.32 to 3.62	8-Sep-10	On-going (b)	224	1,640	-4.8	-35 (d)
BP-MW-11	0.16 to 0.50	23-Jul-10	8-Sep-10	7.8	57	0	0
RW-01	0.01 to 0.44	28-Oct-10	On-going (c)	1.3	10	0	0
RW-03	0.03 to 0.53	11/24/2010	On-going (c)	4.0	29	0	0
RW-02	0.01 to 0.17	1/28/2011	On-going (c)	0.8	5	0	0
BP-MW-10	0.09 to 0.31	na	na	0	0	0	0
BP-MW-07	0.00 to 0.01	na	na	0	0	0	0
RW-05	none	na	na	0	0	0	0
BP-MW-06	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:				5,959	43,664	184	1,346

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) Tank measurement variability

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
RG Steel 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
8/4/2011	11.44	11.88	0.44	11.74	11.91	0.17	9.45	9.76	0.31
8/11/2011	11.43	11.61	0.18	11.77	11.91	0.14	9.50	9.81	0.31
8/17/2011	10.50	10.77	0.27	11.06	11.21	0.15	8.77	9.30	0.53
8/31/2011	9.35	9.45	0.10	9.69	9.79	0.10	7.62	7.65	0.03
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
8/4/2011	9.80	10.11	0.31	11.19	12.30	1.11	11.04	11.05	0.01
8/11/2011	9.80	10.32	0.52	11.21	11.93	0.72	11.11	11.12	0.01
8/17/2011	9.02	9.73	0.71	10.60	11.25	0.65	10.41	10.41	0.00
8/31/2011	6.20	8.75	2.55	9.34	10.55	1.21	9.22	9.22	0.00
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
8/4/2011	12.25	12.65	0.40	8.63	8.94	0.31	11.26	11.76	0.50
8/11/2011	12.26	12.58	0.32	8.74	8.98	0.24	11.35	11.85	0.50
8/17/2011	11.56	12.03	0.47	7.15	7.26	0.11	10.25	10.75	0.50
8/31/2011	9.11	12.73	3.62	6.90	6.99	0.09	9.33	9.49	0.16

Figures



Legend

- ◆ Existing Monitoring Well
- AS/SVE Treatment Area
- Special Study Area

INTERIM MEASURES TREATMENT CELLS

- "Cell 1": Prototype AS/SVE System in Benzol Area
- "Cell 2": AS/SVE and Dual Phase GW Treatment/Injection System in the Former Coal Storage Area
- "Cell 3": AS/SVE System in the "Cove" Area
- "Cell 4": In-Situ Anaerobic Bio-treatment System in the Coal Tar Area
- "Cell 5": Groundwater Extraction/Treatment/Injection at the Turning Basin Area
- "Cell 6": LNAPL Recovery at the Former Benzol Processing Area



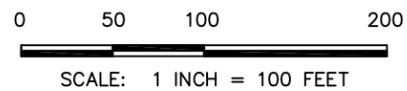
CLIENT: Sparrows Point	LOCATION: Baltimore, MD
DATE: 08/16/2011	FILE: G:\Projects\SparrowsPoint\Projects\2010\CokeOven-and-CokePoint-6Prototype Cells_rev2.mxd
GIS: JK	 12420 Milestone Center Drive Germantown, MD 20876
CHECKED: RL	
SENIOR: BE	

Figure 1
Interim Measures Treatment Areas

Image source: World Imagery, ESRI, GeoEye, 2009.

LEGEND:

V-1	TRENCH VAPOR EXTRACTION RISER
EXT-1	SVE PILOT TEST EXTRACTION WELL
OBS-1	SVE PILOT TEST OBSERVATION WELL
CO18-PZM006	EXISTING MONITORING WELL
AS-2	AIR SPARGE WELL
- - - - -	VAPOR COLLECTION TRENCHES
- - - - -	FORMER STRUCTURES (DEMOLISHED)



URS
 335 COMMERCE DRIVE, SUITE 300
 FORT WASHINGTON, PA 19034
 PHONE: (215) 367-2500 FAX: (215) 367-1000

Job: 15302307.11001
 Prepared by: JES
 Checked by: JH
 Date: 10/27/10

AS-BUILT LAYOUT PLAN
 CELL 1: FORMER BENZOL PROCESSING AREA
 RG STEEL SPARROWS POINT, LLC FACILITY
 BALTIMORE, MARYLAND

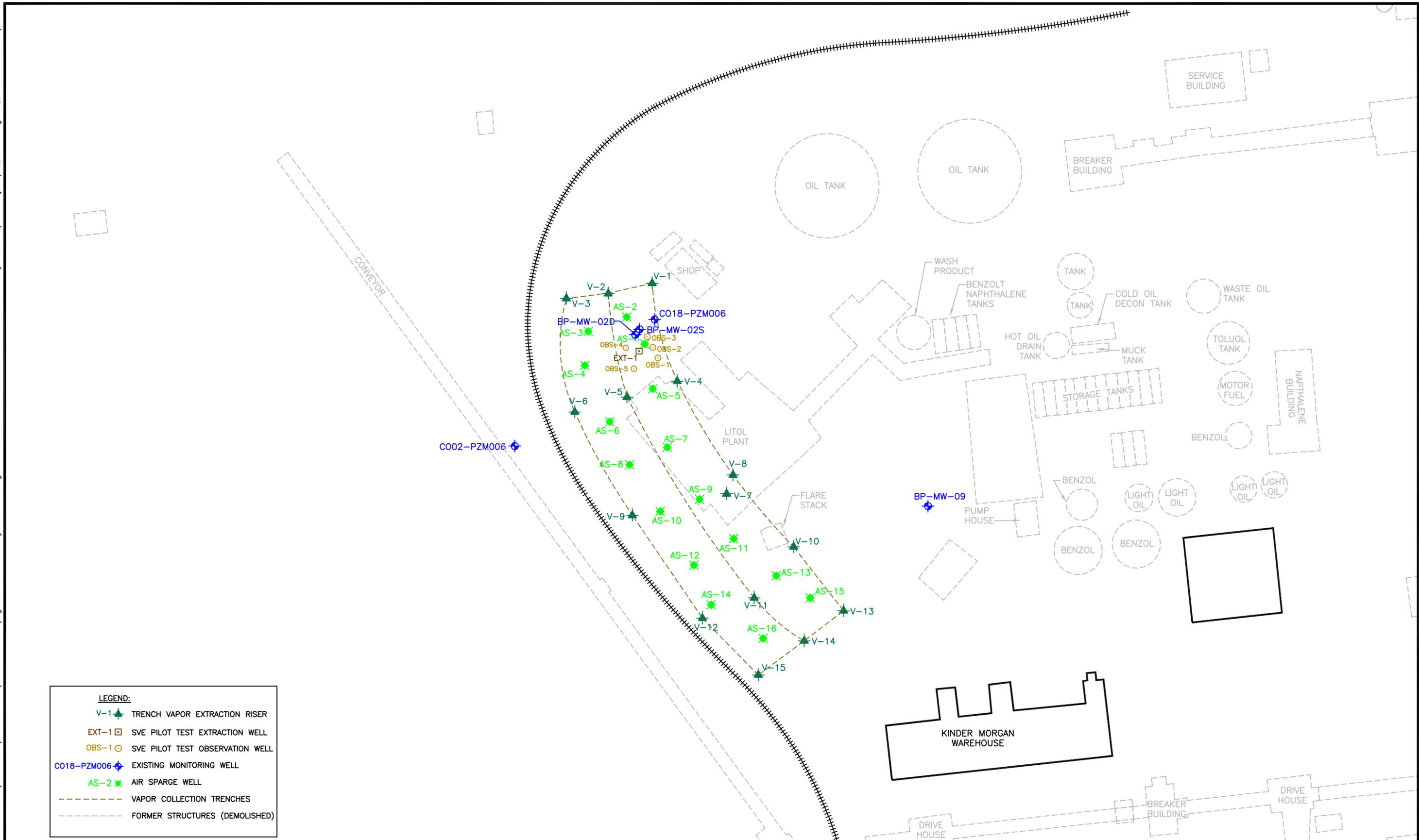


Figure 3
Cumulative Summary of Estimated Hydrocarbon Recovery
Former Coke Oven Area Interim Remedial Measures
RG Steel Sparrows Point, LLC

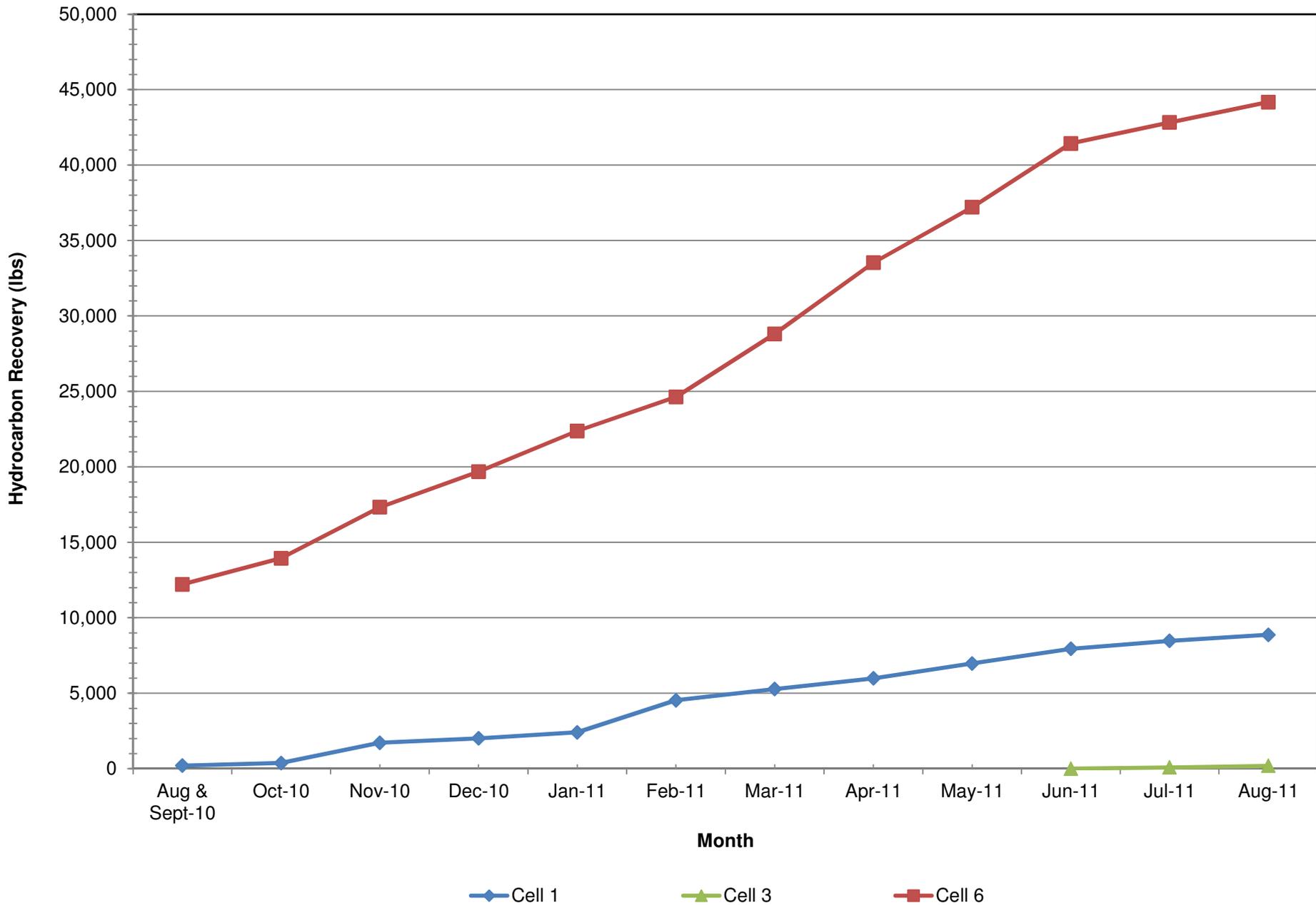


Figure 4
Measured Groundwater VOC Concentration per Month
Cell 1: Prototype AS/SVE System in Former Benzol Processing Area
RG Steel Sparrows Point, LLC

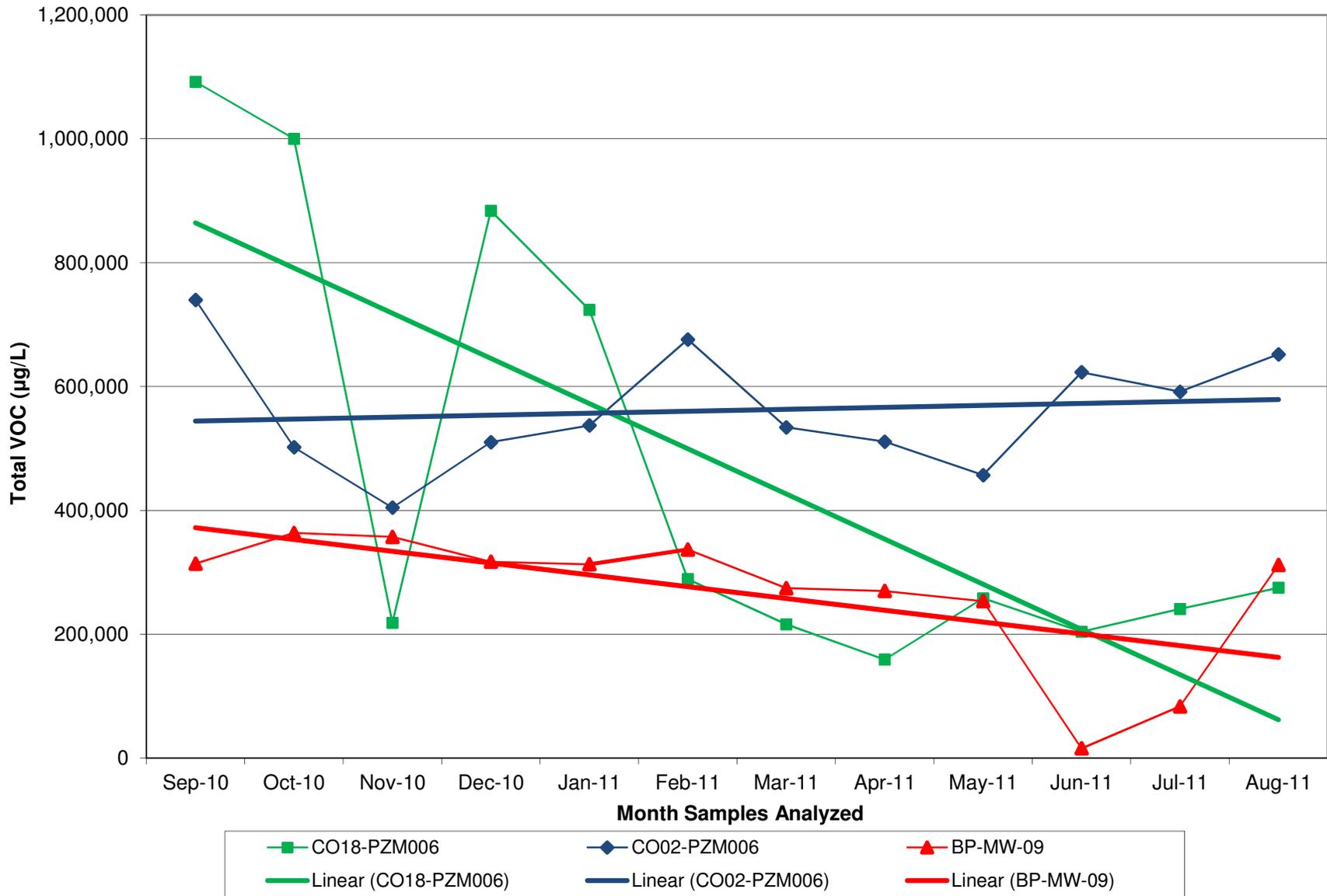
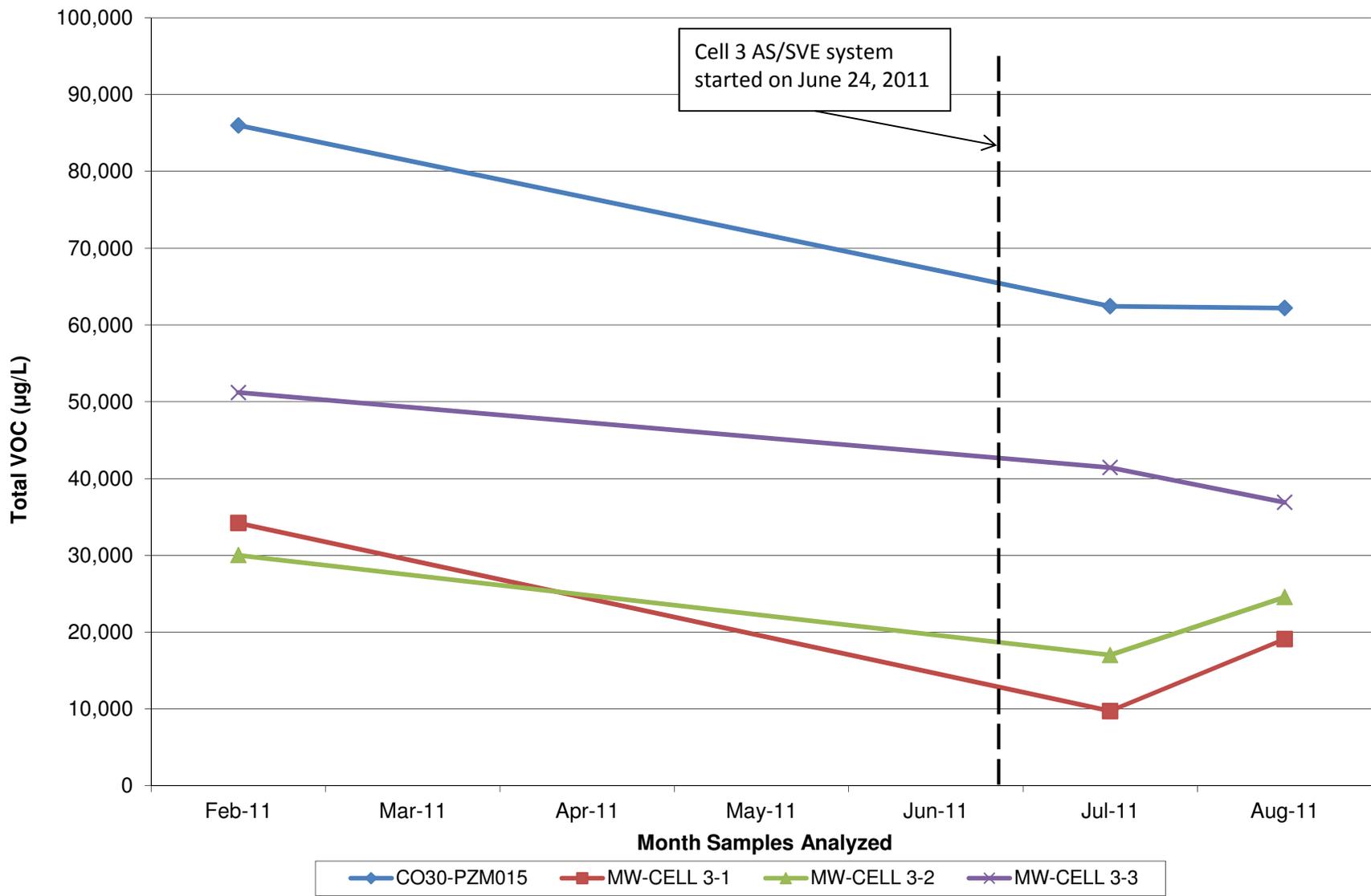


Figure 5
Measured Groundwater VOC Concentration by Month
Cell 3: Prototype AS/SVE System in the "Cove" Area
RG Steel Sparrows Point, LLC



Cell 4

In-Situ Anaerobic Bio-System



Image source: World Imagery, ESRI, GeoEye, 2009.

Legend

- Extraction Well (Existing)
- Extraction Well (Planned)
- Recirculation Well (Existing)
- Recirculation Well (Planned)
- Monitoring Well (Planned)
- Monitoring Well (Existing)
- Groundwater Flow Direction

CLIENT	Severstal Sparrows Point, LLC		
LOCATION	Baltimore, MD		
 200 Orchard Ridge Drive Gaithersburg, MD 20878	GIS BY	JK	05/31/2011
	CHK BY	BE	05/31/2011
	PM	BE	05/31/2011

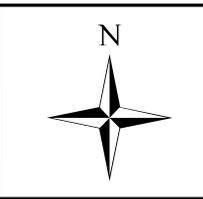
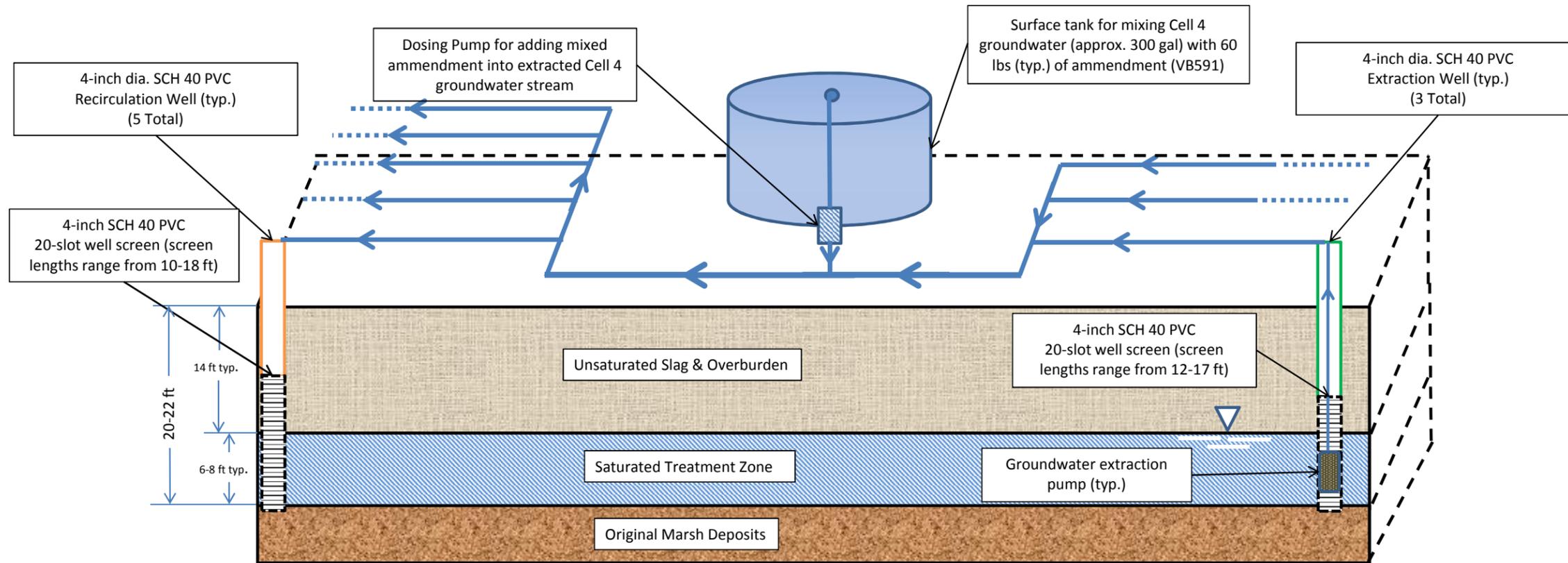
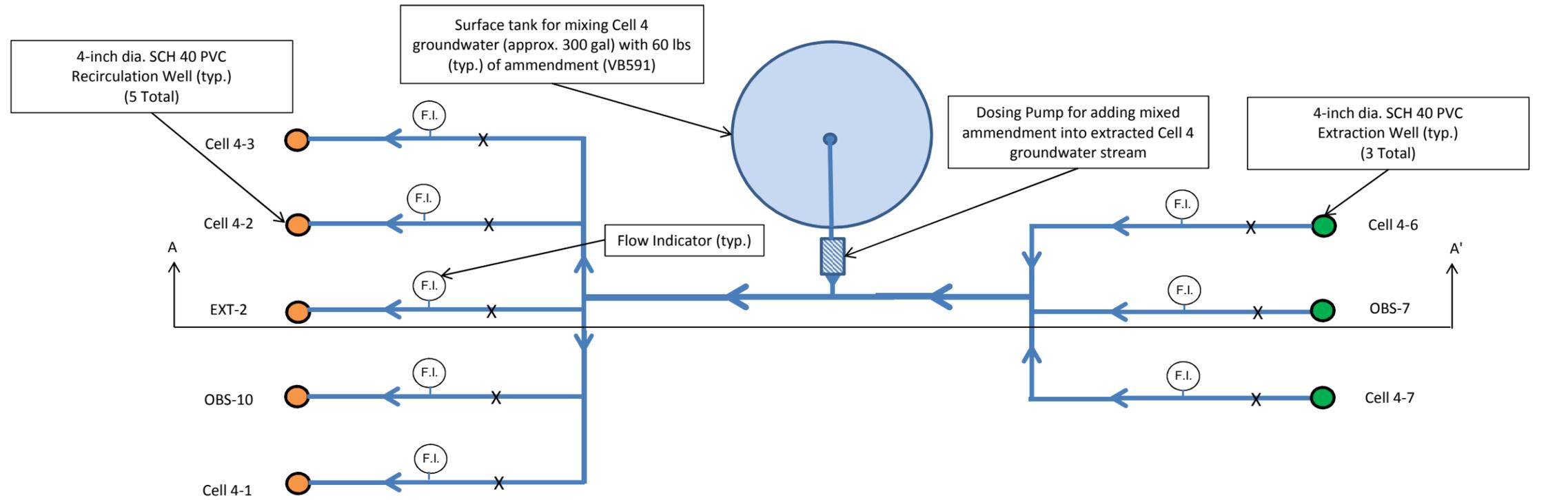


Figure 6

Cell 4 Wells

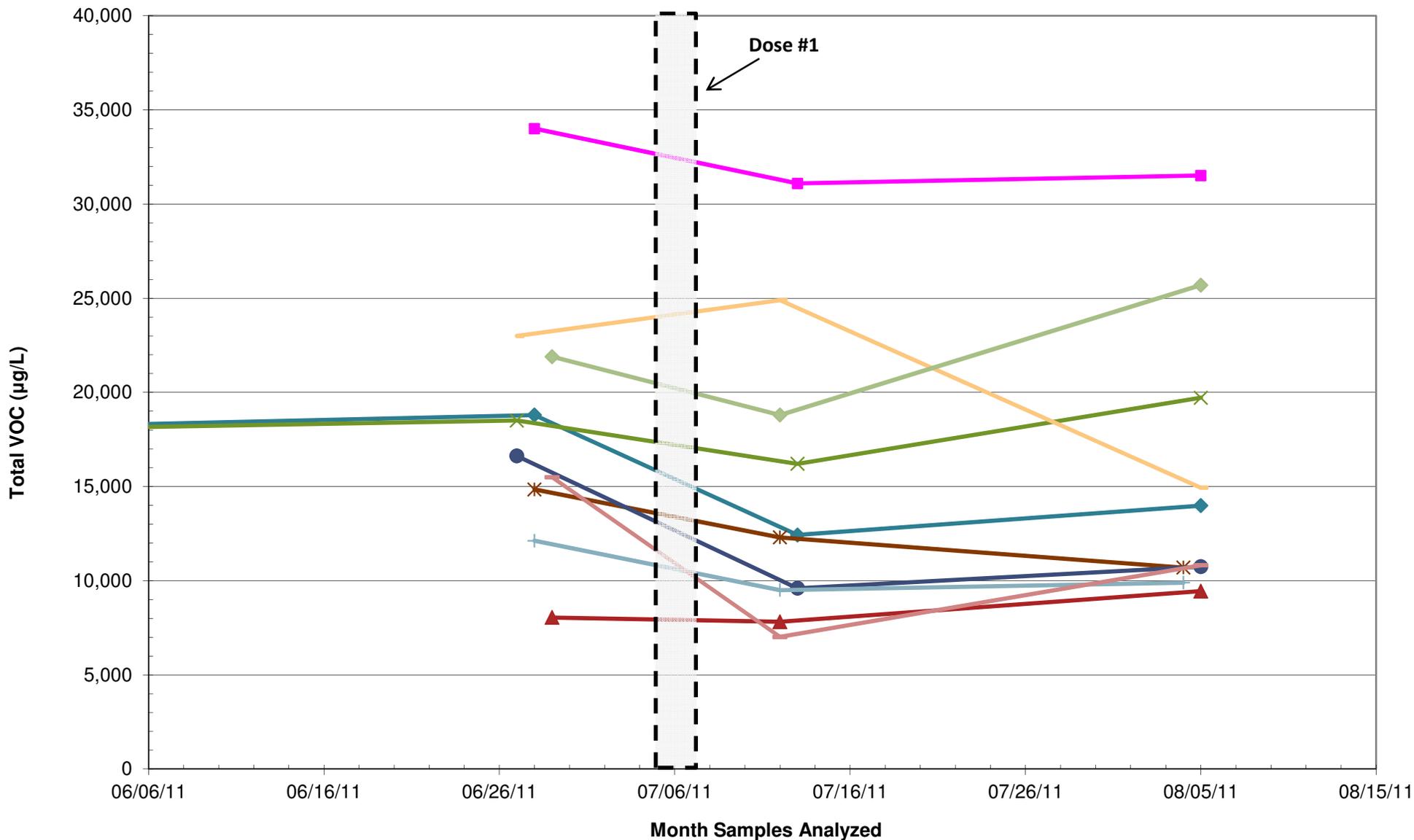
G:\Projects\SparrowsPoint\Projects\2010\CokeOven-and-CokePoint-Cell4closeup_ExistingandPlanned_Wells.mxd

Figure 7
Schematic Layout and Sections
Cell 4 In-Situ Anaerobic Bio-Treatment System
Former Coke Oven Area Interim Remedial Measures
RG Steel Sparrows Point, LLC

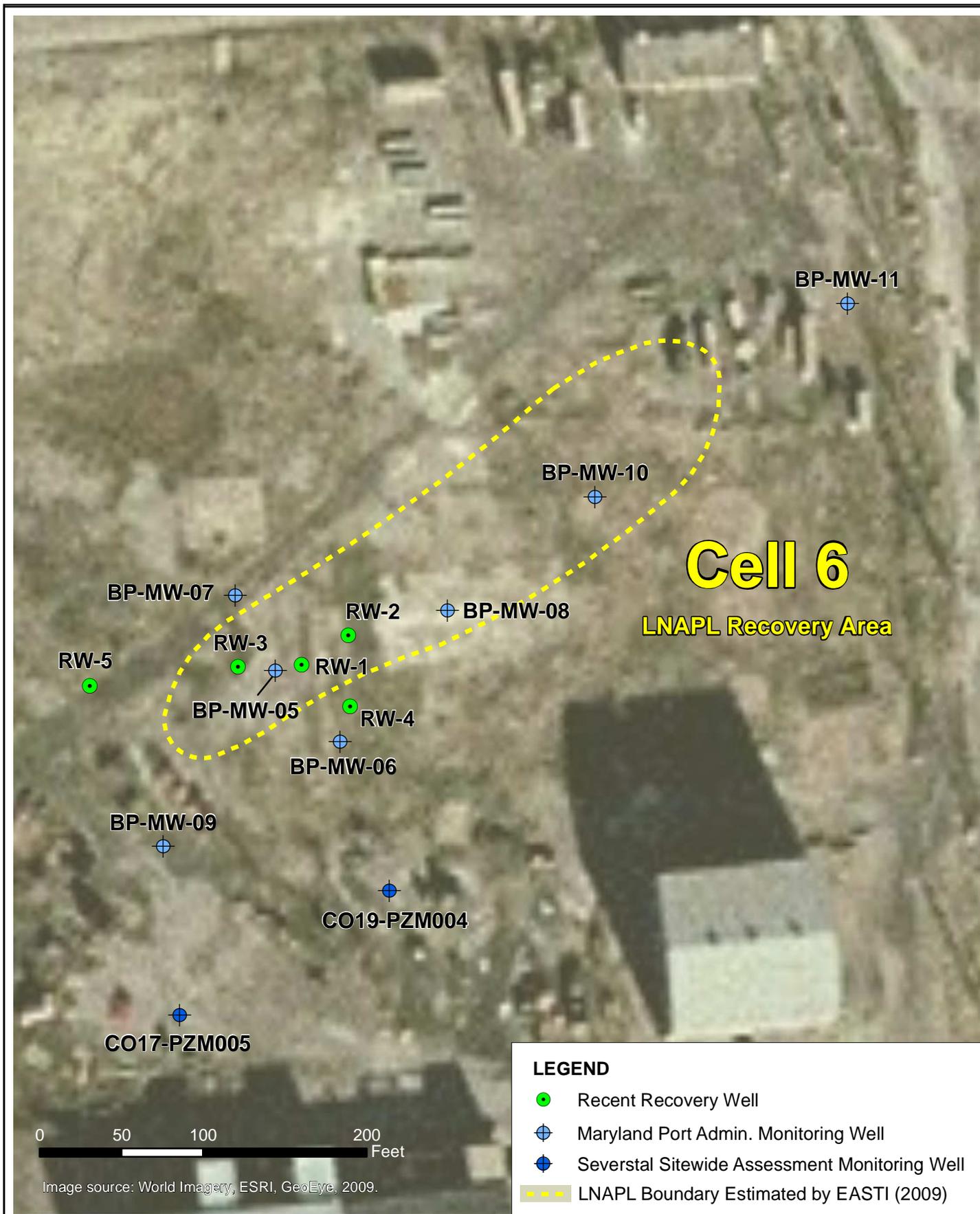


Section A-A' (not to scale)

Figure 8
Measured Groundwater VOC Concentration per Month
Cell 4: In-Situ Anaerobic Bio-Treatment Area
RG Steel Sparrows Point, LLC



AS-2 EXT-2 OBS-6 OBS-8 Cell 4-1 Cell 4-3 Cell 4-4 Cell 4-5 Cell 4-6 Cell 4-7



CLIENT Sparrows Point

LOCATION Baltimore, MD

URS
200 Orchard Ridge Drive
Gaithersburg, MD 20878

GIS BY	JK	10/13/10
CHK BY	BE	10/14/10
PM	BE	10/14/10



Figure 9
LNAPL Monitoring and Recovery Wells

G:\Projects\SparrowsPoint\Projects\2010\CokeOven-and-CokePoint-Cell6closeup_rev.mxd