RG STEEL
Sparrows Point, LLC

1430 Sparrows Point Boulevard | Sparrows Point, MD 21219

November 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 October2011

Dear Mr. Fan and Ms. Brown:

Enclosed with this correspondence is the ***Coke Oven Area Interim Measures Progress Report October2011*** 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 November 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 October 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

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COKE OVEN AREA INTERIM MEASURES PROGRESS REPORT
(OCTOBER 2011)

Prepared for

RG Steel Sparrows Point, LLC
Sparrows Point, Maryland

November 30, 2011

URS Corporation
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876
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 October 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 October 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 October 31, 2011, Cells 1, 3, 4 and 6 continue to be operational. Due to an electrical surge from a lightning strike, the Cell 3 AS/SVE system was temporarily inoperable from September 8 through October 16, 2011. The damaged equipment was replaced at Cell 3 and the unit was brought back on-line on October 17, 2011. Groundwater samples were collected from Cell 4 on October 13 and 14, 2011 to evaluate the effects of the second amendment dosing event which occurred from September 19 to 21, 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.

October 2011 Operational Performance

Operational performance of Cell 1 during this reporting period is summarized in **Table 1**. In summary, the CATOX unit operated for 687 hours (92.3 %) 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.

The hydrocarbon removal rate was calculated to be approximately 0.016 pounds per operating hour (estimated monthly total of 10.82 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 8,959[1] 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 October 12 and 28, 2011, were 11.8 and 15 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. The mass removal calculations assume that the average of the two (2) analytical samples is representative of hydrocarbon concentrations for the entire month of October. This assumption is based on the fact that the same sparge wells (AS-1 thru AS-8) and extraction wells (V-1 thru V-6) were online when the system was operational.

[1] Cumulative mass hydrocarbon estimated from Cell 1 has been revised since the September 2011 Progress Report due to a calculation error.

October 2011 Groundwater Monitoring Results

Groundwater samples were collected on October 12 and 13, 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 on a monthly basis since the startup of the IM system. 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.

October 2011 Operational Performance

Operational performance of Cell 3 during this reporting period is summarized in **Table 4**. In summary, the CATOX unit operated for 343 hours (46.1 %) during October. Due to an electrical surge caused by a lightning strike, the system was inoperable from September 8 through October 16, 2011. The damaged equipment was replaced and the Cell 3 system restarted on October 17, 2011. 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 0.31 pounds per operating hour (estimated monthly total of 105.1 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 310.9 pounds of recovered hydrocarbons. **Figure 5** 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. One (1) untreated soil gas sample was collected in a Tedlar® bag on October 28 2011, which was submitted to TestAmerica. Influent soil gas hydrocarbon concentrations were 199 ppmv, 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 analytical sample is representative of hydrocarbon concentrations for the entire month of October. This assumption is based on the fact that the same sparge wells (AS-2 thru AS-12) and extraction wells (V-2 thru V-4) were online when the system was operational.

October 2011 Cell 3 Groundwater Monitoring

Groundwater samples were collected on October 12, 2011 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.

Figure 6 presents a graph of the total measured VOC concentration in Cell 3 groundwater for each well on a monthly basis 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 on **Figure 8**. 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.

October 2011 Operations

The second amendment dosing event occurred from September 19 to 21, 2011 and was summarized in the *September 2011 Monthly Progress Report*. As per the approved design concept, groundwater in Cell 4 was monitored in October 2011 to document potential impacts of the September 2011 dosing event.

October 2011 Groundwater Monitoring Results

To monitor the effects of the second nutrient amendment, groundwater samples were collected on October 13 and 14, 2011 (approximately three [3] weeks after the second dosing event) from the following wells (**Figure 7**):

- OBS-6
- OBS-8
- EXT-2
- AS-2
- MW-CELL4-1
- MW-CELL4-3
- MW-CELL4-4
- MW-CELL4-5
- MW-CELL4-6
- MW-CELL4-7

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 9 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. 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 October (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 10** illustrates the well locations.

During October, approximately 270 gallons (1,981 pounds) of LNAPL was recovered, bringing the total recovered LNAPL to 6,412 gallons (46,982 pounds) as of October 28, 2011. **Figure 3** presents a graph of the cumulative estimated monthly LNAPL recovery from Cell 6 since the startup of the IM system. The LNAPL was recovered from the following wells:

Well	LNAPL Recovery (gal / lbs)		Notes
	During October 2011	Total thru Oct. 28, 2011	
BP-MW-05	148.6 / 1,089	5,358 / 39,257	
RW-04	83.7 / 613	767 / 5,621	
BP-MW-08	38.1 / 279	273 / 2,002	
BP-MW-11	0 / 0	7.8 / 57	(a)
RW-03	0 / 0	4.0 / 29	(b)
RW-01	0 / 0	1.3 / 10	(b)
RW-02	0 / 0	0.8 / 5	(b)

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

The wells are presented in **Table 8** generally in the order of decreasing LNAPL occurrence/recovery. During the reporting period, the range of LNAPL thicknesses varied as summarized below (wells are not listed if LNAPL was not present):

- RW-04 (0.15 to 0.90 feet),
- BP-MW-05 (0.09 to 0.80 feet),
- BP-MW-08 (0.05 to 0.45 feet),
- BP-MW-11 (0.27 to 0.45 feet),
- BP-MW-10 (0.15 to 0.41 feet),
- RW-02 (0.06 to 0.17 feet),
- RW-03 (0.04 to 0.11 feet),

- RW-01 (0.05 to 0.10 feet), and
- BP-MW-07 (0.00 to 0.01 feet).

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 October 2011 Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total CATOX Operating Time (October 1 - October 31, 2011)	hours	687
Overall CATOX Operational Time	%	92.3
Estimated Total Hydrocarbons Destroyed	pounds	10.82
Estimated Hydrocarbon Removal Rate	pounds/hour	0.016

Cell 1 Cumulative Summary of Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total ICE/CATOX Operating Time (August 3, 2010 - October 31, 2011)	hours	10,896
Overall ICE/CATOX Operational Time	%	66.9
Estimated Total Hydrocarbons Destroyed	pounds	8,959
Estimated Average Hydrocarbon Removal Rate	pounds/hour	1.23

Table 2
Summary of Soil Gas Analytical Results (October 2011)
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	10/12/2011	10/28/2011
	Time	10:30	13:10
	Dilution Factor	1160.71	1531.55
Analyte	Units		
TO-15 Volatile Organics			
trans-1,3-Dichloropropene	ppb	< 230 U	< 310 U
Acetone	ppb	< 5,800 U	< 7,700 U
Ethylbenzene	ppb	< 230 U	< 310 U
2-Hexanone	ppb	< 580 U	< 770 U
Methylene Chloride	ppb	< 580 U	< 770 U
Benzene	ppb	**9,300**	**13,000**
1,1,2,2-Tetrachloroethane	ppb	< 230 U	< 310 U
Tetrachloroethene	ppb	< 230 U	< 310 U
Toluene	ppb	**1,600**	**2,000**
1,1,1-Trichloroethane	ppb	< 230 U	< 310 U
1,1,2-Trichloroethane	ppb	< 230 U	< 310 U
Trichloroethene	ppb	< 230 U	< 310 U
Vinyl Chloride	ppb	< 230 U	< 310 U
o-Xylene	ppb	**290**	< 310 U
m-Xylene & p-Xylene	ppb	**610**	< 310 U
2-Butanone (MEK)	ppb	< 1,200 U	< 1,500 U
4-Methyl-2-pentanone (MIBK)	ppb	< 580 U	< 770 U
Bromoform	ppb	< 230 U	< 310 U
Carbon Disulfide	ppb	< 580 U	< 770 U
Carbon tetrachloride	ppb	< 230 U	< 310 U
Chlorobenzene	ppb	< 230 U	< 310 U
Chloroethane	ppb	< 230 U	< 310 U
Chloroform	ppb	< 230 U	< 310 U
1,1-Dichloroethane	ppb	< 230 U	< 310 U
1,2-Dichloroethane	ppb	< 230 U	< 310 U
1,1-Dichloroethene	ppb	< 230 U	< 310 U
trans-1,2-Dichloroethene	ppb	< 230 U	< 310 U
1,2-Dichloropropane	ppb	< 230 U	< 310 U
cis-1,3-Dichloropropene	ppb	< 230 U	< 310 U
Total Volatile Organics	ppb	**11,800**	**15,000**

Notes:

BOLD = Analyte detected

ppb = parts per billion

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

Table 3
Summary of Groundwater Analytical Results (October 2011)
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	10/13/2011	10/12/2011	10/13/2011
	Time	10:20	14:50	9:35
Analyte	Units			
Water Quality Parameters				
Temperature	deg C	21.23	26.59	19.16
pH	std units	8.13	7.06	12.41
ORP	mV	-312	-5	-340
Conductivity	mS/cm	1.23	2.42	2.31
Turbidity	NTU	--	--	--
Dissolved Oxygen	mg/L	0.00	0.65	5.00
Volatile Organics				
Vinyl Chloride	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
Chloroethane	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
1,1-Dichloroethene	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
Acetone	µg/L	< 120,000 U H	< 120,000 U H	< 120,000 U H
Carbon Disulfide	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
Methylene Chloride	µg/L	< 25,000 U H	< 25,000 U H	< 25,000 U H
trans-1,2-Dichloroethene	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
1,1-Dichloroethane	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
2-Butanone (MEK)	µg/L	< 25,000 U H	< 25,000 U H	< 25,000 U H
Chloroform	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
1,1,1-Trichloroethane	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
Carbon Tetrachloride	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
Benzene	µg/L	**410,000 H**	**140,000 H**	**220,000 H**
1,2-Dichloroethane	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
Trichloroethene	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
1,2-Dichloropropane	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
Methyl Isobutyl Ketone (MIBK)	µg/L	< 25,000 U H	< 25,000 U H	< 25,000 U H
cis-1,3-Dichloropropene	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
Toluene	µg/L	**33,000 H**	**18,000 H**	**54,000 H**
trans-1,3-Dichloropropene	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
1,1,2-Trichloroethane	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
2-Hexanone (MBK)	µg/L	< 25,000 U H	< 25,000 U H	< 25,000 U H
Tetrachloroethene	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
Chlorobenzene	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
1,1,1,2-Tetrachloroethane	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
Ethylbenzene	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
Bromoform	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
1,1,2,2-Tetrachloroethane	µg/L	< 5,000 U H	< 5,000 U H	< 5,000 U H
Total Xylenes	µg/L	< 15,000 U H	< 15,000 U H	**26,000 H**
Total Volatile Organics	**µg/L**	**443,000**	**158,000**	**300,000**

Notes:

-- = Not Measured
Bold = Analyte Detected
deg C = degrees Celcius
mg/L =Milligram per liter
mS/cm = Microsiements per Centimeter
mV = Millivolts
NTU = Nephelometric Turbidity Units
ORP = Oxidation Reduction Potential
std units = standard units
</U = Analyte not detected above corresponding laboratory reporting limit
H = Analyte analyzed beyond specified hold time
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 October 2011 Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total CATOX Operating Time (October 1 - October 31, 2011)	hours	343
Overall CATOX Operational Time	%	46.1
Estimated Total Hydrocarbons Destroyed	pounds	105.1
Estimated Hydrocarbon Removal Rate	pounds/hour	0.31

Cell 3 Cumulative Summary of Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total CATOX Operating Time (June 24, 2011 - October 31, 2011)	hours	1,966
Overall CATOX Operational Time	%	53.5
Estimated Total Hydrocarbons Destroyed	pounds	310.9
Estimated Hydrocarbon Removal Rate	pounds/hour	0.14

Table 5
Summary of Soil Gas Analytical Results (October 2011)
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
	Date	10/28/2011
	Time	13:20
	Dilution Factor	10350.43
Analyte	Units	
TO-15 Volatile Organics		
trans-1,3-Dichloropropene	ppb	< 2,100 U
Acetone	ppb	< 52,000 U
Ethylbenzene	ppb	< 2,100 U
2-Hexanone	ppb	< 5,200 U
Methylene Chloride	ppb	< 5,200 U
Benzene	ppb	**130,000**
1,1,2,2-Tetrachloroethane	ppb	< 2,100 U
Tetrachloroethene	ppb	< 2,100 U
Toluene	ppb	**69,000**
1,1,1-Trichloroethane	ppb	< 2,100 U
1,1,2-Trichloroethane	ppb	< 2,100 U
Trichloroethene	ppb	< 2,100 U
Vinyl Chloride	ppb	< 2,100 U
o-Xylene	ppb	< 2,100 U
m-Xylene & p-Xylene	ppb	< 2,100 U
2-Butanone (MEK)	ppb	< 10,000 U
4-Methyl-2-pentanone (MIBK)	ppb	< 5,200 U
Bromoform	ppb	< 2,100 U
Carbon Disulfide	ppb	< 5,200 U
Carbon tetrachloride	ppb	< 2,100 U
Chlorobenzene	ppb	< 2,100 U
Chloroethane	ppb	< 2,100 U
Chloroform	ppb	< 2,100 U
1,1-Dichloroethane	ppb	< 2,100 U
1,2-Dichloroethane	ppb	< 2,100 U
1,1-Dichloroethene	ppb	< 2,100 U
trans-1,2-Dichloroethene	ppb	< 2,100 U
1,2-Dichloropropane	ppb	< 2,100 U
cis-1,3-Dichloropropene	ppb	< 2,100 U
Total Volatile Organics	ppb	**199,000**

Notes:

BOLD = Analyte detected

ppb = parts per billion

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

Table 6
Summary of Groundwater Analytical Results (October 2011)
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	10/12/2011	10/12/2011	10/12/2011	10/12/2011
	Time	11:25	11:56	12:40	13:49
Analyte	Units				
Water Quality Parameters					
Temperature	deg C	18.57	18.89	18.03	18.91
pH	std units	12.51	12.52	12.31	12.49
ORP	mV	-297	-240	-289	-206
Conductivity	mS/cm	2.99	2.96	2.32	2.77
Turbidity	NTU	--	--	--	--
Dissolved Oxygen	mg/L	0.00	0.00	5.53	0.00
Volatile Organics					
Vinyl Chloride	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
Chloroethane	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
1,1-Dichloroethene	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
Acetone	µg/L	< 25,000 U H	< 25,000 U	< 25,000 U	< 25,000 U H
Carbon Disulfide	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
Methylene Chloride	µg/L	< 5,000 U H	< 5,000 U	< 5,000 U	< 5,000 U H
trans-1,2-Dichloroethene	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
1,1-Dichloroethane	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
2-Butanone (MEK)	µg/L	< 5,000 U H	< 5,000 U	< 5,000 U	< 5,000 U H
Chloroform	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
1,1,1-Trichloroethane	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
Carbon Tetrachloride	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
Benzene	µg/L	**67,000 H**	**26,000**	**71,000**	**23,000 H**
1,2-Dichloroethane	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
Trichloroethene	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
1,2-Dichloropropane	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
Methyl Isobutyl Ketone (MIBK)	µg/L	< 5,000 U H	< 5,000 U	< 5,000 U	< 5,000 U H
cis-1,3-Dichloropropene	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
Toluene	µg/L	**5,100 H**	**1,600**	**4,300**	**2,000 H**
trans-1,3-Dichloropropene	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
1,1,2-Trichloroethane	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
2-Hexanone (MBK)	µg/L	< 5,000 U H	< 5,000 U	< 5,000 U	< 5,000 U H
Tetrachloroethene	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
Chlorobenzene	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
1,1,1,2-Tetrachloroethane	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
Ethylbenzene	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
Bromoform	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
1,1,2,2-Tetrachloroethane	µg/L	< 1,000 U H	< 1,000 U	< 1,000 U	< 1,000 U H
Xylenes, Total	µg/L	< 3,000 U H	< 3,000 U	< 3,000 U	< 3,000 U H
Total Volatile Organics	**µg/L**	**72,100**	**27,600**	**75,300**	**25,000**

Notes:

-- = Not Measured
Bold = Analyte Detected
deg C = degrees Celcius
mg/L =Milligram per liter
mS/cm = Microsiements per Centimeter
mV = Millivolts
NTU = Nephelometric Turbidity Units
ORP = Oxidation Reduction Potential
std units = standard units
</U = Analyte not detected above corresponding laboratory reporting limit
H = Analyte analyzed beyond specified hold time
µg/L = Micrograms per liter

Table 7
Summary of Groundwater Analytical Results (October 2011)
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 4-1	Cell 4-3	Cell 4-4	Cell 4-5	Cell 4-6	Cell 4-7
Date		10/14/11	10/14/11	10/14/11	10/14/11	10/13/11	10/14/11	10/13/11	10/14/11	10/14/11	10/13/11
Time		8:30	11:24	9:30	10:30	12:00	14:42	13:00	13:38	12:30	14:15
Units											
Water Quality Parameters											
Temperature	deg C	19.81	20.22	20.27	19.05	19.80	20.54	19.60	20.39	20.32	19.47
pH	std units	13.38	13.01	12.38	12.41	10.51	10.78	12.35	13.06	13.22	13.31
ORP	mV	-256	-187	-237	-246	-231	-257	-225	-238	-199	-213
Conductivity	mS/cm	2.75	2.04	1.42	3.42	1.48	1.41	1.52	2.16	2.75	4.79
Turbidity	NTU	--	--	--	--	--	--	--	--	--	--
Dissolved Oxygen	mg/L	5.10	0.00	0.00	0.25	0.22	0.00	0.60	0.00	0.00	5.60
Volatile Organics											
Vinyl Chloride	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Chloroethane	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
1,1-Dichloroethene	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Acetone	µg/L	< 2,500 U	< 2,500 U	< 25,000 U	< 25,000 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	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Methylene Chloride	µg/L	< 500 U	< 500 U	< 5,000 U	< 5,000 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U
trans-1,2-Dichloroethene	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
1,1-Dichloroethane	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
2-Butanone (MEK)	µg/L	< 500 U	< 500 U	< 5,000 U	< 5,000 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U
Chloroform	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
1,1,1-Trichloroethane	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Carbon Tetrachloride	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Benzene	µg/L	**370**	**530**	< 1,000 U	**6,000**	**630**	**320**	**720**	**630**	**530**	**800**
1,2-Dichloroethane	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Trichloroethene	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
1,2-Dichloropropane	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Methyl Isobutyl Ketone (MIBK)	µg/L	< 500 U	< 500 U	< 5,000 U	< 5,000 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U
cis-1,3-Dichloropropene	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Toluene	µg/L	**120**	**130**	< 1,000 U	**4,300**	**280**	**290**	**160**	**310**	**220**	**620**
trans-1,3-Dichloropropene	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
1,1,2-Trichloroethane	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
2-Hexanone (MBK)	µg/L	< 500 U	< 500 U	< 5,000 U	< 5,000 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U
Tetrachloroethene	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Chlorobenzene	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
1,1,1,2-Tetrachloroethane	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Ethylbenzene	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Bromoform	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
1,1,2,2-Tetrachloroethane	µg/L	< 100 U	< 100 U	< 1,000 U	< 1,000 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Xylenes, Total	µg/L	**390**	**540**	< 3,000 U	< 3,000 U	**680**	**440**	**740**	**680**	**540**	**1,100**
Semi-Volatiles											
Naphthalene	µg/L	**12,000**	**6,800**	**8,000**	**23,000**	**7,900**	**5,600**	**7,500**	**12,000**	**9,300**	**18,000**
Total Volatile Organics	µg/L	**12,880**	**8,000**	**8,000**	**33,300**	**9,490**	**6,650**	**9,120**	**13,620**	**10,590**	**20,520**

Table 7
Summary of Groundwater Analytical Results (October 2011)
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 4-1	Cell 4-3	Cell 4-4	Cell 4-5	Cell 4-6	Cell 4-7
Date		10/14/11	10/14/11	10/14/11	10/14/11	10/13/11	10/14/11	10/13/11	10/14/11	10/14/11	10/13/11
Time		8:30	11:24	9:30	10:30	12:00	14:42	13:00	13:38	12:30	14:15
Wet Chemistry											
Ferric Iron	mg/L	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	**0.12**	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U
Ferrous Iron	mg/L	**0.28**	**0.28**	**0.44**	**0.74**	**0.29**	**1.3**	**0.29**	**0.20**	**0.19**	**0.36**
Nitrite-N	mg/L	**0.58**	**0.061**	**0.022**	**0.13**	**0.045**	**0.50**	**0.038**	**0.31**	**0.24**	**0.99**
Nitrate-N	mg/L	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U	< 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	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U
Orthophosphate as P	mg/L	**0.018**	**0.039**	**0.62**	**0.072**	**0.33**	**1.2**	**0.078**	**0.042**	**0.022**	< 0.010 U
Total Kjeldahl Nitrogen	mg/L	**12**	**21**	**38**	**310**	**52**	**68**	**22**	**20**	**31**	**29**
Metals											
Iron, Total	mg/L	**0.15**	**0.37**	**0.48**	**0.50**	**0.41**	**0.74**	**0.32**	**0.18**	**0.20**	**0.19**

Notes:

-- = Not Measured
Bold = Analyte Detected
deg C = degrees Celcius
E = Exceeds Instrument Calibration
mg/L =Milligram per liter
mS/cm = Microsiements 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 October 2011 (ft)	Total LNAPL Recovery Period		Cumulative Total LNAPL Recovered thru October 28, 2011		LNAPL Recovered During October 2011	
		Begin	End	(gal)	(lbs) (a)	(gal)	(lbs) (a)
RW-04	0.15 to 0.90	23-Jul-10	On-going (b)	767	5,621	83.7	613
BP-MW-05	0.09 to 0.80	28-Jan-10	On-going (b)	5,358	39,257	148.6	1,089
BP-MW-08	0.05 to 0.45	8-Sep-10	On-going (b)	273	2,002	38.1	279
BP-MW-11	0.27 to 0.45	23-Jul-10	8-Sep-10	7.8	57	0	0
RW-02	0.06 to 0.17	1/28/2011	On-going (c)	0.8	5.5	0	0
RW-03	0.04 to 0.11	11/24/2010	On-going (c)	4.0	29	0	0
RW-01	0.05 to 0.10	28-Oct-10	On-going (c)	1.3	10	0	0
BP-MW-10	0.15 to 0.41	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:	**6,412**	**46,982**	**270**	**1,981**

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

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
10/4/2011	10.00	10.05	0.05	9.59	9.68	0.09	8.00	8.04	0.04
10/14/2011	10.50	10.59	0.09	10.45	10.51	0.06	8.45	8.49	0.04
10/21/2011	10.61	10.69	0.08	10.32	10.49	0.17	8.65	8.76	0.11
10/28/2011	10.80	10.90	0.10	10.43	10.55	0.12	8.93	9.03	0.10

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
10/4/2011	8.30	8.75	0.45	9.80	10.15	0.35	9.62	9.62	0.00
10/14/2011	8.75	8.90	0.15	10.40	11.20	0.80	10.15	10.15	0.00
10/21/2011	8.90	9.80	0.90	10.43	10.75	0.32	10.22	10.22	0.00
10/28/2011	9.43	9.62	0.19	10.70	10.79	0.09	10.47	10.48	0.01

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
10/4/2011	10.70	11.15	0.45	6.10	6.51	0.41	9.75	10.02	0.27
10/14/2011	11.50	11.65	0.15	6.50	6.80	0.30	10.15	10.55	0.40
10/21/2011	11.38	11.80	0.42	7.75	7.90	0.15	11.56	11.95	0.39
10/28/2011	11.65	11.70	0.05	7.55	7.76	0.21	11.35	11.80	0.45

Figures

N
W E
S

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

200 0 200 400 Feet

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	
CHECKED: RL	
SENIOR: BE	

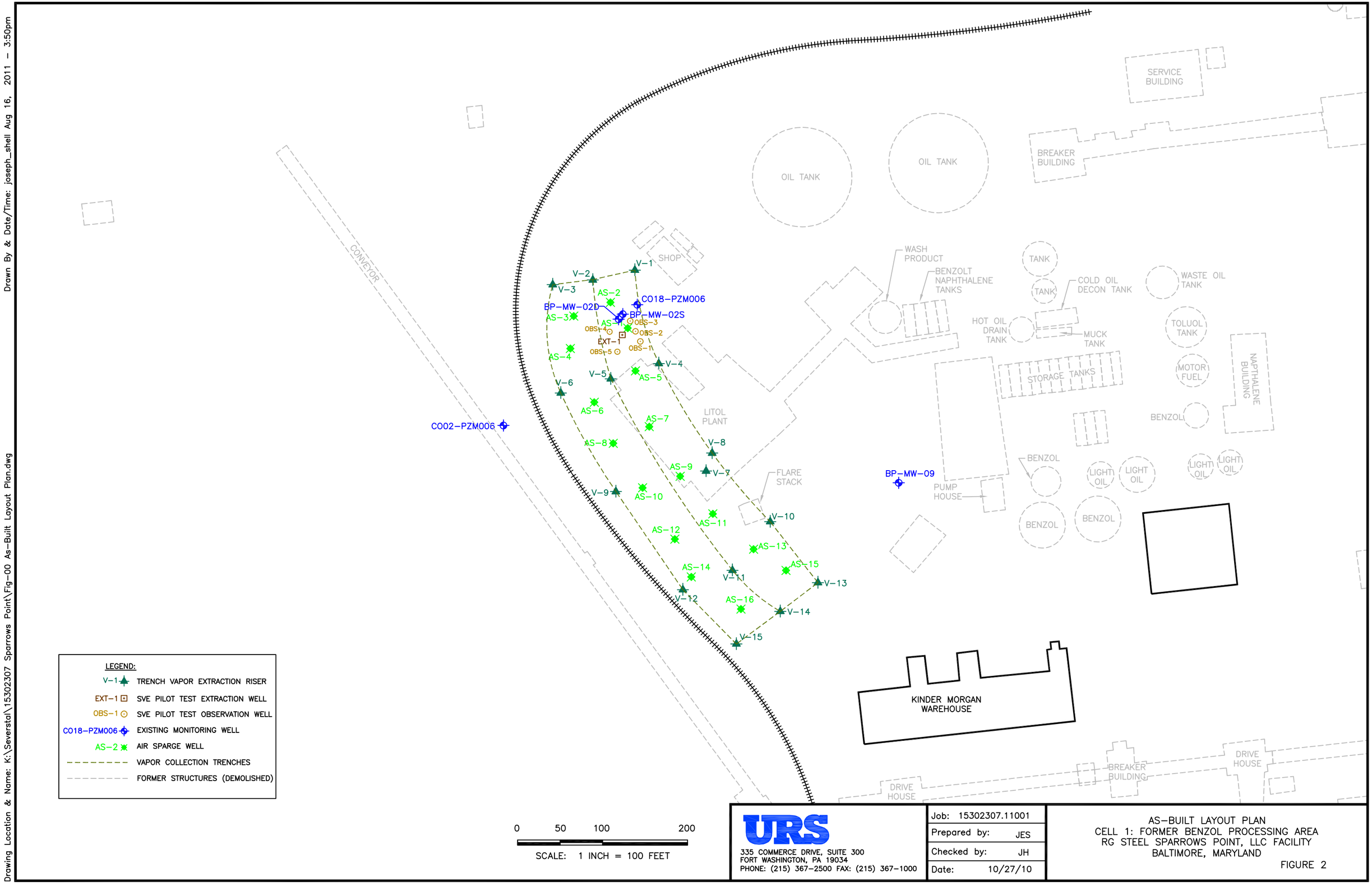
URS
12420 Milestone Center Drive
Germantown, MD 20876

Figure 1

Interim Measures Treatment Areas

Drawn By & Date/Time: joseph_shell Aug 16, 2011 - 3:50pm

Drawing Location & Name: K:\Severstal\15302307 Sparrows Point\Fig-00 As-Built Layout Plan.dwg



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)

0 50 100 200

SCALE: 1 INCH = 100 FEET

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 2

Figure 3
Cells 1 and 6 Cumulative Summary of Estimated Hydrocarbon Recovery
Former Coke Oven Area Interim Remedial Measures
RG Steel Sparrows Point, LLC

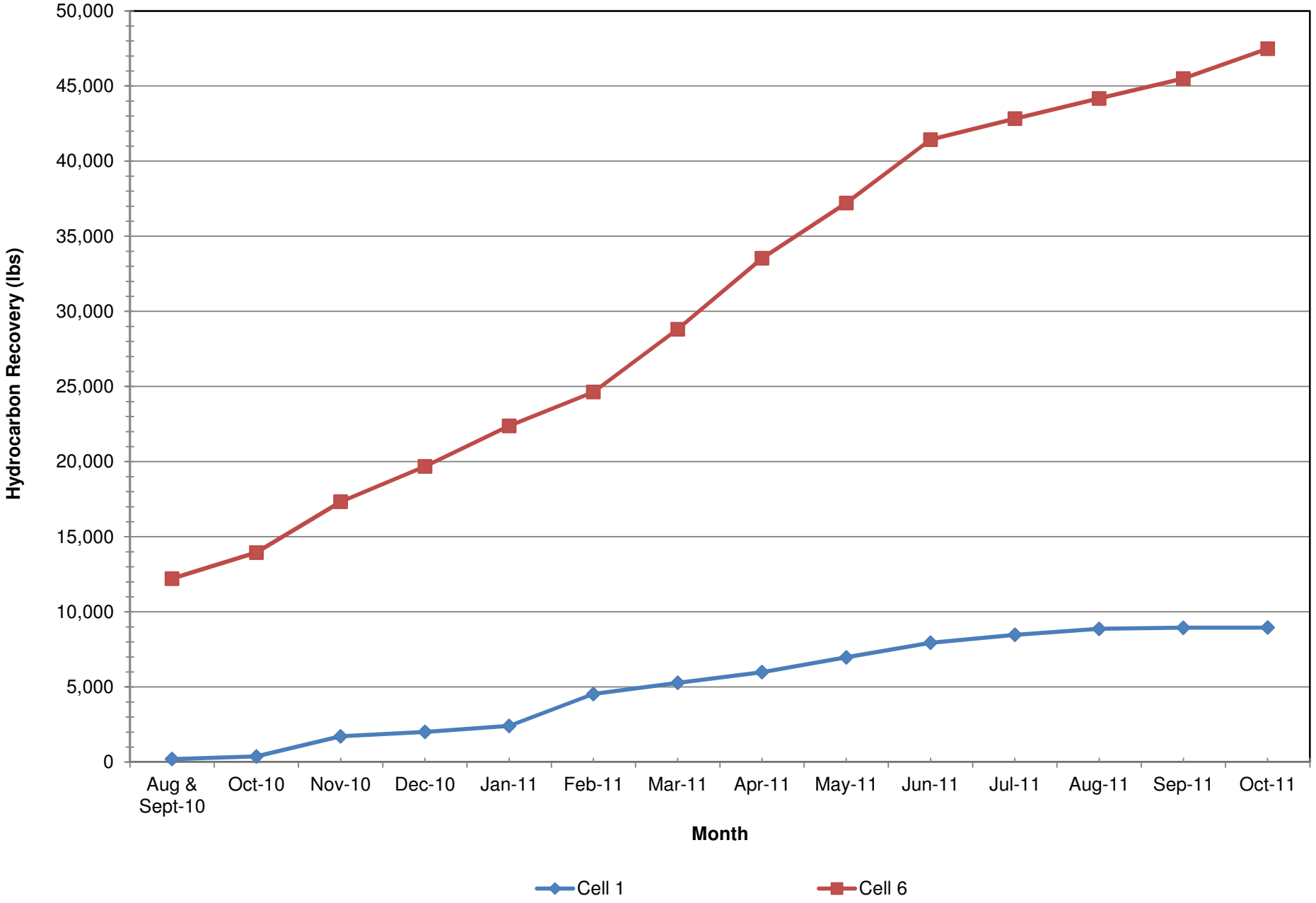


Figure 4
Measured Groundwater VOC Concentration by Month
Cell 1: Prototype AS/SVE System in the "Cove" Area
RG Steel Sparrows Point, LLC

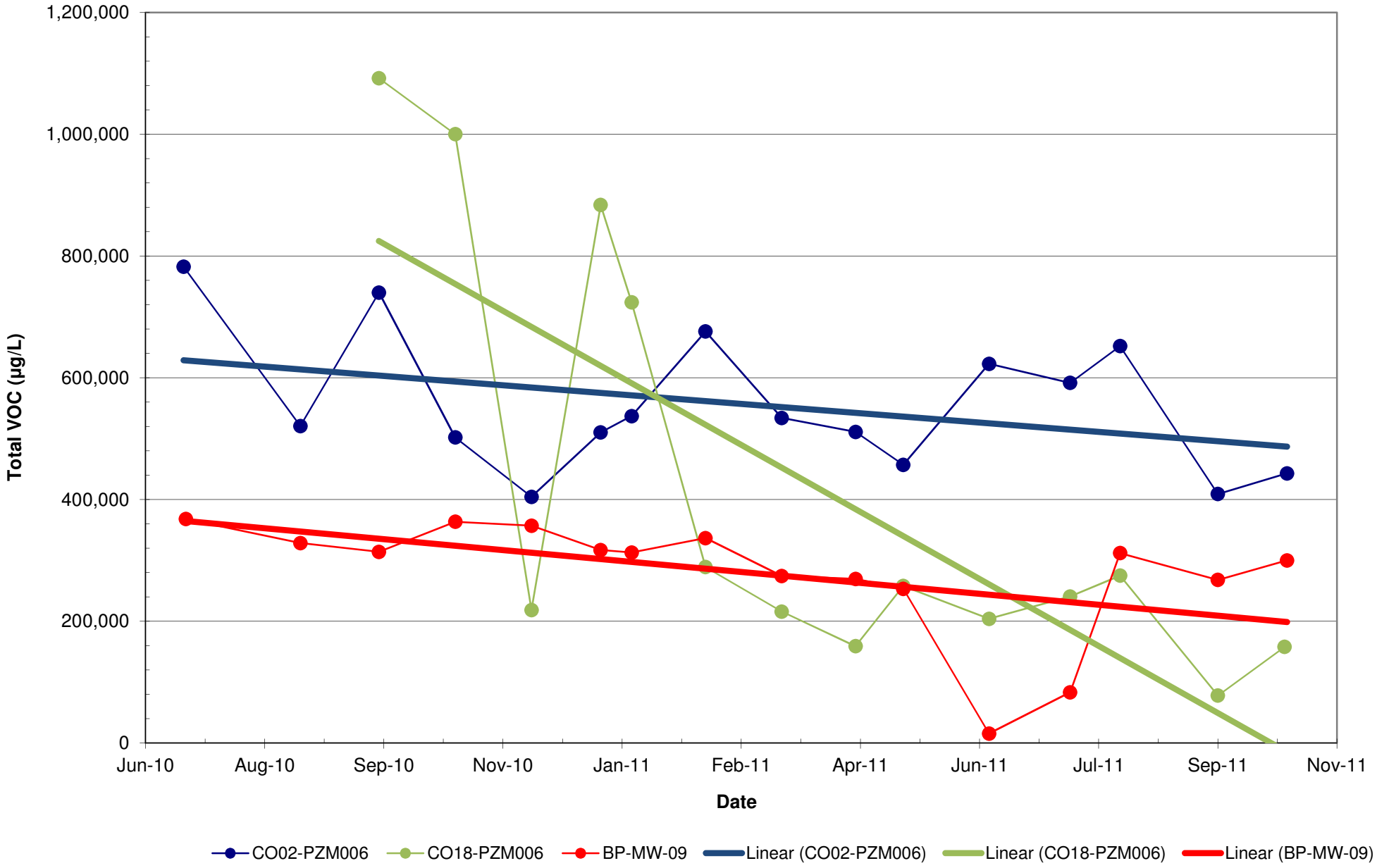


Figure 5
Cell 3 Cumulative Summary of Estimated Hydrocarbon Recovery
Former Coke Oven Area Interim Remedial Measures
RG Steel Sparrows Point, LLC

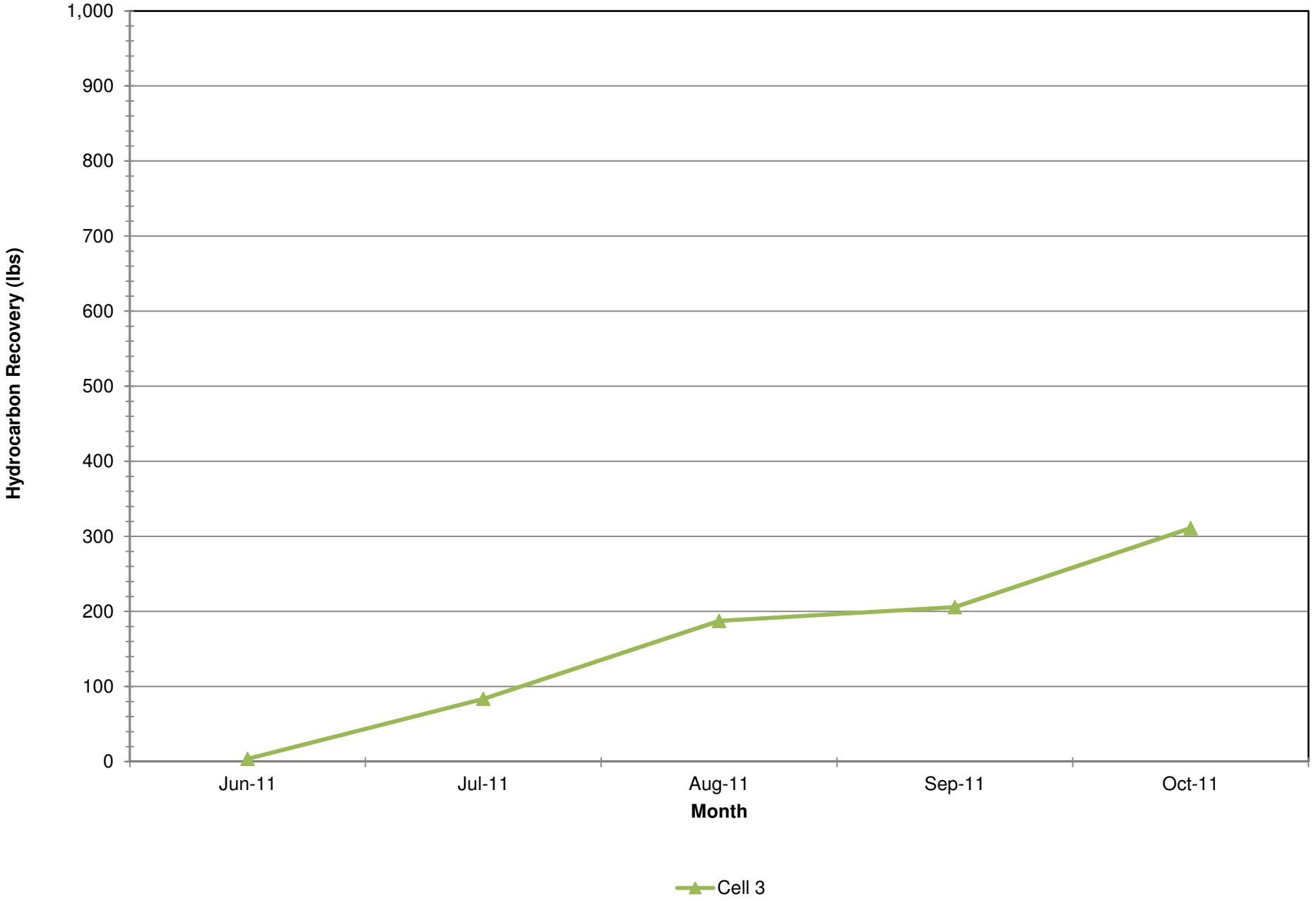
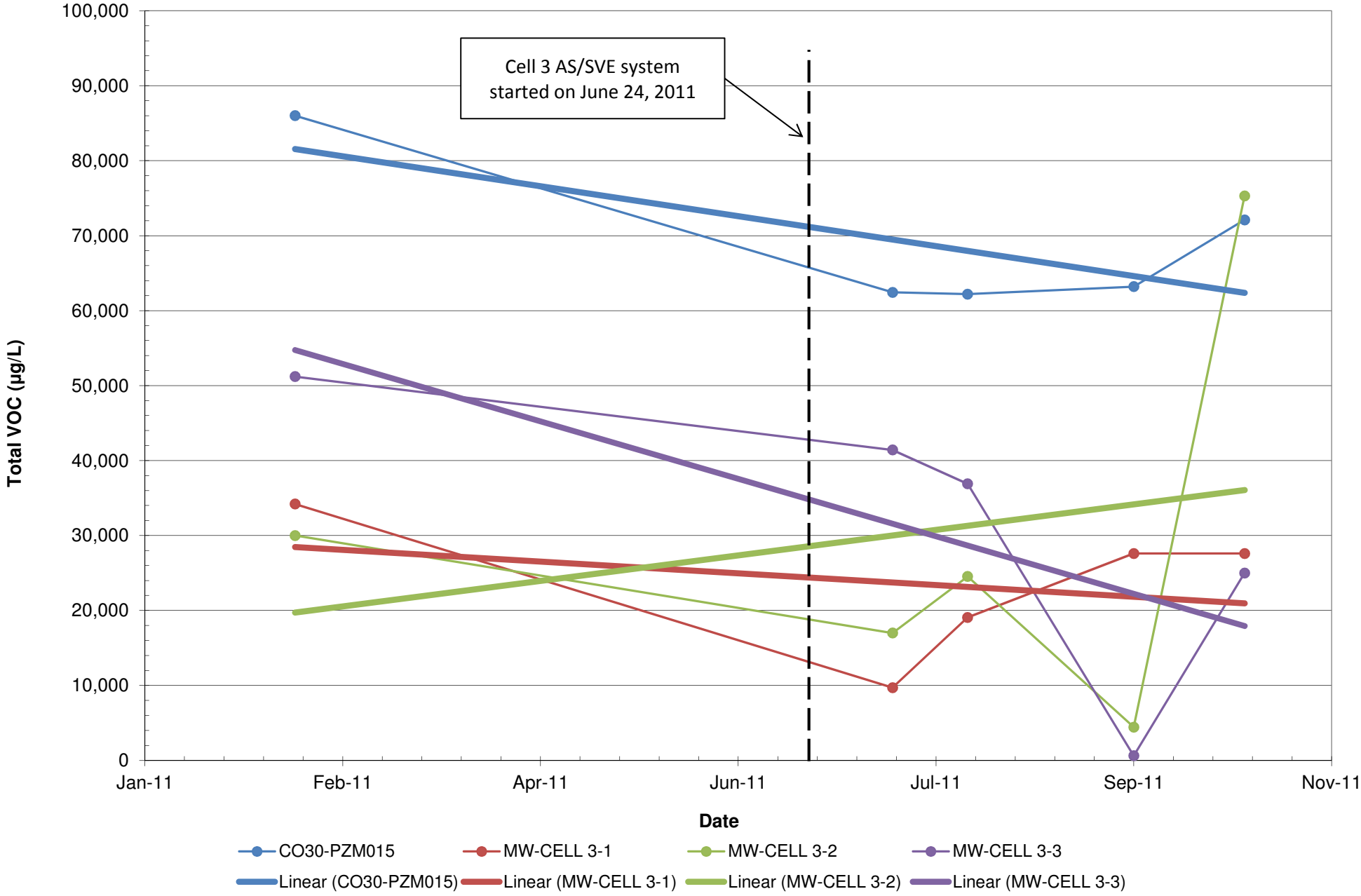


Figure 6
Measured Groundwater VOC Concentration by Month
Cell 3: Prototype AS/SVE System in the "Cove" Area
RG Steel Sparrows Point, LLC



CLIENT	Severstal Sparrows Point, LLC
LOCATION	Baltimore, MD

URS
200 Orchard Ridge Drive
Gaithersburg, MD 20878

GIS BY	JK	05/31/2011
CHK BY	BE	05/31/2011
PM	BE	05/31/2011

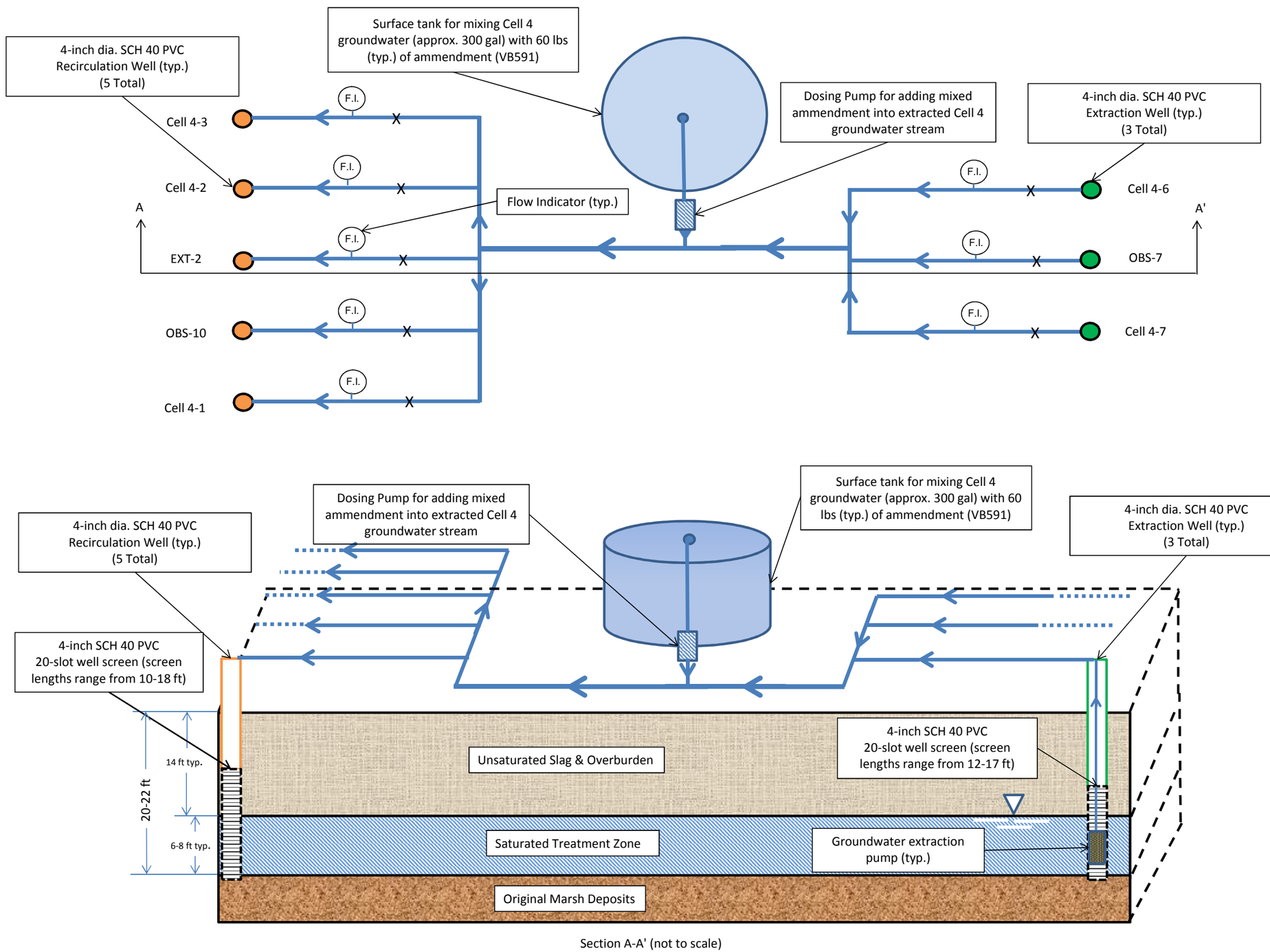
N

Figure 7

Cell 4 Wells

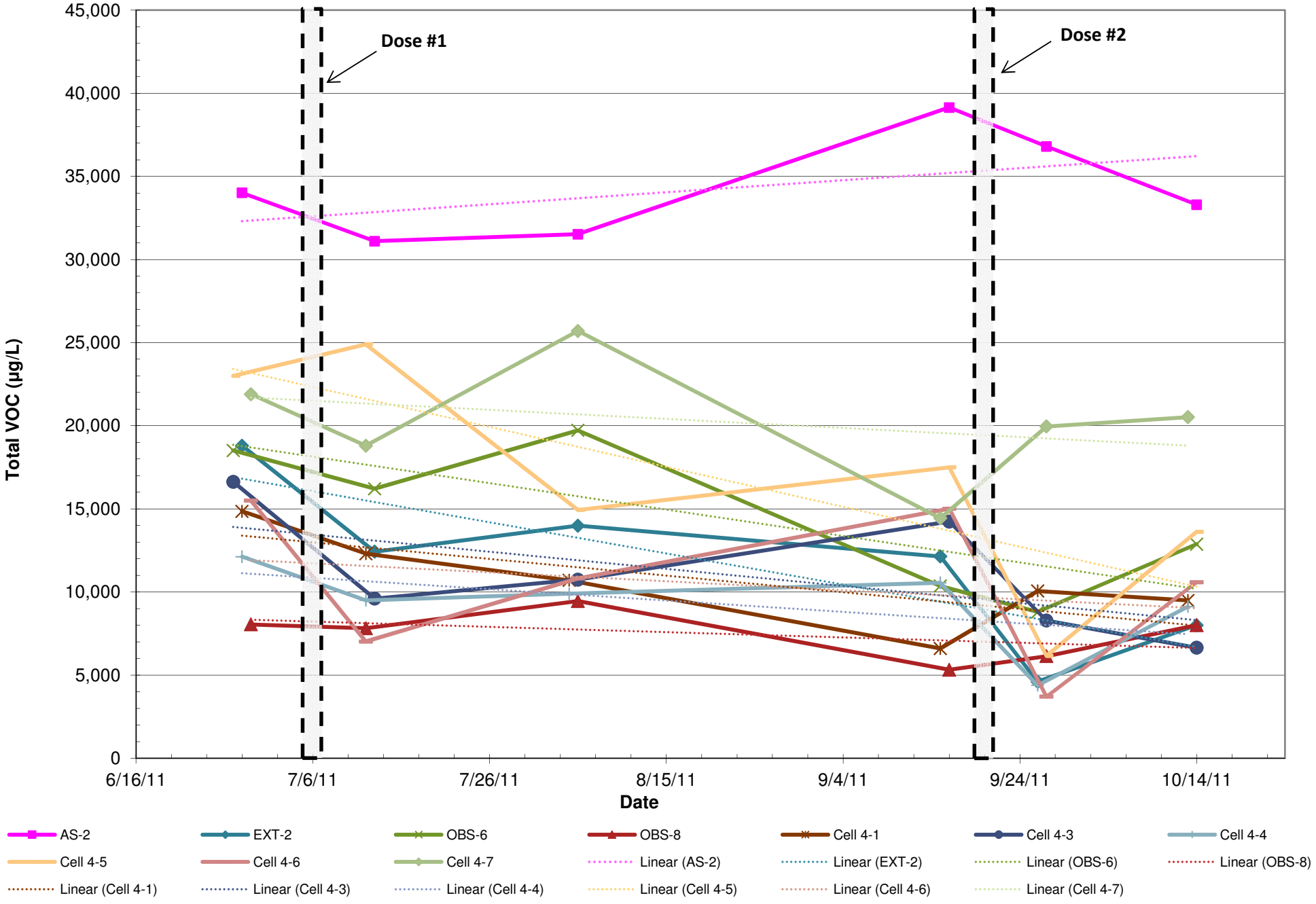
G:\Projects\SparrowsPoint\Projects\2010\CokeOven-and-CokePoint-Cell4closeup_ExistingandPlanned_Wells.mxd

Figure 8
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 9
Measured Groundwater VOC Concentration per Month
Cell 4: In-Situ Anaerobic Bio-Treatment Area
RG Steel Sparrows Point, LLC



CLIENT	Sparrows Point
LOCATION	Baltimore, MD

URS
12420 Milestone Center Drive
Germantown, MD 20876

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

N

Figure 10

LNAPL Monitoring and Recovery Wells

G:\Projects\SparrowsPoint\Projects\2011\CokeOven-and-CokePoint-Cell6closeup_rev.mxd