RG STEEL
Sparrows Point, LLC

1430 Sparrows Point Boulevard | Sparrows Point, MD 21219

July 29, 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 June 2011

Dear Mr. Fan and Ms. Brown:

Enclosed with this correspondence is the ***Coke Oven Area Interim Measures Progress Report June 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 July 29th, 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 June 30, 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
(JUNE 2011)

Prepared for

RG Steel Sparrows Point, LLC
Sparrows Point, Maryland

July 29, 2011

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 June 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 June 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 June 30, 2011, Cell 1, Cell 3 and Cell 6 are operational. The temporary catalytic oxidation (CATOX) unit for AS/SVE system at Cell 1 was shut down on June 22, 2011 and was subsequently replaced by a new CATOX-AS/SVE unit (hereafter referred to as CATOX unit) unit on June 24, 2011.

Construction of the AS/SVE system at Cell 3 was completed in June 2011. Startup/shakedown operations were initiated at Cell 3 on June 23, 2011. Construction of required injection and recirculation wells for Cell 4 was completed in May and June 2011. Procurement of materials for the in-situ anaerobic bio-treatment system at Cell 4 was completed in June 2011 and the first monthly injection event was completed in July , 2011 as planned.

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 CATOX unit (formerly an internal combustion engine [ICE] unit, the function of which was replaced by a temporary CATOX unit on May 3, 2011). The temporary CATOX unit was installed to improve operational efficiency of the Cell 1 AS/SVE system while new CATOX units for both Cell 1 and Cell 3 were being fabricated. The new CATOX unit was delivered and installed during the week of June 20, 2011. Startup/shakedown of the new Cell 1 components began on June 24, 2011.

MDE received RG Steel's Air and Radiation Management Administration (ARMA) permit-to-construct application for the new Cell 1 and Cell 3 CATOX units on April 20, 2011 and issued the modified permit-to-construct for the CATOX units (for both Cell 1 and Cell 3) on May 20, 2011. In accordance with the modified permit-to-construct conditions, the CATOX units are operated in accordance with the manufacturer's specifications.

Design of the Cell 1 system includes air sparging groundwater wells and vapor collection trenches as shown schematically on **Figure 2**.

Figure 3 shows the system layout of Cell 1, which consists of the following major components:

- Three (3) generally parallel and interconnected vapor collection trenches approximately 500 feet long and 60 feet apart, fitted with perforated 4-inch SDR-17 high-density polyethylene (HDPE) pipe. 15 vertical extraction risers are connected to a common suction header.
- 16 air sparge wells located between the trenches.
- 4-inch SDR-17 HDPE sparge and suction headers fitted with control valves for 2-inch SDR-17 HDPE sparge and suction laterals.
- One (1) trailer-mounted electric CATOX unit for extraction vacuum and vapor destruction, which is accompanied by a separate air compressor for sparge air.
- Perimeter slag berm for system demarcation and protection from vehicular traffic.

June 2011 Operational Performance

Operational performance of Cell 1 during this reporting period is summarized in **Table 1**. In summary, the CATOX unit operated for 670 hours (93 %) 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.

.Hydrocarbon removal rates ranged from approximately 0.9 to 3.4 pounds per operating hour (approximately 22 to 82 pounds per operating day for an estimated monthly total of 966 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 7,943 pounds of recovered hydrocarbons. **Figure 4** presents a graph of the cumulative estimated hydrocarbon recovery in Cell 1 by month 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 further substantiate CATOX unit performance within the manufacturer's specifications. Untreated soil gas samples were collected in Tedlar® bags, which were submitted to TestAmerica Laboratories, Inc. Knoxville, Tennessee laboratory for analysis by US EPA Method TO-15. Influent soil gas hydrocarbon concentrations, collected on June 22 and 24, 2011, were 575 and 1,998 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 June 22, 2011 is representative of soil vapor concentrations during the first 22 operating days of June because, in general, the same extraction wells (V-1, -3, -4, -6) and sparge wells (AS-1, -2, -5) were online and connected to the temporary CATOX unit. Also, the temporary CATOX operational temperatures were generally stable within normal ranges.

- The analytical sample from June 24, 2011 represents soil vapor concentrations during the last seven (7) operating days of June because, in general, the same extraction wells (V-1 thru V-6) and sparge wells (AS-1 thru AS-7) were online and connected to the new CATOX unit. Also, the new CATOX unit operated within the manufacturer's specifications with operational temperatures generally stable and within normal ranges.

June 2011 Groundwater Monitoring Results

Groundwater samples were collected on June 10, 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 5 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 decreasing total VOC concentration trend is documented since system startup in August 2010. 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

Construction of the Cell 3 AS/SVE system began May 23, 2011 and was substantially complete on June 23, 2011. Preliminary startup/shakedown of the Cell 3system was initiated on June 23, 2011. After some adjustments, the system was started on June 24, 2011. MDE issued a modified permit-to-construct for the Cell 3 CATOX system on May 20, 2011.

Figure 6 shows the location of the Cell 3 AS/SVE treatment area at the COA. A system schematic of the Cell 3 system layout is shown on **Figure 7**, which consists of the following major components:

- One (1) vapor collection trench (generally parallel to the cove shoreline) approximately 600 feet long and 3 feet wide fitted with a horizontal perforated 4-inch diameter SDR-17 HDPE vapor collection pipe locate on the cove-side of the trench. Five (5) vertical vapor-extraction risers are connected to a common suction header.

- 14 air sparge wells located within the trench, opposite the vapor collection pipe. These 14 air sparge wells, each spaced approximately 40 feet apart, are constructed of 2-inch, schedule 40 PVC with a 2-foot screen of the appropriate slot size and sand pack.

- 4-inch SDR-17 HDPE sparge and suction headers fitted with control valves for 2-inch sparge and suction laterals.

- One (1) trailer-mounted electric CATOX unit for extraction vacuum and vapor destruction. The CATOX unit is sized to handle at least the volume of sparge air delivered to the subsurface.

- One (1) electric air compressor for sparge air sized to have the capability to activate all sparge wells.

- Perimeter slag berm for system demarcation and protection from vehicular traffic.

June 2011 Operational Performance

The Cell 3 CATOX unit was started on June 24, 2011 and operated at 100% up time for the remainder of the month (approximately 156 hours). 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.

Initial influent (i.e., before CATOX treatment) soil gas samples collected for field instrument (PID) analysis indicated low total VOC concentrations, ranging between 3.4 and 12 ppmv. Additional sampling and analyses are scheduled for July 2011.

Cell 3 Groundwater Monitoring

As reported in the February 2011 Progress Report, groundwater samples were collected from several wells on February 14, 2011 to establish a baseline for the area. Benzene concentrations from that sampling event are reported on **Figure 6** of this report. Using the data collected, the following wells have been selected to be sampled on a monthly basis to monitor the performance of the Cell 3 AS/SVE system:

- 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 will be submitted to Microbac and analyzed via US EPA Method 8260B for VOCs. The groundwater monitoring program in Cell 3 is scheduled to commence in July 2011.

Cell 4: In-Situ Anaerobic Bio-treatment Area

US EPA's March 2, 2010 letter approved the in-situ bio-treatment concept for Cell 4 (**Figure 4**). The proposed final design for Cell 4 was submitted on March 31, 2011 in accordance with EPA's January 13, 2011 letter, and received USEPA's approval on April 18, 2011. Cell 4 IM construction activities were initiated in May 2011and included the installation of monitoring wells Cell 4-1, Cell 4-4, Cell 4-5, Cell 4-6, and Cell 4-7. In June 2011 the remaining monitoring wells (Cell 4-2 and Cell 4-3) specified in the approved design were installed. Pumping and recirculation equipment were procured and mobilized for nutrient amendment activities scheduled in the first week of July 2011.

June 2011 Groundwater Monitoring Results

Groundwater samples were collected on June 28, 2011 to establish a baseline prior to nutrient amendment from the following wells:

- 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 4**. These data indicate naphthalene is the most prevalent volatile organic compound (VOC) constituent.

Cell 6: LNAPL Extraction at the Former Benzol Processing Area

The Cell 6 LNAPL monitoring and recovery system was monitored approximately weekly during June 2011 (five [5] site visits). **Table 5** 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 June, approximately 577 gallons (4,230 pounds) of LNAPL was recovered, bringing the total recovered LNAPL to 5,587 gallons (40,939 pounds) as of June 30, 2011. **Figure 4** presents a graph of the cumulative estimated hydrocarbon recovery in Cell 6 by month since the startup of the IM system. The LNAPL was recovered from the following wells:

Well	LNAPL Recovery (gal / lbs)		Notes
	During June 2011	Total thru June 30, 2011	
BP-MW-05	499 / 3,656	4,899 / 35,896	
RW-04	59 / 434	460 / 3,371	
BP-MW-08	19 / 139	214 / 1,570	
BP-MW-11	0 / 0	8 / 57	(a)
RW-01	0 / 0	1.3 / 10	(b)
RW-02	0 / 0	0.8 / 5	(b)
RW-03	0 / 0	4.0 / 29	(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 5** 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):

- BP-MW-05 (0.86 to 1.56 feet),
- RW-04 (0.21 to 0.66 feet),
- BP-MW-11 (0.30 to 0.51 feet),
- BP-MW-08 (0.03 to 0.28 feet),
- RW-02 (0.21 to 0.23 feet),
- BP-MW-10 (0.09 to 0.21 feet),
- RW-03 (0.10 to 0.21 feet),

- RW-01 (0.14 to 0.13 feet), and
- BP-MW-07 (0.01 to 0.05 feet).

LNAPL was not observed in wells RW-05, BP-MW-06, BP-MW-09, or CO19-PZM004.

For all wells in which LNAPL accumulated, **Table 6** 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 June 2011 Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total CATOX Operating Time (June 1 - June 30, 2011)	hours	670
Overall CATOX Operational Time	%	93.1
Estimated Total Hydrocarbons Destroyed	pounds	966
Estimated Hydrocarbon Removal Rate	pounds/hour	0.9 - 3.4

Cell 1 Cumulative Summary of Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total ICE/CATOX Operating Time (August 3, 2010 - June 30, 2011)	hours	4,791
Overall ICE/CATOX Operational Time	%	60.1
Estimated Total Hydrocarbons Destroyed	pounds	7,943
Estimated Hydrocarbon Removal Rate	pounds/hour	1.66

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
Severstal Sparrows Point, LLC

	Sample ID	CATOX Influent	CATOX Influent
	Date	6/22/2011	6/24/2011
	Time	9:37	12:10
	Dilution Factor	39477.50	49525.60
Analyte	Units		
TO-15 Volatile Organics			
trans-1,3-Dichloropropene	ppb	< 7,900 U	< 9,900 U
Acetone	ppb	< 200,000 U	< 250,000 U
Ethylbenzene	ppb	< 7,900 U	< 9,900 U
2-Hexanone	ppb	< 20,000 U	< 25,000 U
Methylene Chloride	ppb	< 20,000 U	**34,000**
Benzene	ppb	**540,000**	**1,800,000**
1,1,2,2-Tetrachloroethane	ppb	< 7,900 U	< 9,900 U
Tetrachloroethene	ppb	< 7,900 U	< 9,900 U
Toluene	ppb	**35,000**	**140,000**
1,1,1-Trichloroethane	ppb	< 7,900 U	< 9,900 U
1,1,2-Trichloroethane	ppb	< 7,900 U	< 9,900 U
Trichloroethene	ppb	< 7,900 U	< 9,900 U
Vinyl Chloride	ppb	< 7,900 U	< 9,900 U
o-Xylene	ppb	< 7,900 U	< 9,900 U
m-Xylene & p-Xylene	ppb	< 7,900 U	**14,000**
2-Butanone (MEK)	ppb	< 39,000 U	< 50,000 U
4-Methyl-2-pentanone (MIB	ppb	< 20,000 U	< 25,000 U
Bromoform	ppb	< 7,900 U	< 9,900 U
Carbon Disulfide	ppb	< 20,000 U	< 25,000 U
Carbon tetrachloride	ppb	< 7,900 U	< 9,900 U
Chlorobenzene	ppb	< 7,900 U	< 9,900 U
Chloroethane	ppb	< 7,900 U	< 9,900 U
Chloroform	ppb	< 7,900 U	< 9,900 U
1,1-Dichloroethane	ppb	< 7,900 U	< 9,900 U
1,2-Dichloroethane	ppb	< 7,900 U	< 9,900 U
1,1-Dichloroethene	ppb	< 7,900 U	< 9,900 U
trans-1,2-Dichloroethene	ppb	< 7,900 U	< 9,900 U
1,2-Dichloropropane	ppb	< 7,900 U	< 9,900 U
cis-1,3-Dichloropropene	ppb	< 7,900 U	< 9,900 U
Total Volatile Organics	ppb	**575,000**	**1,988,000**
Hydrocarbons			
Methane	%		

Notes:

<Blank>	= Not measured
BOLD	= Analyte detected
ppb	= parts per billion
</U	= Analyte not detected above corresponding Reporting Limit
%	= Percent

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

Analyte	Sample ID / Date / Units	MDE GW Stds[1]	CO02-PZM006 6/10/2011	CO18-PZM006 6/10/2011	BP-MW-09 6/10/2011
Water Quality Parameters					
Temperature	deg C	*NA*	19.85	26.70	19.80
pH	std units	*NA*	7.78	7.01	8.99
ORP	mV	*NA*	-302	-16	-197
Conductivity	mS/cm	*NA*	1.700	2.440	0.616
Turbidity	NTU	*NA*	N/A	N/A	N/A
DO	mg/L	*NA*	0.41	7.25	0.00
Volatile Organics					
Acetone	µg/L	*550*	< 120,000 U	< 120,000 U	< 12,000 U
Benzene	µg/L	*5*	**580,000**	**180,000**	**6,100**
Bromoform	µg/L	*80*	< 5,000 U	< 5,000 U	< 500 U
2-Butanone (MEK)	µg/L	*700*	< 25,000 U	< 25,000 U	< 2,500 U
Carbon Disulfide	µg/L	*100*	< 5,000 U	< 5,000 U	**990**
Carbon Tetrachloride	µg/L	*5*	< 5,000 U	< 5,000 U	< 500 U
Chlorobenzene	µg/L	*100*	< 5,000 U	< 5,000 U	< 500 U
Chloroethane	µg/L	*3.6*	< 5,000 U	< 5,000 U	< 500 U
Chloroform	µg/L	*80*	< 5,000 U	< 5,000 U	< 500 U
1,1-Dichloroethane	µg/L	*90*	< 5,000 U	< 5,000 U	< 500 U
1,2-Dichloroethane	µg/L	*5*	< 5,000 U	< 5,000 U	< 500 U
1,1-Dichloroethene	µg/L	*7*	< 5,000 U	< 5,000 U	< 500 U
trans-1,2-Dichloroethene	µg/L	*100*	< 5,000 U	< 5,000 U	< 500 U
1,2-Dichloropropane	µg/L	*5*	< 5,000 U	< 5,000 U	< 500 U
cis-1,3-Dichloropropene	µg/L	*0.44*	< 5,000 U	< 5,000 U	< 500 U
trans-1,3-Dichloropropene	µg/L	*0.44*	< 5,000 U	< 5,000 U	< 500 U
Ethylbenzene	µg/L	*700*	< 5,000 U	< 5,000 U	**880**
2-Hexanone (MBK)	µg/L	*NA*	< 25,000 U	< 25,000 U	< 2,500 U
4-Methyl-2-Pentanone (MIBK)	µg/L	*630*	< 25,000 U	< 25,000 U	< 2,500 U
Methylene Chloride	µg/L	*5*	< 25,000 U	< 25,000 U	< 2,500 U
1,1,1,2-Tetrachloroethane	µg/L	*NA*	< 5,000 U	< 5,000 U	< 500 U
1,1,2,2-Tetrachloroethane	µg/L	*0.05*	< 5,000 U	< 5,000 U	< 500 U
Tetrachloroethene	µg/L	*5*	< 5,000 U	< 5,000 U	< 500 U
Toluene	µg/L	*1,000*	**43,000**	**24,000**	**3,600**
Xylenes, Total	µg/L	*10,000*	< 15,000 U	< 15,000 U	**4,100**
1,1,1-Trichloroethane	µg/L	*200*	< 5,000 U	< 5,000 U	< 500 U
1,1,2-Trichloroethane	µg/L	*5*	< 5,000 U	< 5,000 U	< 500 U
Trichloroethene	µg/L	*5*	< 5,000 U	< 5,000 U	< 500 U
Vinyl Chloride	µg/L	*2*	< 5,000 U	< 5,000 U	< 500 U
Total Volatile Organics	**µg/L**	**--**	**623,000**	**204,000**	**15,670**

Notes:

--	= Not measured
Bold	= Analyte Detected
deg C	= Degree Celcius
mg/L	= milligrams 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 Reporting Limit
µg/L	= micrograms per liter
*	= revised laboratory report

Table 4
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 4-1
	Date	6/27/2011	6/29/2011	6/28/2011	6/28/2011	6/28/2011
	Units					
Water Quality Parameters						
Temperature	deg C	16.74	20.73	17.00	21.00	20.25
pH	std units	11.56	11.61	11.88	10.94	11.22
ORP	mV	-255	-238	-231	-253	-248
Conductivity	mS/cm	2.39	1.91	2.90	2.85	1.52
Turbidity	NTU	0.96	2.24	1.42	6.91	9.84
DO	mg/L	0.28	0.21	0.44	0.34	1.52
Volatile Organics						
Acetone	µg/L	< 2,500 U	< 2,500 U	< 2,500 U	< 2,500 U	< 2,500 U
Benzene	µg/L	**1,500**	**700**	**1,900**	**6,800**	**1,200**
Bromoform	µg/L	< 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
Carbon Disulfide	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Carbon Tetrachloride	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Chlorobenzene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Chloroethane	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Chloroform	µg/L	< 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
1,2-Dichloroethane	µg/L	< 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
trans-1,2-Dichloroethene	µg/L	< 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
cis-1,3-Dichloropropene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
trans-1,3-Dichloropropene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Ethylbenzene	µg/L	< 100 U	< 100 U	< 100 U	**110**	< 100 U
2-Hexanone (MBK)	µg/L	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U
4-Methyl-2-Pentanone (MIBK)	µg/L	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U
Methylene Chloride	µg/L	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U
1,1,1,2-Tetrachloroethane	µg/L	< 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
Tetrachloroethene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Toluene	µg/L	**1,100**	**460**	**1,500**	**5,100**	**810**
m,p-Xylenes	µg/L	**660**	**430**	**1,000**	**2,100**	**610**
o-Xylenes	µg/L	**250**	**160**	**380**	**810**	**230**
Xylenes, Total	µg/L	**910**	**590**	**1,400**	**3,000**	**840**
1,1,1-Trichloroethane	µg/L	< 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
Trichloroethene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Vinyl Chloride	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Naphthalene	µg/L	**15,000**	**6,300**	**14,000**	**19,000**	**12,000**
Total Volatile Organics	**µg/L**	**19,420**	**8,640**	**20,180**	**36,920**	**15,690**
Microbiology						
Heterotrophic Plate Count	CFU/ml	< 1.0 U	< 1.0 U	--	--	--
Wet Chemistry						
Ferric Iron	mg/L	< 0.025 U	< 0.025 U	< 0.055 U	< 0.025 U	< 0.025 U
Ferrous Iron	mg/L	**0.47**	**0.68**	**1.3**	**1.6**	**1.5**
Nitrate-N	mg/L	< 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
Nitrite-N	mg/L	**0.28**	**0.049**	**0.12**	**0.15**	**0.086**
Orthophosphate as P	mg/L	**0.013**	**0.014**	< 0.010 U	**0.025**	**0.021**
Sulfate as SO4	mg/L	**580**	**360**	**600**	**1,500**	**520**
Sulfite as SO3	mg/L	< 2.0 U	--	< 2.0 U	< 2.0 U	< 2.0 U
Total Kjeldahl Nitrogen	mg/L	**45**	**25**	**40**	**270**	**30**
Metals						
Iron, Total	mg/L	**0.28**	**0.29**	**0.30**	**0.30**	**0.37**

Notes:

-- = Not Measured

Bold = Analyte Detected

CFU/ml = Colony Forming Unit per milliliter

deg C = Degree Celcius

mg/L = milligram per liter

mS/cm = Microsiemens per Centimeter

mV = Millivolts

NTU = Nephelometric Turbidity Units

ORP = Oxidation Reduction Potential

std units = Standard Units

U = Analyte not detected above Reporting Limit

µg/L = Micrograms per liter

Table 4
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	Cell 4-3	Cell 4-4	Cell 4-5	Cell 4-6	Cell 4-7
	Date	6/27/2011	6/28/2011	6/27/2011	6/29/2011	6/29/2011
	Units					
Water Quality Parameters						
Temperature	deg C	16.53	21.47	16.97	16.76	20.03
pH	std units	11.75	11.50	11.63	11.77	11.96
ORP	mV	-242	-263	-317	-192	-212
Conductivity	mS/cm	2.22	1.65	2.88	2.61	3.12
Turbidity	NTU	3.39	5.14	1.72	4.87	4.42
DO	mg/L	0.32	2.05	0.20	0.44	0.20
Volatile Organics						
Acetone	µg/L	< 2,500 U	< 2,500 U	< 2,500 U	< 2,500 U	< 2,500 U
Benzene	µg/L	**910**	**950**	**3,700**	**890**	**1,400**
Bromoform	µg/L	< 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
Carbon Disulfide	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Carbon Tetrachloride	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Chlorobenzene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Chloroethane	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Chloroform	µg/L	< 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
1,2-Dichloroethane	µg/L	< 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
trans-1,2-Dichloroethene	µg/L	< 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
cis-1,3-Dichloropropene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
trans-1,3-Dichloropropene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Ethylbenzene	µg/L	< 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
4-Methyl-2-Pentanone (MIBK)	µg/L	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U
Methylene Chloride	µg/L	< 500 U	< 500 U	< 500 U	< 500 U	< 500 U
1,1,1,2-Tetrachloroethane	µg/L	< 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
Tetrachloroethene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Toluene	µg/L	**730**	**660**	**3,200**	**770**	**1,000**
m,p-Xylenes	µg/L	**710**	**590**	**1,500**	**600**	**1,100**
o-Xylenes	µg/L	**280**	**220**	**570**	**240**	**380**
Xylenes, Total	µg/L	**990**	**810**	**2,100**	**840**	**1,500**
1,1,1-Trichloroethane	µg/L	< 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
Trichloroethene	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Vinyl Chloride	µg/L	< 100 U	< 100 U	< 100 U	< 100 U	< 100 U
Naphthalene	µg/L	**14,000**	**9,700**	**14,000**	**13,000**	**18,000**
Total Volatile Organics	**µg/L**	**17,620**	**12,930**	**25,070**	**16,340**	**23,380**
Microbiology						
Heterotrophic Plate Count	CFU/ml	**1.0**	**54**	< 1.0 U	**7.0**	**2.0**
Wet Chemistry						
Ferric Iron	mg/L	< 0.015 U	< 0.015 U	< 0.025 U	< 0.015 U	< 0.015 U
Ferrous Iron	mg/L	**0.21**	**0.80**	**0.93**	**0.67**	**0.96**
Nitrate-N	mg/L	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U	**0.10**
Nitrate/Nitrite-N	mg/L	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U	**0.20**
Nitrite-N	mg/L	**0.028**	**0.045**	**0.21**	**0.023**	**0.099**
Orthophosphate as P	mg/L	**0.020**	**0.024**	**0.016**	**0.013**	**0.012**
Sulfate as SO4	mg/L	**370**	**450**	**1,200**	**290**	**660**
Sulfite as SO3	mg/L	< 2.0 U	< 2.0 U	< 2.0 U	--	--
Total Kjeldahl Nitrogen	mg/L	**22**	**32**	**70**	**27**	**49**
Metals						
Iron, Total	mg/L	**0.17**	**0.28**	**0.57**	**0.097**	**0.31**

Notes:

-- = Not Measured

Bold = Analyte Detected

CFU/ml = Colony Forming Unit per milliliter

deg C = Degree Celcius

mg/L = milligram per liter

mS/cm = Microsiemens per Centimeter

mV = Millivolts

NTU = Nephelometric Turbidity Units

ORP = Oxidation Reduction Potential

std units = Standard Units

U = Analyte not detected above Reporting Limit

µg/L = Micrograms per liter

Table 5
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 June 2011 (ft)			Total LNAPL Recovery Period		Cumulative Total LNAPL Recovered thru June 30, 2011		LNAPL Recovered During June 2011	
				Begin	End	(gal)	(lbs) (a)	(gal)	(lbs) (a)
BP-MW-05	0.86	to	1.56	28-Jan-10	On-going (b)	4,899	35,896	499	3,656
RW-04	0.21	to	0.66	23-Jul-10	On-going (b)	460	3,371	59	434
BP-MW-08	0.03	to	0.28	8-Sep-10	On-going (b)	214	1,570	19	139
BP-MW-11	0.30	to	0.51	23-Jul-10	8-Sep-10	8	57	0	0
RW-01	0.14	to	0.13	28-Oct-10	On-going (c)	1.3	10	0.0	0
RW-03	0.10	to	0.21	11/24/2010	On-going (c)	4.0	29	0.0	0
RW-02	0.21	to	0.23	1/28/2011	On-going (c)	0.8	5	0.0	0
BP-MW-10	0.09	to	0.21	na	na	0	0	0	0
BP-MW-07	0.01	to	0.05	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:	**5,587**	**40,939**	**577**	**4,230**

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 6
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
6/3/2011	11.12	11.26	0.14	11.30	11.45	0.15	9.20	9.41	0.21
6/10/2011	11.24	11.38	-0.86	11.40	11.55	0.15	9.30	9.51	0.21
6/15/2011	11.30	11.46	0.16	11.49	11.59	0.10	9.36	9.58	0.22
6/23/2011	11.20	11.39	0.19	11.43	11.64	0.21	9.27	9.48	0.21
6/30/2011	11.24	11.54	0.30	11.55	11.76	0.21	9.40	9.63	0.23

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
6/3/2011	9.40	9.90	0.50	10.64	12.20	1.56	10.77	10.77	0.00
6/10/2011	9.55	9.80	0.25	11.00	12.03	1.03	10.86	10.87	0.01
6/15/2011	9.64	9.90	0.26	11.04	12.06	1.02	10.94	10.95	0.01
6/23/2011	9.57	9.78	0.21	10.97	12.03	1.06	10.89	10.94	0.05
6/30/2011	9.65	10.31	0.66	11.06	11.92	0.86	10.99	11.01	0.02

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
6/3/2011	10.29	10.29	0.00	8.94	9.06	0.12	10.35	- -	- -
6/10/2011	10.41	10.41	0.00	9.12	9.21	0.09	10.50	10.80	0.30
6/15/2011	10.52	10.52	0.00	9.16	9.30	0.14	10.61	11.04	0.43
6/23/2011	10.46	10.46	0.00	9.15	9.35	0.20	11.01	11.49	0.48
6/30/2011	10.58	10.58	0.00	9.27	9.48	0.21	11.14	11.65	0.51

Figures

N
W E
S

Legend

◆ Existing Monitoring Well

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

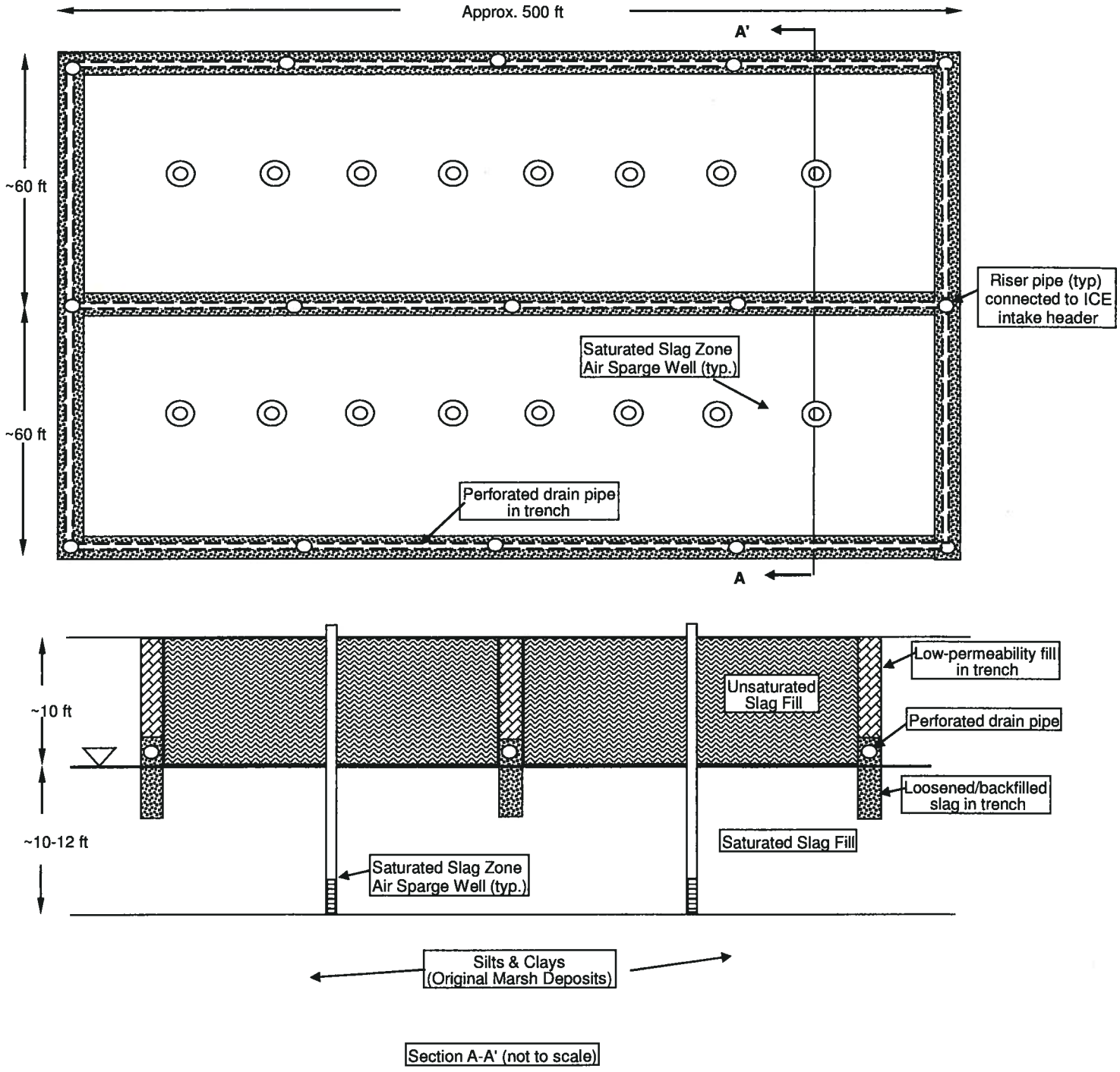
CLIENT: Sparrows Point	LOCATION: Baltimore, MD
DATE: 06/11/10	FILE: G:\Projects\SparrowsPoint\Projects\2010\CokeOven-and-CokePoint-6Prototype Cells_rev1.mxd
GIS: AER	
CHECKED: RL	
SENIOR: BE	

URS
200 Orchard Ridge Drive
Gaithersburg, MD 20878

Figure 1

Interim Measures Treatment Areas

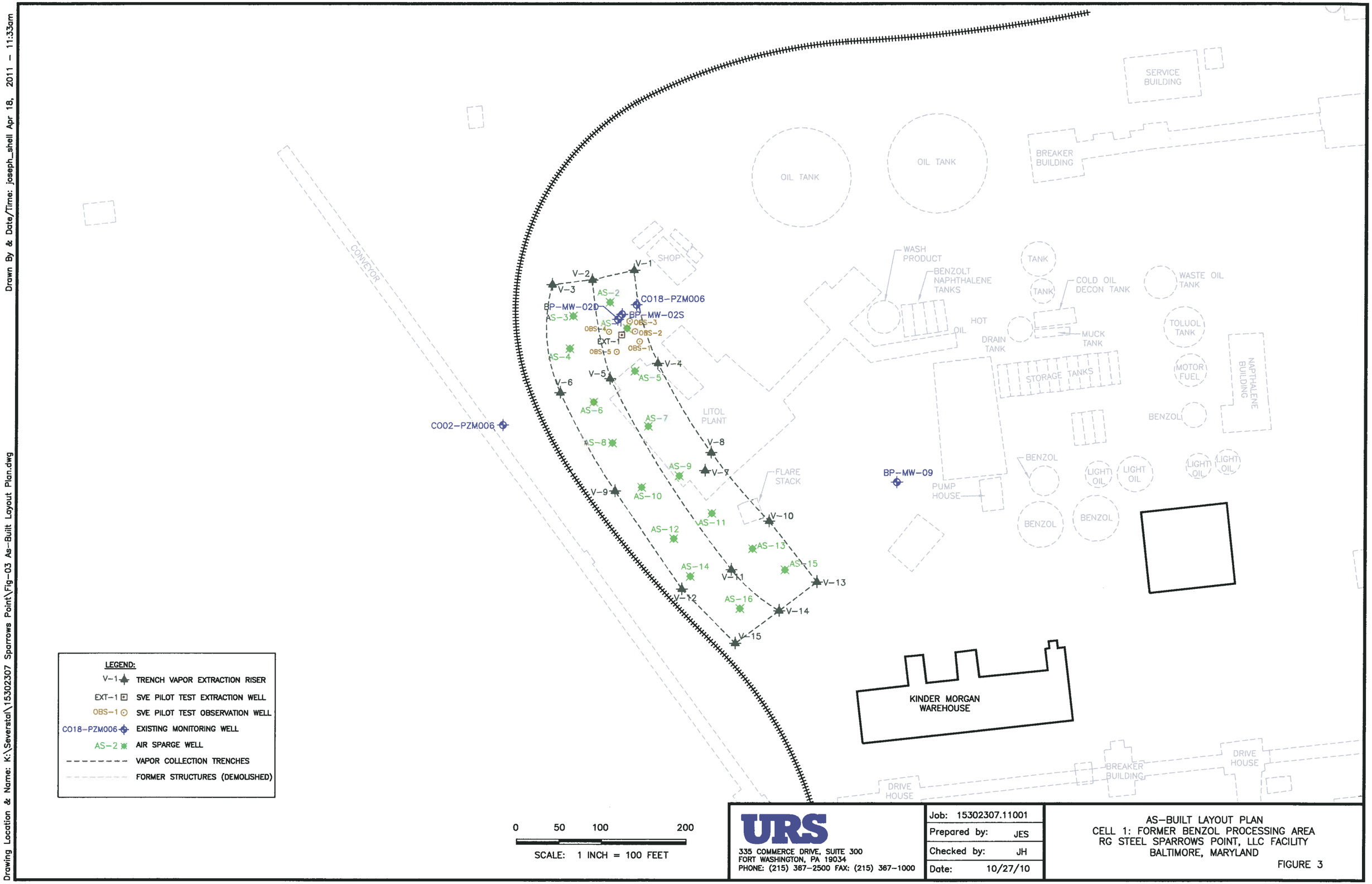
Figure 2
Schematic Diagram
Cell 1: Prototype AS/SVE System in Former Benzol Processing Area
Former Coke Oven Area Interim Remedial Measures
RG Steel Sparrows Point, LLC



Section A-A' (not to scale)

Drawn By & Date/Time: joseph_shell Apr 18, 2011 - 11:33am

Drawing Location & Name: K:\Severstal\15302307 Sparrows Point\Fig-03 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
- C018-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 3

Figure 5
Measured Groundwater VOC Concentration per Month
Cell 1: Prototype AS/SVE System in Former Benzol Processing Area
RG Steel Sparrows Point, LLC

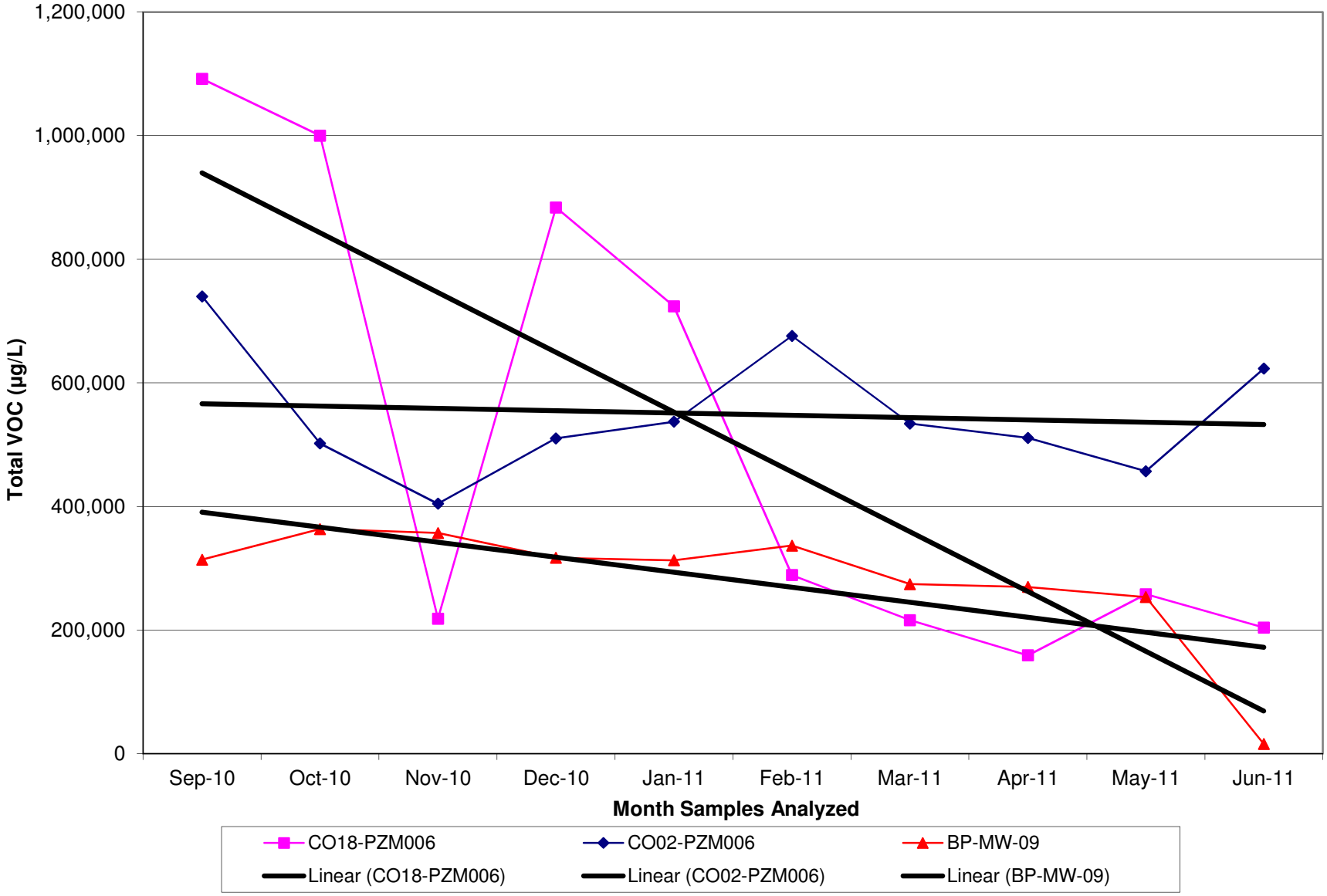
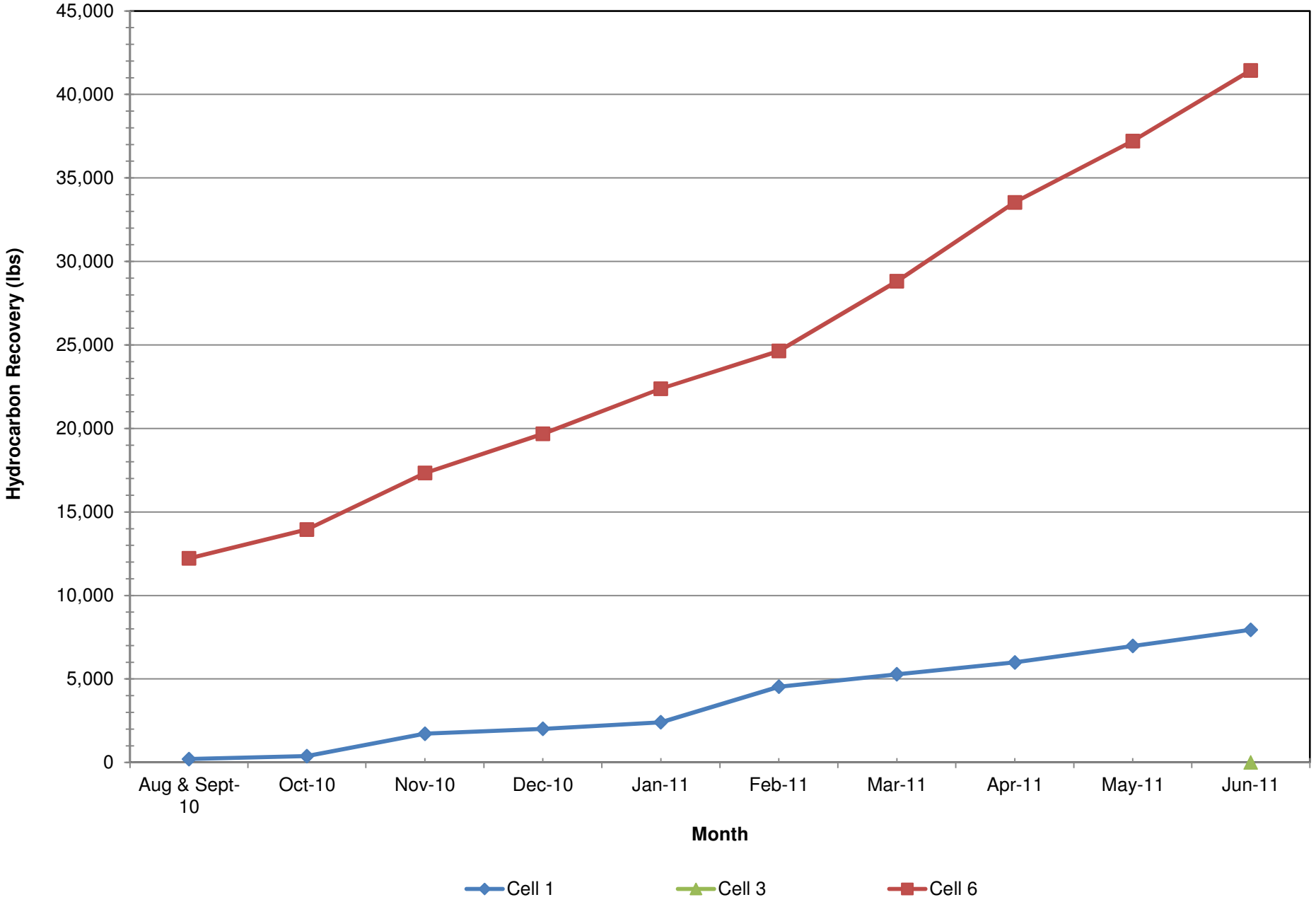


Figure 4
Cumulative Summary of Estimated Hydrocarbon Recovery
Former Coke Oven Area Interim Remedial Measures
RG Steel Sparrows Point, LLC



G:\Projects\SparrowsPoint\Projects\2009\6-2CokeOven-and-CokePointBenzene-focusareas-vWells-Jan11_rev2.mxd 02/21/2011 JK

N W E S

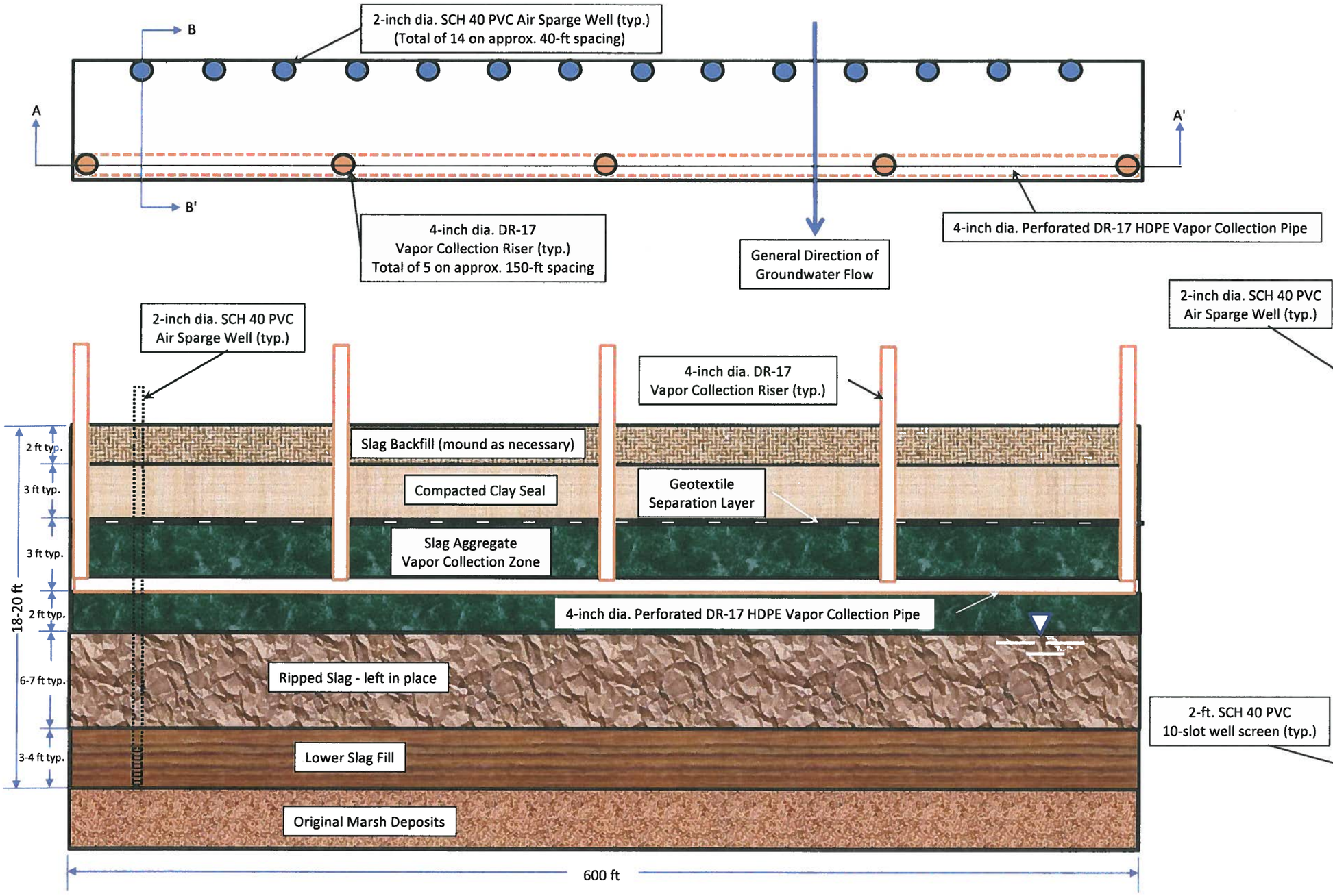
200 0 200 400 Feet

Figure 6

Cell 3 AS/SVE Treatment Area[(a)]

[(a)]Exact locations may be adjusted depending on subsurface conditions encountered during excavation.

Figure 7
Schematic Layout and Sections
Cell 3 AS/SVE System in "Cove" Area
Former Coke Oven Area Interim Remedial Measures
RG Steel Sparrows Point, LLC



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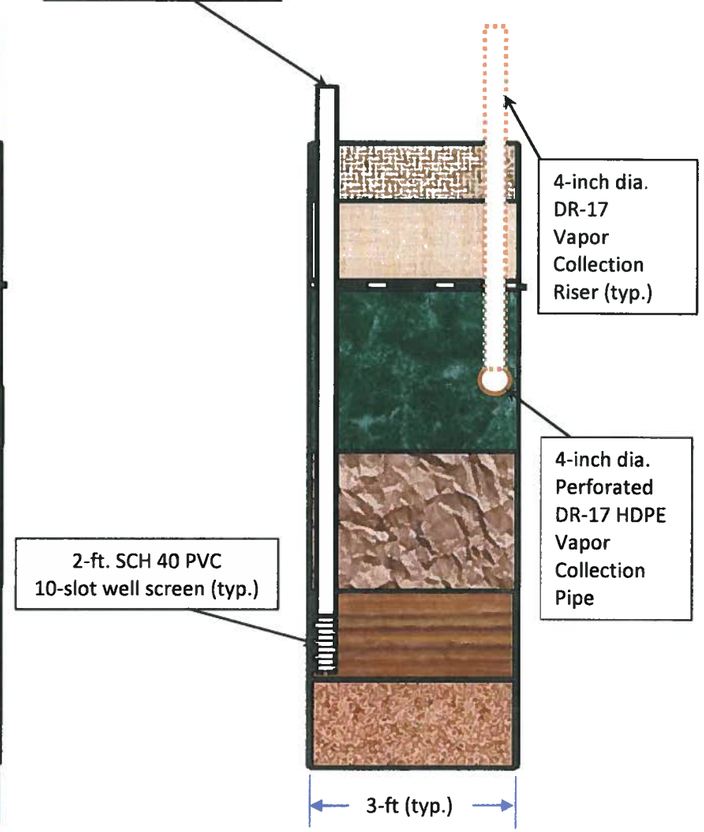


Section B-B'
(not to scale)

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

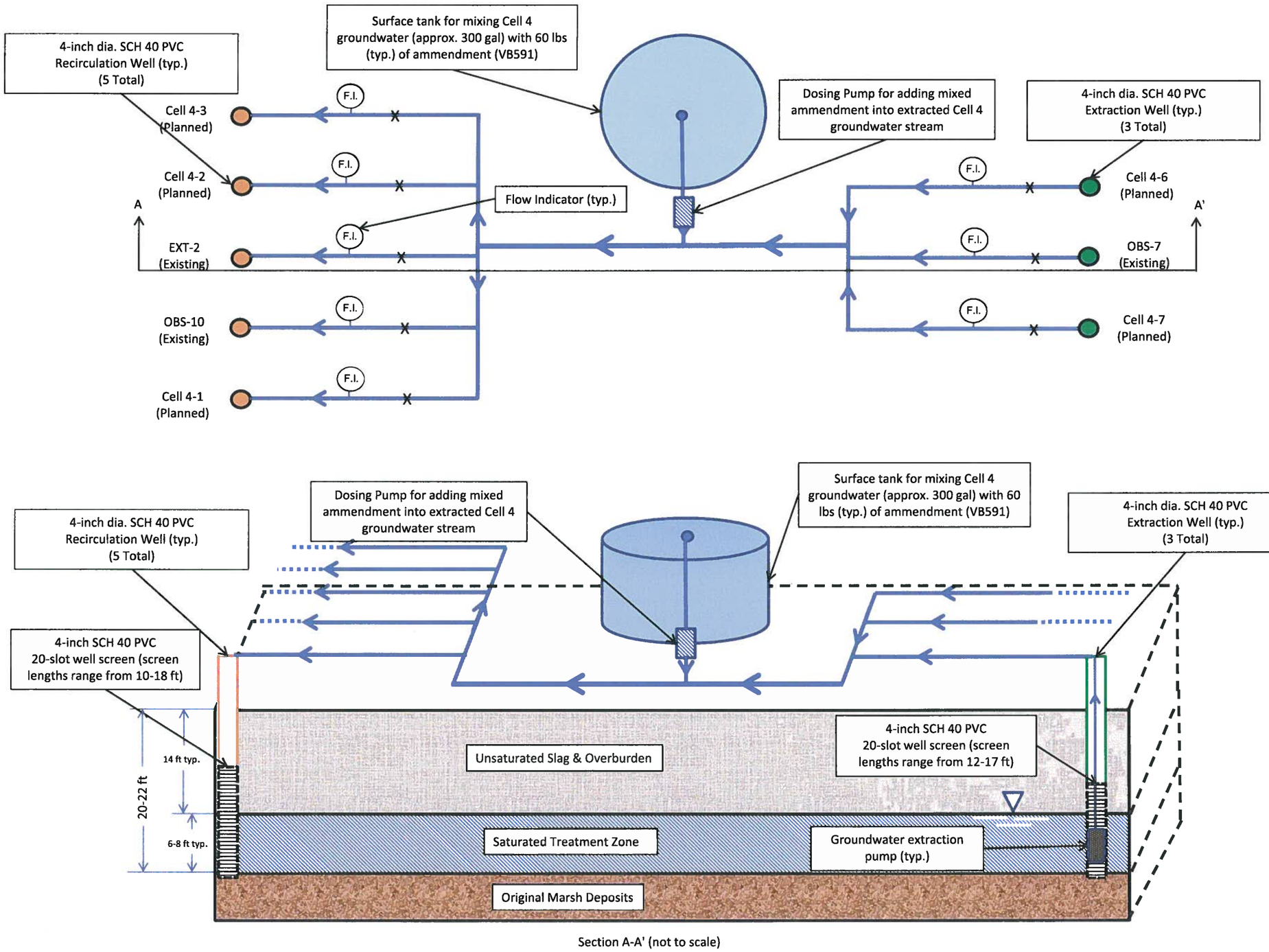
N

Figure 8

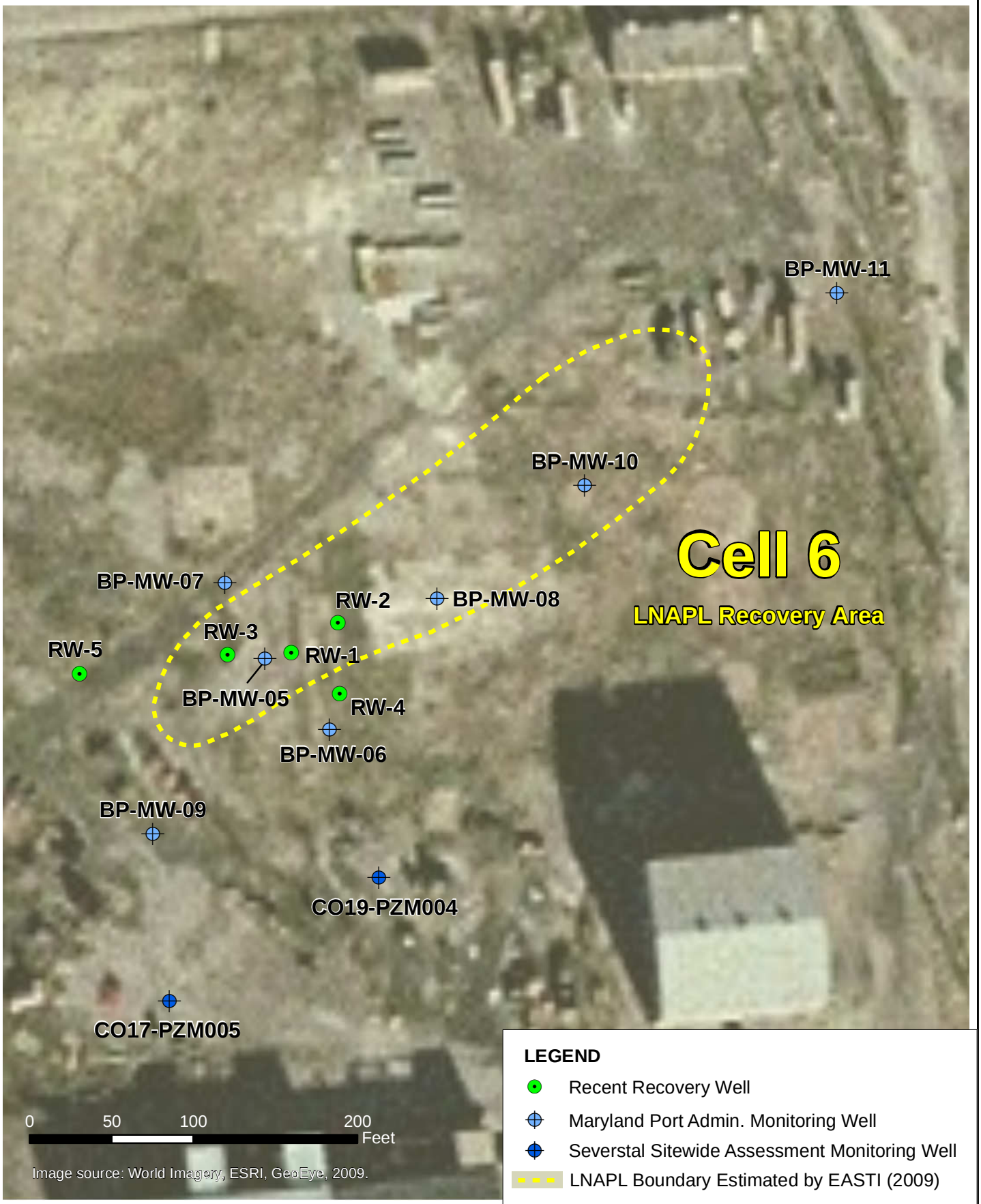
Cell 4 Wells

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

Figure 9
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)



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

N

Figure 10

LNAPL Monitoring and Recovery Wells

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