



February 28, 2013

Mr. Andrew Fan, PE  
US EPA Region III, 3LC23  
1650 Arch Street  
Philadelphia, PA 19103-2029

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

**Re: CONSENT DECREE, CIVIL ACTION NOS. JFM-97-558, JFM-97-559**  
*COKE OVEN AREA INTERIM MEASURES PROGRESS REPORT JANUARY 2013*

Dear Mr. Fan and Ms. Brown:

Enclosed with this correspondence is the Coke Oven Area Interim Measures Progress Report January 2013 completed for the Sparrows Point Facility in accordance with the requirements outlined in US EPA's September 2, 2010 approval letter for the Coke Oven Area Interim Measures work associated with the referenced Consent Decree. This report was distributed electronically on February 28, 2013 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 January 31, 2013. Please me at (314) 686-5611 should questions arise during your review of the enclosed progress report.

Sincerely,

Russell Becker  
Vice President, Remediation  
Sparrows Point LLC

Enclosure

# COKE OVEN AREA INTERIM MEASURES PROGRESS REPORT (January 2013)

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*Prepared for*

Sparrows Point, LLC



February 28, 2013



**ENVIRONMENTAL  
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200 Harry S. Truman Parkway, Suite 300  
Annapolis, MD 21401 (401) 263-2234

# Coke Oven Area Interim Remedial Measures Progress Report

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## Introduction

In accordance with the United States Environmental Protection Agency's (US EPA)'s September 2, 2010 letter, this document is the monthly progress report for January 2013 for the US EPA approved interim measures (IMs) that have been developed to address identified environmental conditions at the Coke Oven Area (COA) Special Study Area at the Sparrows Point LLC facility located in Sparrows Point, Maryland. This progress report summarizes IM progress for January 2013.

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

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

As of January 2013, Cells 1, 3, 4 and 6 continue to be operational. Soil gas sampling to assess current conditions was performed during January 2013. The results of these sampling events including trending graphs from IM startup are detailed in this report.

# Coke Oven Area Interim Remedial Measures Progress Report

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## 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.

### January 2013 Operational Performance

Operational performance of Cell 1 during this reporting period is summarized in **Table 1**. In summary, the CATOX unit operated for 743 hours (99.9 %) 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 0.002 pounds per operating hour (estimated monthly total of 1.5 pounds). **Table 1** also includes a cumulative summary of operational performance since system startup on August 3, 2010. In total, Cell 1 has destroyed approximately 9,580 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 analysis to monitor CATOX unit performance. One (1) untreated soil gas sample was collected in a Tedlar® bag and submitted to TestAmerica Laboratories, Inc. in Knoxville, Tennessee (TestAmerica) for analysis by US EPA Method TO-15. The influent soil gas hydrocarbon concentration collected on January 30, 2013 was less than one (1) part per million by volume (ppmv).

Hydrocarbon removal calculations were based entirely on the analytical results and the average daily field-measured influent flow rates. The mass removal calculations assume that the sample collected on January 30, 2013 is representative of hydrocarbon concentrations for the entire

## Coke Oven Area Interim Remedial Measures Progress Report

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month of December. This assumption is based on the fact that the same air sparge wells (AS-1 thru AS-8) and extraction wells (V-1 thru V-6) were online when the system was operational.

Soil gas concentrations recovered from this treatment area have decreased in recent months notwithstanding the loose fitting that has been repaired. Modified operating practices, including pulsing the system, have been implemented in February to determine if improvements can be made in operating protocol to increase recovery of hydrocarbons from the subsurface. This effort will also evaluate the system for possible concentration rebounding.

Additional influent soil gas sampling will be conducted in February to evaluate the change in system performance with the modified operating practices. Soil gas sampling practices will also be changed for the February sampling from Tedlar® bag to SUMMA canister.

### January 2013 Groundwater Monitoring Results

Groundwater sampling will be conducted on a quarterly basis to monitor ongoing operations. The next scheduled event is February 2013. The data from the groundwater monitoring for Cell 1 is shown in **Figure 4**.

### 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.

### January 2013 Operational Performance

Operational performance of Cell 3 during this reporting period is summarized in **Table 2**. In summary, the CATOX unit operated for 743 hours (99.9 %) during January. 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.

## Coke Oven Area Interim Remedial Measures Progress Report

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The hydrocarbon removal rate was calculated to be approximately 0.00 pounds per operating hour (estimated monthly total of 0.0 pounds). **Table 2** also includes a cumulative summary of operational performance since system startup on June 24, 2011. In total, Cell 3 has destroyed approximately 623 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 analysis to monitor CATOX unit performance. One (1) untreated soil gas sample was collected in a Tedlar® bag and submitted to TestAmerica. The influent soil gas hydrocarbon concentration collected on January 30, 2013 was less than one (1) part per million by volume (ppmv).

Hydrocarbon removal calculations were based entirely on the analytical results and the average daily field-measured influent flow rates. The mass removal calculations assume that the sample collected on January 30, 2013 is representative of hydrocarbon concentrations for the entire month of December. This assumption is based on the fact that the same air sparge wells (AS-2 thru AS-12) and extraction wells (V-2 thru V-4) were online when the system was operational.

Soil gas concentrations recovered from this treatment area have also decreased in recent months. Modified operating practices similar to Cell 1, including pulsing the system, have been implemented to determine if improvements can be made in operating protocol to increase recovery of hydrocarbons from the subsurface. This effort will also evaluate the system for possible concentration rebounding.

Additional influent soil gas sampling will be conducted in February to evaluate the change in system performance with the modified operating practices. Soil gas sampling practices will also be changed for the February sampling from Tedlar® bag to SUMMA canister.

# Coke Oven Area Interim Remedial Measures Progress Report

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## January 2013 Cell 3 Groundwater Monitoring

Groundwater sampling will be conducted on a quarterly basis to monitor ongoing operations. The next scheduled event is February 2013. The data from the groundwater monitoring for Cell 3 is shown in **Figure 5**.

## Cell 4: In-Situ Anaerobic Bio-treatment Area

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

## January 2013 Operations

A review of historical data and hydrocarbon removal effectiveness is currently underway for this interim measure system. Findings and operational plan for ongoing operation will be presented in the February 2013 Progress Report.

## January 2013 Groundwater Monitoring Results

Groundwater sampling will be conducted on a quarterly basis to monitor ongoing operations. The next scheduled event is February 2013. The data from the groundwater monitoring for Cell 4 is shown in **Figure 8**.

# Coke Oven Area Interim Remedial Measures Progress Report

## Cell 6: LNAPL Extraction at the Former Benzol Processing Area

The Cell 6 LNAPL monitoring and recovery system was monitored weekly during January 2013. **Table 3** summarizes LNAPL occurrence and recovery observed during the reporting period, the start date of extraction from recovery wells and cumulative LNAPL recovered since the beginning of the interim measure. **Figure 9** illustrates the well locations. An estimated 189 gallons (1,384 pounds) of LNAPL were recovered during January, bringing the total recovered LNAPL to 8,564 gallons (62,744 pounds) as of January 31, 2013. **Figure 3** presents a graph of the cumulative estimated monthly hydrocarbon recovery in Cell 6 since the startup of the IM system. The LNAPL was recovered from the following wells:

Well	LNAPL Recovery (gal/lbs)		Notes
	During January 2013	Total thru January 31, 2013	
BP-MW-05	152/1,112	6,782/49,689	c
RW-04	22/163	1,068/7,829	c
BP-MW-08	15/109	685/5,012	c
BP-MW-11	0/0	8/57	a
RW-03	0/0	19/141	d
RW-01	0/0	1/10	b
RW-02	0/0	0.8/5.9	b

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

(b) Manual bailing

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

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

The wells are presented in **Table 4**. LNAPL thicknesses during the reporting period are summarized below (wells are not listed if LNAPL was not present):

- RW-04 (2.0 ft),
- BP-MW-05 (0.65 ft),



## Coke Oven Area Interim Remedial Measures Progress Report

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- BP-MW-08 (0.6 ft),
- BP-MW-11 (0.68 ft),
- BP-MW-10 (0.18 ft),
- RW-02 (0.09 ft),
- RW-03 (0.52 ft)
- RW-01 (0.05 ft), and
- BP-MW-07 (0.19 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 4** provides well-specific details concerning the measured depths to LNAPL, the water table, and calculated LNAPL thicknesses.

# TABLES

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Table 1

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

**Cell 1 January 2013 Estimated Hydrocarbon Recovery**

Parameter	Units	Quantity
Total CATOX Operating Time (January 1 - January 31, 2013)	hours	743
Overall CATOX Operational Time	%	99.9%
Estimated Total Hydrocarbons Destroyed	pounds	1.5
Estimated Hydrocarbon Removal Rate	pounds/hour	0.002

**Cell 1 Cumulative Summary of Estimated Hydrocarbon Recovery**

Parameter	Units	Quantity
Total ICE/CATOX Operating Time (August 3, 2010 -January 31, 2013)	hours	17,998
Overall CATOX Operational Time	%	82.3%
Estimated Total Hydrocarbons Destroyed	pounds	9,580
Estimated Hydrocarbon Removal Rate	pounds/hour	0.5

**Table 2**  
**Summary of Operation Conditions**  
**Cell 3: AS/SVE System in the "Cove" Area**  
**Former Coke Oven Area Interim Remedial Measures**  
**Sparrows Point, LLC**

**Cell 3 January 2013 Estimated Hydrocarbon Recovery**

Parameter	Units	Quantity
Total CATOX Operating Time (January 1 - January 31, 2013)	hours	743
Overall CATOX Operational Time	%	99.9%
Estimated Total Hydrocarbons Destroyed	pounds	0
Estimated Hydrocarbon Removal Rate	pounds/hour	0

**Cell 3 Cumulative Summary of Estimated Hydrocarbon Recovery**

Parameter	Units	Quantity
Total ICE/CATOX Operating Time (August 3, 2010 -January 31, 2013)	hours	12,719
Overall CATOX Operational Time	%	86.7%
Estimated Total Hydrocarbons Destroyed	pounds	623.4
Estimated Hydrocarbon Removal Rate	pounds/hour	0.05

Table 3

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

Well	LNAPL Occurrence During January 2013 (ft)	Total LNAPL Recovery Period		Cumulative Total LNAPL Recovered		Estimate LNAPL Recovered During January 2013	
		Begin	End	(gal)	(lbs) (a)	(gal)	(lbs) (a)
RW-04	2	23-Jul-10	On-going (b)	1,068	7,829	22	163
BP-MW-05	0.65	28-Jan-10	On-going (b)	6,782	49,689	152	1,112
BP-MW-08	0.6	8-Sep-10	On-going (b)	685	5,012	15	109
BP-MW-11	0.68	23-Jul-10	9/8/2010	7.8	57	0	0
RW-02	0.09	28-Jan-11	On-going (c)	0.8	5.9	0	0
RW-03	0.52	24-Nov-10	On-going (c)	19.3	141	0	0
RW-01	0.05	28-Oct-11	On-going (c)	1.3	10	0	0
BP-MW-10	0.18	na	na	0	0	0	0
BP-MW-07	0.68	na	na	0	0	0	0
BP-MW-06	none	na	na	0	0	0	0
RW-05	none	na	na	0	0	0	0
BP-MW-09	none	na	na	0	0	0	0
CO19-PZM004	none	na	na	0	0	0	0
<b>Total Recovery:</b>				<b>8,564</b>	<b>62,744</b>	<b>189</b>	<b>1,384</b>

**Notes:**

- (a) Weight is calculated based on average BP-MW-05 and BP-MW-08 oil density of 0.878 grams per cubic centimeter, measured by EA (2009) by ASTM Method D1481
- (b) Skimmer
- (c) Bailing
- (d) Cumulative recovery volumes are calculated using an estimated recovery from 12/28/11 to 1/18/12 as well as 5/24/12 to 6/22/12.

Table 4

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

Date	RW-01			RW-02			RW-03		
	Depth to LNAPL	Depth to Water	LNAPL Thickness	Depth to LNAPL	Depth to Water	LNAPL Thickness	Depth to LNAPL	Depth to Water	LNAPL Thickness
1/31/2013	10.69	10.74	0.05	10.48	10.57	0.09	8.91	9.43	0.52
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
1/31/2013	9.48	11.48	2	11.02	11.67	0.65	10.48	10.67	0.19
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
1/31/2013	12	12.6	0.6	8.95	9.13	0.18	11.03	11.71	0.68

All measurements are presented in feet

# FIGURES

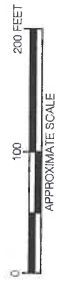
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**LEGEND**

- 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)



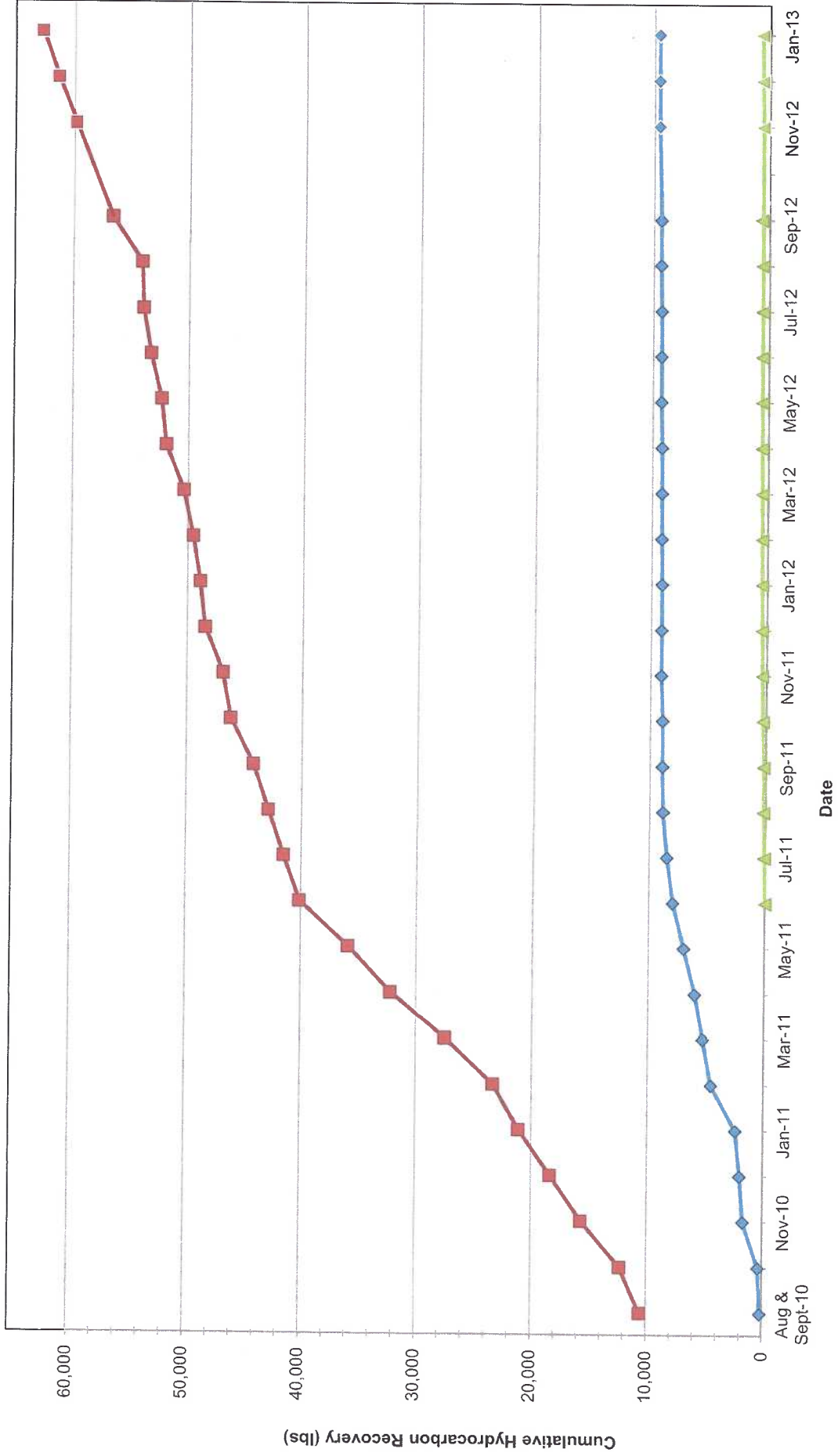
Project  
Sparrows Point, LLC  
Baltimore, Maryland

**AS-BUILT LAYOUT PLAN  
CELL 1 FORMER BENZOL  
PROCESSING AREA**

Project Number: E-2439.01  
File Number: E2439-2013-01-02

Date:	February 27, 2013	Figure:	2
REPS:	MZ	BB	SS
		Driller:	





**CUMULATIVE SUMMARY OF ESTIMATED HYDROCARBON RECOVERY**  
 Sparrows Point, LLC

Baltimore, Maryland

Project Number	E-2439.01
Project Manager	BB
File	E2439-2013-01-03

Figure **3**

**Cumulative Summary of Estimated Hydrocarbon Recovery**  
 Former Coke Oven Area Interim Remedial Measures  
 Sparrows Point, LLC

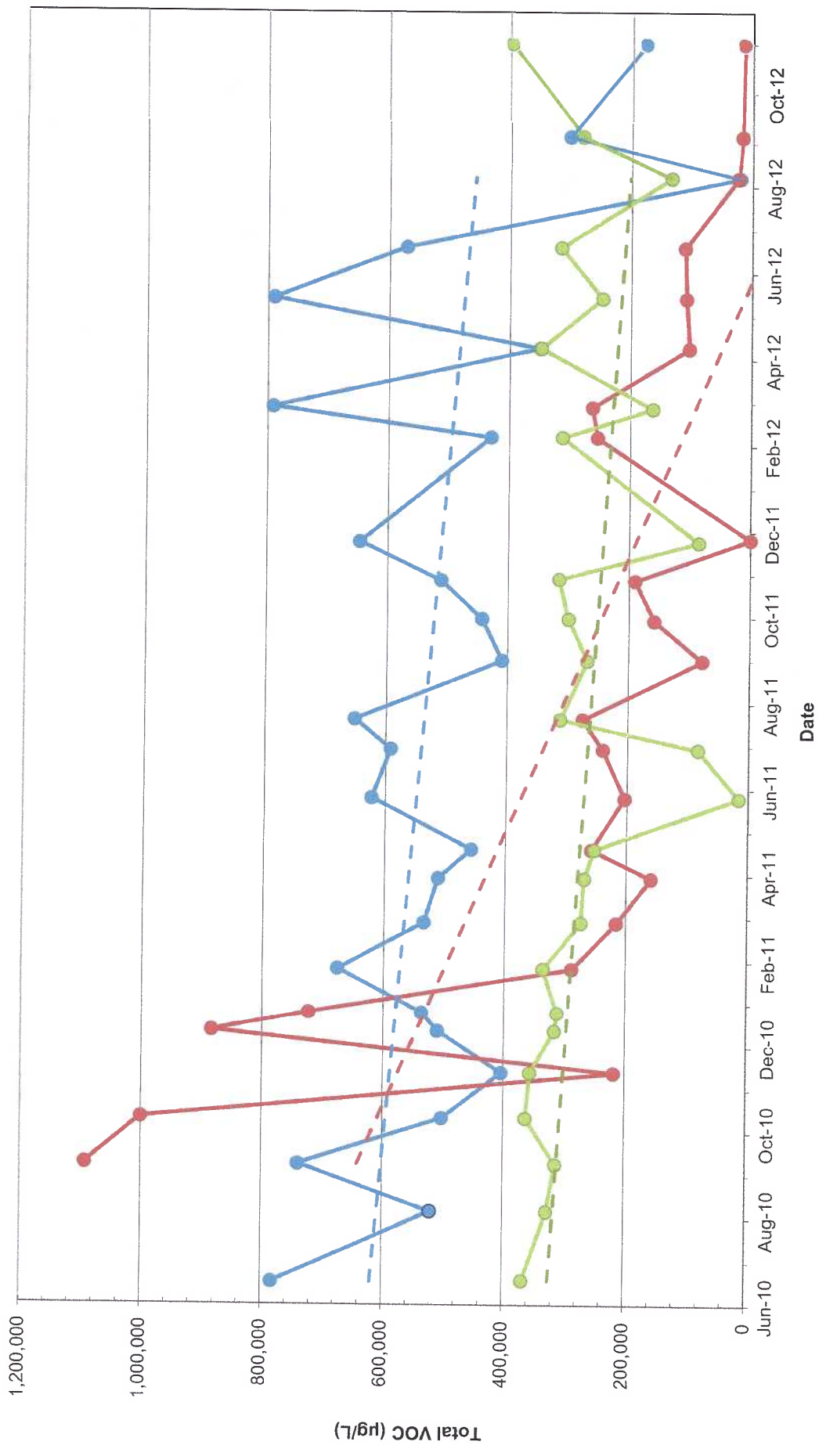
◆ Cell 1   
 ■ Cell 6   
 ▲ Cell 3

February 27, 2013

Date

Drafter

SS

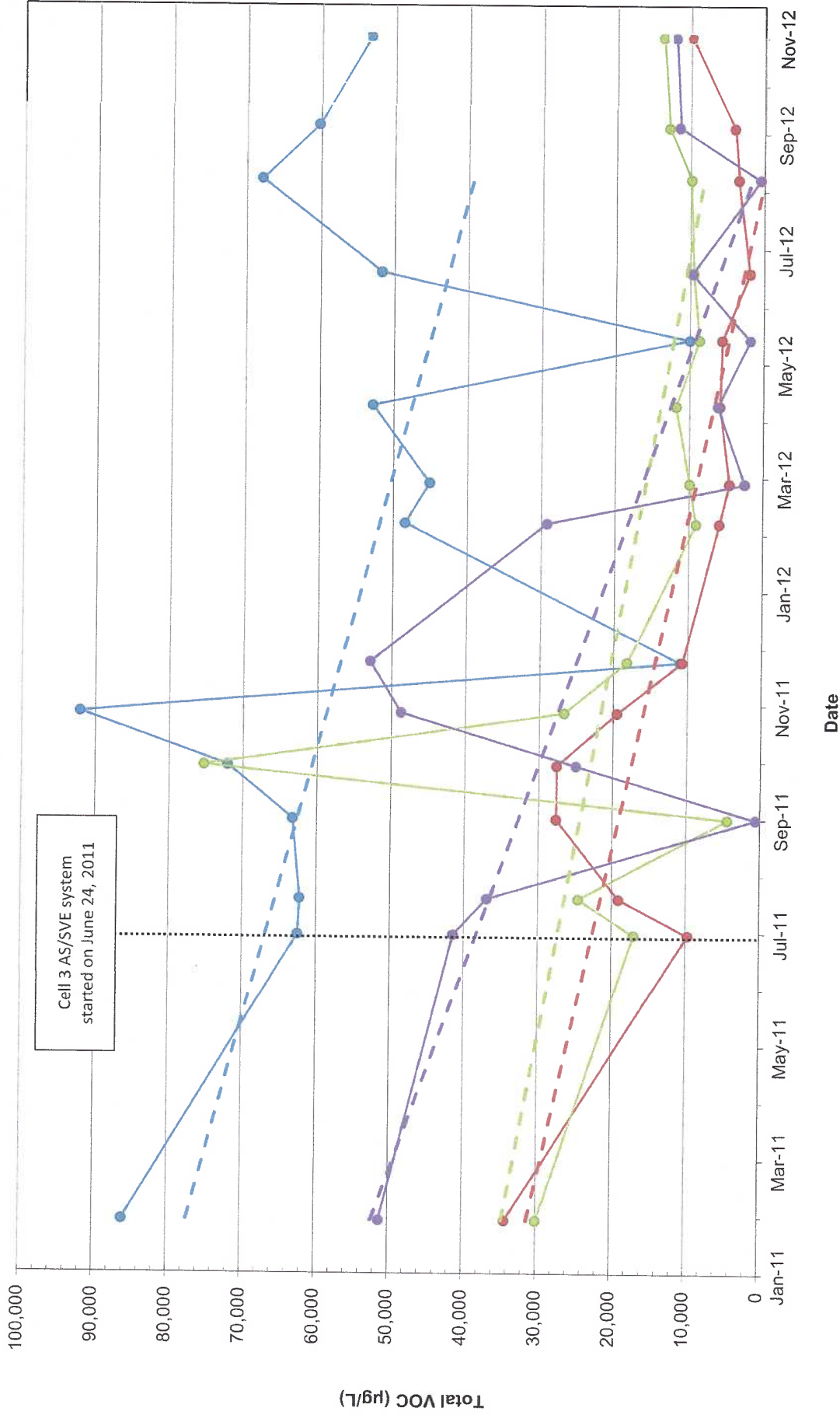


**MEASURED GROUNDWATER VOC CONCENTRATION BY MONTH**  
 Sparrows Point, LLC  
 Baltimore, Maryland  
 Project Number: E-2439.01  
 Project Manager: BB  
 File: E2439-2013-01-04  
 Figure: **4**

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

Legend:  
 CO02-PZM006 (Blue line)  
 CO18-PZM006 (Red line)  
 BP-MW-09 (Green line)

Date: February 27, 2013  
 Drafter: SS



Cell 3 AS/SVE system started on June 24, 2011

<b>MEASURED GROUNDWATER VOC CONCENTRATION BY MONTH</b>	
Sparrows Point, LLC	
Baltimore, Maryland	
PEPG	Project Number
MZ	E-2439.01
Project Manager	File
BB	E2439-2013-01-05
Figure <b>5</b>	

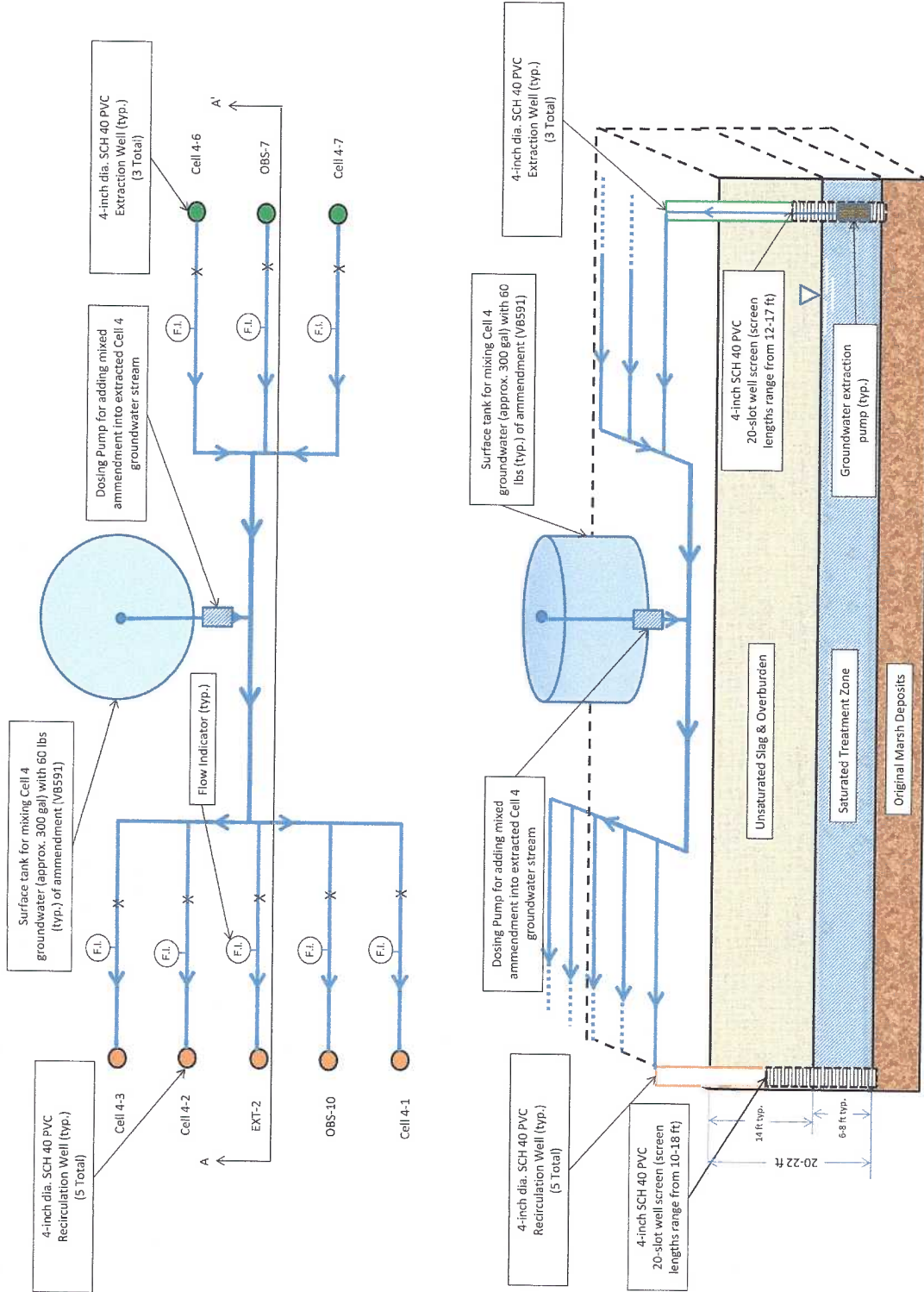
**Measured Groundwater VOC Concentration by Month**  
**Cell 3: Prototype AS/SVE System in the "Cove" Area**  
 Sparrows Point, LLC

—●— CO30-PZM015   
 —●— MW-CELL 3-1   
 —●— MW-CELL 3-2   
 —●— MW-CELL 3-3

**ENVIRONMENTAL**  
ENGINEERING & CONTRACTING, INC.

Date	Drafter
February 27, 2013	SS

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



Project:  
Sparrows Point, LLC  
Baltimore, Maryland

**SCHEMATIC LAYOUT AND SECTIONS**

Project Number	E-2439.01	File Number	E2439-2013-01-06
Date	February 27, 2013	Figure	6
PG/SG	MZ	TPW	BB
		Checker	SS

# Cell 4

## In-Situ Anaerobic Bio-System

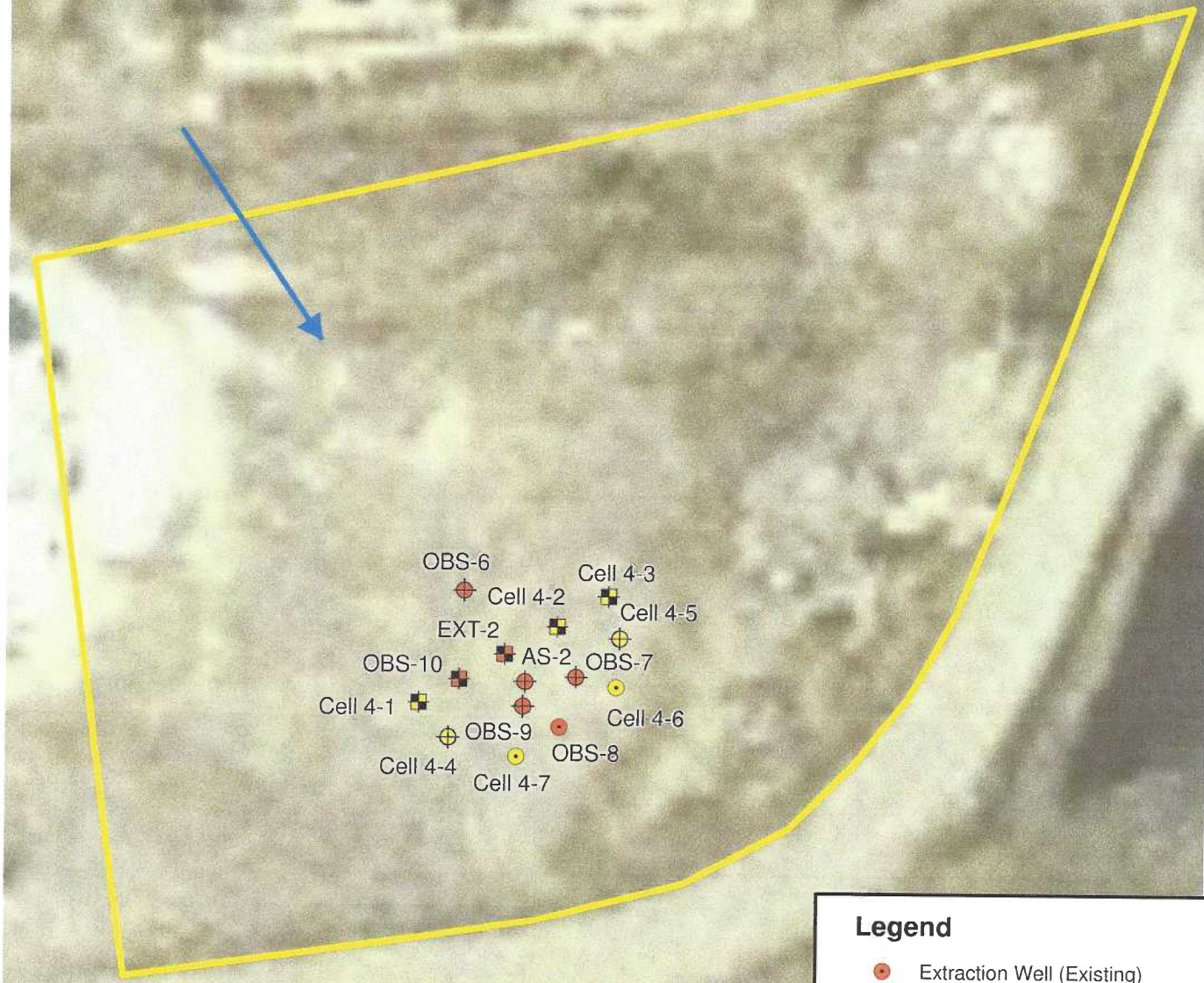


Image source: World Imagery, ESRI, GeoEye, 2009.

**Legend**

- Extraction Well (Existing)
- Extraction Well (New)
- Recirculation Well (Existing)
- Recirculation Well (New)
- ⊕ Monitoring Well (Existing)
- ⊕ Monitoring Well (New)
- ➔ Groundwater Flow Direction

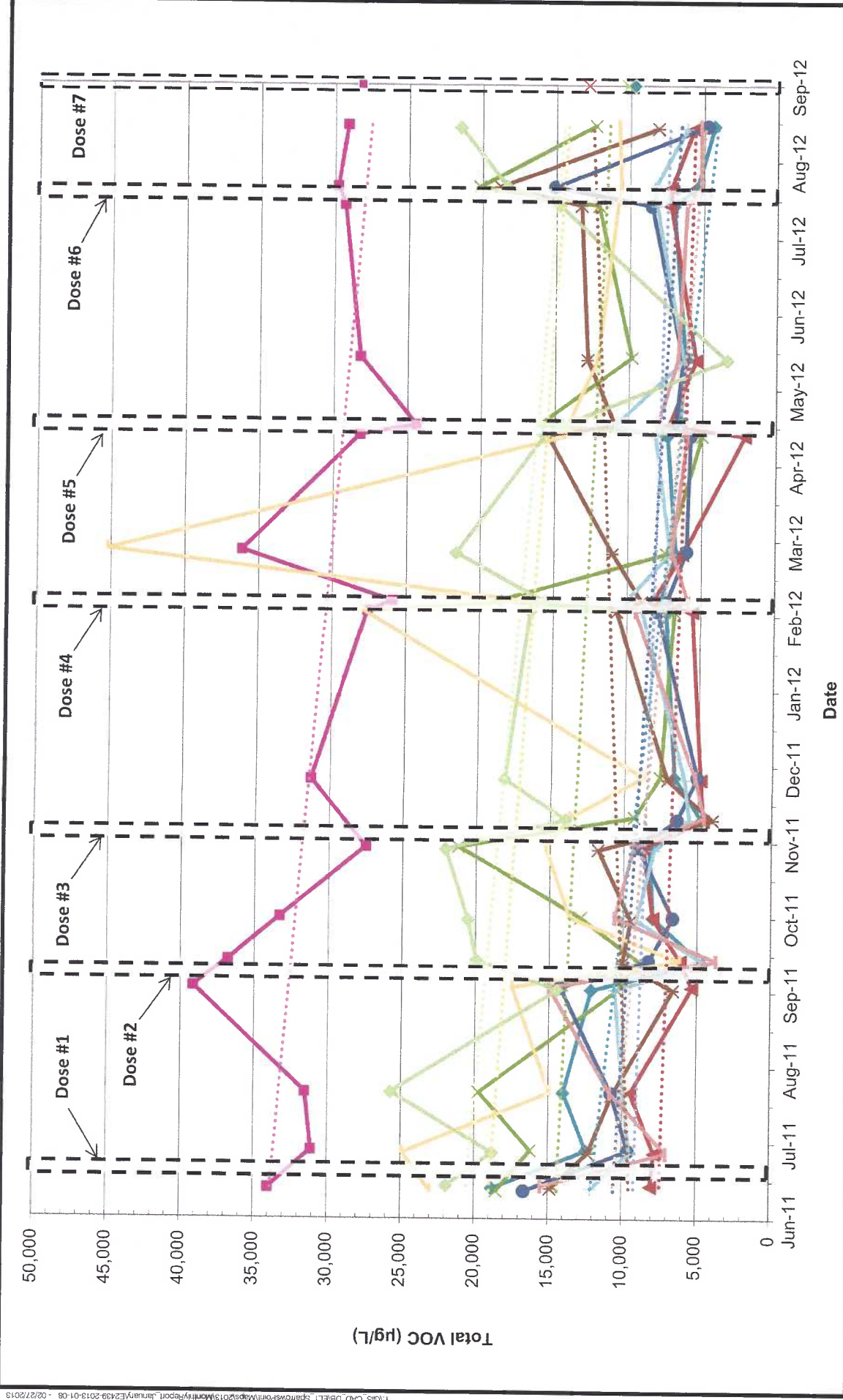


### CELL 4 WELLS

Sparrows Point, LLC  
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 Baltimore, Maryland

Date	Drafter
February 27, 2013	SS

PE/PG	Project Number	<b>7</b>
MZ	E-2439.01	
Project Manager	File	
BB	E2439-2013-01-07	



**MEASURED GROUNDWATER VOC CONCENTRATION BY MONTH**  
 Sparrows Point, LLC  
 Baltimore, Maryland  
 Project Number: E-2439.01  
 Project Manager: BB  
 Figure: 8

**Measured Groundwater VOC Concentration by Month**  
 Cell 4: In-Situ Anaerobic Bio-Treatment Area  
 Sparrows Point, LLC

Legend:

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

Date: February 27, 2013  
 Drafter: SS