COKE OVEN AREA INTERIM MEASURES PROGRESS REPORT

(Third Quarter 2014)

Prepared for

Sparrows Point Terminal, LLC
and
Sparrows Point, LLC

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Prepared by

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Introduction

This document presents operational data and monitoring information collected in the 3rd quarter of 2014 for interim measures (IMs) that have been installed to address identified environmental conditions at the Coke Oven Area (COA) Special Study Area at the Sparrows Point LLC site located in Sparrows Point, Maryland. This progress report also summarizes IM performance including data from the second quarter of 2014 and is submitted in accordance with reporting requirements outlined in correspondence received from US EPA on March 26, 2013. The following designations are applied in this document to the operating IM "Cells" (**Figure 1**) at the COA:

- Cell 1: Air Sparge/Soil Vapor Extraction (AS/SVE) System in the Former Benzol Processing Area,
- Cell 2: Air Sparge/Soil Vapor Extraction (AS/SVE) System in the shallow groundwater zone, groundwater pump and treat (GW P&T) system in the intermediate zone, Former Coal Basin Area,
- Cell 3: AS/SVE System in "Cove" Area,
- Cell 4/5: Dual Phase Extraction (DPE) system for the shallow zone, "Turning Basin" side of former Coke Oven Area,
- Cell 6: Light Non-Aqueous Phase Liquid (LNAPL) Recovery at the Former Benzol Processing Area.

As of the end of the third quarter 2014, Cells 1, 3, and 6 continue to be operational. Groundwater and soil gas sampling were conducted during the third quarter of 2014 to assess current conditions and removal efficiencies of the operating IM systems. The results of these sampling events, including trending graphs from IM startup, are detailed in this report. LNAPL removal continued at Cell 6 without interruption.

Design, equipment and site installation work has been completed on the IM remediation systems for Cell 2 and Cell 4/5. Final approval for both systems was received from EPA on September 10, 2013. As part of this approval, the bio-treatment process at Cell 4 has been discontinued and a combined Cell4/Cell5 remediation design has been approved. As of September 30, 2014, start-up testing commenced on both remediation systems, with full

operation planned for October, 2014. Additional detail on the design, operation and groundwater monitoring for these systems will be provided in the progress report for the 4th quarter of 2014.

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

Cell 1 consists of an AS/SVE system 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.

3rd Quarter 2014 Operational Performance

Operational performance of Cell 1 during this reporting period is summarized in **Table 1**. In summary, the CATOX unit operated for 576 hours (26.4 %) during this reporting period. The system at Cell 1 continues to operate on a pulsing schedule; where the system is in recovery or on mode for one day and then turned off to let the area rebound for two or three days. This practice was implemented during the first quarter 2013 to improve recovery of hydrocarbons from the subsurface. Operations continue to be 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 0.25 pounds per operating hour (estimated quarterly total of 146.7 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 12,422 pounds of recovered hydrocarbons as shown graphically in **Figure 3**.

Soil gas samples were collected for laboratory analysis to monitor CATOX unit performance. Three (3) untreated soil gas sample were collected in Suma Canisters and submitted to Pace Analytical Services, Inc. in Minneapolis, Minnesota for analysis by US EPA Method TO-15. The average influent soil gas hydrocarbon concentration of the three samples taken throughout the third quarter was 291,377 micrograms per cubic meter (ug/m^3) as summarized in **Table 2**.

Hydrocarbon removal calculations were based on the analytical results and the average daily field-measured influent flow rates. The mass removal calculations assume that the samples collected throughout the third quarter are representative of hydrocarbon concentrations for the entire quarter. 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. The pulsing operational method continues to show improved recovery concentrations in the influent soil gases and will be maintained in the future.

3rd Quarter 2014 Groundwater Monitoring Results

Groundwater samples were collected on September 30, 2014 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 Pace Analytical Services, Inc., located in Greensburg, Pennsylvania for the analyses shown in **Table 3**. These data indicate benzene is the most prevalent volatile organic compound (VOC) constituent. Since system startup in August 2010, a decreasing total VOC concentration trend is documented at the wells monitored for system performance as illustrated in **Figure 4**. 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.

3rd Quarter 2014 Operational Performance

Operational performance of Cell 3 during this reporting period is summarized in **Table 4**. In summary, the CATOX unit operated for 576 hours (26.4%) during the third quarter of 2014. The system at Cell 3 continues to operate on a pulsing schedule; where the system is in recovery or on mode for one day and then turned off to let the area rebound for two or three days. This practice was implemented to improve recovery of hydrocarbons from the subsurface. Operations continue to be 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 0.0463 pounds per operating hour (estimated quarterly total of 26.6 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 1,428.6 pounds of recovered hydrocarbons as shown graphically in **Figure 3**.

Soil gas samples were collected for laboratory analysis to monitor CATOX unit performance. Three (3) untreated soil gas sample were collected in Suma Canisters and submitted to Pace Analytical Services. The average influent soil gas hydrocarbon concentration of the three samples taken throughout the third quarter was 52,930 ug/m^3 as summarized in **Table 5**.

Hydrocarbon removal calculations were based entirely on the analytical results and the average daily field-measured influent flow rates. The mass removal calculations assume that the samples collected throughout the third quarter are representative of hydrocarbon concentrations for the entire third quarter of 2014. 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. Operations at this Cell will continue to be evaluated in the future to improve system recovery rates.

3rd Quarter 2014 Groundwater Monitoring

Groundwater samples were collected on September 29, 2014 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 Pace Analytical for the analyses shown in **Table 6**. These data indicate that benzene is the most prevalent VOC constituent. Since system startup on June 24, 2011, a generally inconclusive VOC concentration trend is documented, as illustrated in **Figure 5**. An outlier result for VOC concentrations at MW-CELL3-3 was identified from the sampling and analysis conducted in the 3rd quarter of 2014. This result and associated 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

The in-situ anaerobic bio-treatment system at Cell 4 has been discontinued as of the end of third quarter 2013. The treatment area at Cell 4 has been incorporated into the design of Cell 5, which will be operational in October, 2014.

3rd Quarter 2014 Groundwater Monitoring Results

Groundwater samples were collected on September 29, 2014. Groundwater samples were collected from the following wells (**Figure 7**):

- AS-2 MW-CELL 4-6

The groundwater sample was submitted to Pace Analytical for the analyses shown in **Table 7**. The data in Table 7 indicate naphthalene is the most prevalent VOC constituent. The analysis for the sample collected for AS-2 indicates a concentration fluctuation for naphthalene that is above the solubility limit and appears not to be representative of dissolved naphthalene groundwater concentrations as shown in **Figure 8A**. This fluctuation may be due to the inadvertent introduction of NAPL in to the sample. Continued sampling within the Cell 4 area will be evaluated in the fourth quarter of 2014 to determine the usefulness of samples from this monitoring well.

Cell 6: LNAPL Extraction at the Former Benzol Processing Area

The Cell 6 LNAPL monitoring and recovery system was monitored weekly during the third quarter of 2014. **Table 8** summarizes; 1) LNAPL occurrence and recovery observed in monitoring wells for this Cell during the reporting period, 2) the start date of extraction from recovery wells and 3) cumulative LNAPL recovered since the beginning of the interim measure. **Figure 9** illustrates the well locations. An estimated 450 gallons (3,298 pounds) of LNAPL were recovered during the third quarter 2014, bringing the total recovered LNAPL to 11,213 gallons (82,156 pounds) as of September 30, 2014. The LNAPL was recovered from the following wells:

Well	LNAPL Recovery (gal/lbs)	
	3rd Qtr 2014	Total thru 3rd Qtr 2014
BP-MW-05	253/1,854	8,725/63,930
RW-04	116/850	1,239/9,079
BP-MW-08	81/594	1,220/8,933
BP-MW-11	0/0	8/57
RW-03	0/0	19/141
RW-01	0/0	1/10
RW-02	0/0	0.8/5.9

LNAPL thicknesses during the reporting period are summarized below (wells are not listed if LNAPL was not present):

- RW-04 (2.27 ft),
- BP-MW-05 (0.85 ft),
- BP-MW-08 (2.03 ft),
- BP-MW-11 (5.05 ft),
- BP-MW-10 (0.53 ft),
- RW-03 (1.00 ft),
- RW-01 (0.21 ft),
- RW-02 (0.13 ft),
- BP-MW-07 (0.13)

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.

As of September 30, 2014, additional skimmer pump systems are being installed in wells BP-MW-10, BP-MW-11 and RW-3. These skimmer pumps are expected to be operational in October, 2014.

TABLES

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

Cell 1 Third Quarter 2014 Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total CATOX Operating Time (April 1 - September 30, 2014)	hours	576
Overall CATOX Operational Time	%	26.4%
Estimated Total Hydrocarbons Destroyed	pounds	146.7
Estimated Hydrocarbon Removal Rate	pounds/hour	0.25

Cell 1 Cumulative Summary of Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total ICE/CATOX Operating Time (August 3, 2010 - September 30, 2014)	hours	21,096
Overall CATOX Operational Time	%	69.0%
Estimated Total Hydrocarbons Destroyed	pounds	12,422
Estimated Hydrocarbon Removal Rate	pounds/hour	0.6

Table 2
Summary of Soil Gas Analytical Results (Third Quarter 2014)
Cell 1: Prototype AS/SVE System in Former Benzol Processing Area
Former Coke Oven Area Interim Remedial Measures
Sparrows Point, LLC

Analyte	Sample ID Date Time Dilution Factor Units	CATOX Influent Q3 2014
TO-15 Volatile Organics		
trans-1,3-Dichloropropene	ug/m^3	ND
Acetone	ug/m^3	**8**
Ethylbenzene	ug/m^3	**209**
2-Hexanone	ug/m^3	ND
Methylene Chloride	ug/m^3	ND
Benzene	ug/m^3	**282,205**
1,1,2,2-Tetrachloroethane	ug/m^3	ND
Tetrachloroethene	ug/m^3	**11**
Toluene	ug/m^3	**5,728**
1,1,1-Trichloroethane	ug/m^3	ND
1,1,2-Trichloroethane	ug/m^3	ND
Trichloroethene	ug/m^3	ND
Vinyl Chloride	ug/m^3	ND
o-Xylene	ug/m^3	**846**
m-Xylene & p-Xylene	ug/m^3	**2,365**
2-Butanone (MEK)	ug/m^3	**4**
4-Methyl-2-pentanone (MIBK)	ug/m^3	ND
Bromoform	ug/m^3	ND
Carbon Disulfide	ug/m^3	**1**
Carbon tetrachloride	ug/m^3	ND
Chlorobenzene	ug/m^3	ND
Chloroethane	ug/m^3	ND
Chloroform	ug/m^3	ND
1,1-Dichloroethane	ug/m^3	ND
1,2-Dichloroethane	ug/m^3	ND
1,1-Dichloroethene	ug/m^3	ND
trans-1,2-Dichloroethene	ug/m^3	ND
1,2-Dichloropropane	ug/m^3	ND
cis-1,3-Dichloropropene	ug/m^3	ND
Total Volatile Organics	ug/m^3	**291,377**

Notes:

VOC concentrations are averages derived from the 3 monthly influent air samples taken during the quarter (one sample taken each month of the quarter)

BOLD = Analyte detected

ug/m^3 = micro grams per cubic meter

ND = Analyte not detected above laboratory reporting limit

Table 3
Summary of Groundwater Analytical Results (Third Quarter 2014)
Cell 1: Prototype AS/SVE System in Former Benzol Processing Area
Former Coke Oven Area Interim Remedial Measures
Sparrows Point, LLC

	Sample ID	CO02-PZM006	CO18-PZM006	BP-MW-09
	Date	9/30/2014	9/30/2014	9/30/2014
Analyte	Units			
Volatile Organics				
Vinyl Chloride	µg/L	ND	ND	ND
Chloroethane	µg/L	ND	ND	ND
1,1-Dichloroethene	µg/L	ND	ND	ND
Acetone	µg/L	ND	ND	ND
Carbon Disulfide	µg/L	ND	**5.1**	ND
Methylene Chloride	µg/L	ND	**5.5**	ND
trans-1,2-Dichloroethene	µg/L	ND	ND	ND
1,1-Dichloroethane	µg/L	ND	ND	ND
2-Butanone (MEK)	µg/L	ND	ND	ND
Chloroform	µg/L	ND	ND	ND
1,1,1-Trichloroethane	µg/L	ND	ND	ND
Carbon Tetrachloride	µg/L	ND	ND	ND
Benzene	µg/L	**53,400**	**196,000**	**1,190**
1,2-Dichloroethane	µg/L	ND	ND	ND
Trichloroethene	µg/L	ND	ND	ND
1,2-Dichloropropane	µg/L	ND	ND	ND
Methyl Isobutyl Ketone (MIBK)	µg/L	ND	ND	ND
cis-1,3-Dichloropropene	µg/L	ND	ND	ND
Toluene	µg/L	**3,850**	**1,140**	**43**
trans-1,3-Dichloropropene	µg/L	ND	ND	ND
1,1,2-Trichloroethane	µg/L	ND	ND	ND
2-Hexanone (MBK)	µg/L	ND	ND	ND
Tetrachloroethene	µg/L	ND	ND	ND
Chlorobenzene	µg/L	ND	ND	ND
1,1,1,2-Tetrachloroethane	µg/L	ND	ND	ND
Ethylbenzene	µg/L	**72**	**53**	ND
Styrene	µg/L	ND	ND	ND
Bromoform	µg/L	ND	ND	ND
1,1,2,2-Tetrachloroethane	µg/L	ND	ND	ND
1,3,5-Trimethylbenzene	µg/L	ND	ND	ND
1,2,4-Trimethylbenzene	µg/L	ND	ND	ND
Total Xylenes	µg/L	**1,360**	**2,170**	**18**
Total Volatile Organics	µg/L	**58,682**	**199,374**	**1,252**

Notes:

Bold = Analyte Detected

ND = Analyte not detected above laboratory reporting limit

µg/L = Micrograms per liter

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

Cell 3 Third Quarter 2014 Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total CATOX Operating Time (April 1 - September 30, 2014)	hours	576
Overall CATOX Operational Time	%	26.4%
Estimated Total Hydrocarbons Destroyed	pounds	26.6
Estimated Hydrocarbon Removal Rate	pounds/hour	0.0463

Cell 3 Cumulative Summary of Estimated Hydrocarbon Recovery

Parameter	Units	Quantity
Total ICE/CATOX Operating Time (August 3, 2010 - September 30, 2014)	hours	15,527
Overall CATOX Operational Time	%	66.5%
Estimated Total Hydrocarbons Destroyed	pounds	1,428.6
Estimated Hydrocarbon Removal Rate	pounds/hour	0.09

Table 5
Summary of Soil Gas Analytical Results (Third Quarter 2014)
Cell 3: AS/SVE System in the "Cove" Area
Former Coke Oven Area Interim Remedial Measures
Sparrows Point, LLC

Analyte	Sample ID Date Time Dilution Factor Units	CATOX Influent Q3 2014
TO-15 Volatile Organics		
trans-1,3-Dichloropropene	ug/m^3	ND
Acetone	ug/m^3	**39**
Ethylbenzene	ug/m^3	**4**
2-Hexanone	ug/m^3	ND
Methylene Chloride	ug/m^3	ND
Benzene	ug/m^3	**49,815**
1,1,2,2-Tetrachloroethane	ug/m^3	ND
Tetrachloroethene	ug/m^3	ND
Toluene	ug/m^3	**2,655**
1,1,1-Trichloroethane	ug/m^3	ND
1,1,2-Trichloroethane	ug/m^3	ND
Trichloroethene	ug/m^3	ND
Vinyl Chloride	ug/m^3	ND
o-Xylene	ug/m^3	**16**
m-Xylene & p-Xylene	ug/m^3	**369**
2-Butanone (MEK)	ug/m^3	**27**
4-Methyl-2-pentanone (MIBK)	ug/m^3	ND
Bromoform	ug/m^3	ND
Carbon Disulfide	ug/m^3	**5**
Carbon tetrachloride	ug/m^3	ND
Chlorobenzene	ug/m^3	ND
Chloroethane	ug/m^3	ND
Chloroform	ug/m^3	ND
1,1-Dichloroethane	ug/m^3	ND
1,2-Dichloroethane	ug/m^3	ND
1,1-Dichloroethene	ug/m^3	ND
trans-1,2-Dichloroethene	ug/m^3	ND
1,2-Dichloropropane	ug/m^3	ND
cis-1,3-Dichloropropene	ug/m^3	ND
Total Volatile Organics	ug/m^3	**52,930**

Notes:

VOC concentrations are averages derived from the 3 monthly influent air samples taken during the quarter (one sample taken each month of the quarter)

BOLD = Analyte detected

ug/m^3 = micro grams per cubic meter

ND = Analyte not detected above laboratory reporting limit

Table 6
Summary of Groundwater Analytical Results (Third Quarter 2014)
Cell 3: Prototype AS/SVE System in the "Cove" Area
Former Coke Oven Area Interim Remedial Measures
Sparrows Point, LLC

	Sample ID	CO30-PZM015	MW-CELL 3-1	MW-CELL 3-2	MW-CELL 3-3
	Date	9/29/2014	9/29/2014	9/29/2014	9/29/2014
Analyte	Units				
Volatile Organics					
Vinyl Chloride	µg/L	ND	ND	ND	ND
Chloroethane	µg/L	ND	ND	ND	ND
1,1-Dichloroethene	µg/L	ND	ND	ND	ND
Acetone	µg/L	ND	ND	ND	ND
Carbon Disulfide	µg/L	ND	ND	ND	ND
Methylene Chloride	µg/L	ND	ND	ND	ND
trans-1,2-Dichloroethene	µg/L	ND	ND	ND	ND
1,1-Dichloroethane	µg/L	ND	ND	ND	ND
2-Butanone (MEK)	µg/L	ND	ND	ND	ND
Chloroform	µg/L	ND	ND	ND	ND
1,1,1-Trichloroethane	µg/L	ND	ND	ND	ND
Carbon Tetrachloride	µg/L	ND	ND	ND	ND
Benzene	µg/L	**83,400**	**18,000**	**22,200**	**237,000**
1,2-Dichloroethane	µg/L	ND	ND	ND	ND
Trichloroethene	µg/L	ND	ND	ND	ND
1,2-Dichloropropane	µg/L	ND	ND	ND	ND
Methyl Isobutyl Ketone (MIBK)	µg/L	ND	ND	ND	ND
cis-1,3-Dichloropropene	µg/L	ND	ND	ND	ND
Toluene	µg/L	**5,260**	**1,100**	**1,280**	**22,000**
trans-1,3-Dichloropropene	µg/L	ND	ND	ND	ND
trans-1,4-Dichloro-2-butene	µg/L	ND	ND	ND	ND
1,1,2-Trichloroethane	µg/L	ND	ND	ND	ND
2-Hexanone (MBK)	µg/L	ND	ND	ND	ND
Tetrachloroethene	µg/L	ND	ND	ND	ND
Chlorobenzene	µg/L	ND	ND	ND	ND
1,1,1,2-Tetrachloroethane	µg/L	ND	ND	ND	ND
Ethylbenzene	µg/L	**94.4**	**17.1**	**20.1**	**531**
Styrene	µg/L	**23.8**	**6.8**	**7.5**	**71**
Bromoform	µg/L	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	µg/L	ND	ND	ND	ND
1,3,5-Trimethylbenzene	µg/L	ND	ND	ND	ND
1,2,4-Trimethylbenzene	µg/L	ND	ND	ND	ND
Total Xylenes	µg/L	**1,530**	**228**	**254**	**4,660**
Total Volatile Organics	µg/L	**90,308**	**19,352**	**23,762**	**264,262**

Notes:

Bold = Analyte Detected

ND = Analyte not detected above laboratory reporting limit

µg/L = Micrograms per liter

Table 7
Summary of Groundwater Analytical Results (Third Quarter 2014)
Cell 4: In-Situ Anaerobic Bio-Treatment Area
Former Coke Oven Area Interim Remedial Measures
Sparrows Point, LLC

	Sample ID	4-1	4-5	4-7	AS-2	EXT-2	OBS-6
	Date				9/29/2014		
	Time						
Analyte	Units						
Volatile Organics							
Vinyl Chloride	µg/L	NS	NS	NS	ND	NS	NS
Chloroethane	µg/L	NS	NS	NS	ND	NS	NS
1,1-Dichloroethene	µg/L	NS	NS	NS	ND	NS	NS
Acetone	µg/L	NS	NS	NS	ND	NS	NS
Carbon Disulfide	µg/L	NS	NS	NS	ND	NS	NS
Methylene Chloride	µg/L	NS	NS	NS	ND	NS	NS
trans-1,2-Dichloroethene	µg/L	NS	NS	NS	ND	NS	NS
1,1-Dichloroethane	µg/L	NS	NS	NS	ND	NS	NS
2-Butanone (MEK)	µg/L	NS	NS	NS	ND	NS	NS
Chloroform	µg/L	NS	NS	NS	ND	NS	NS
1,1,1-Trichloroethane	µg/L	NS	NS	NS	ND	NS	NS
Carbon Tetrachloride	µg/L	NS	NS	NS	ND	NS	NS
Benzene	µg/L	NS	NS	NS	**12,300**	NS	NS
1,2-Dichloroethane	µg/L	NS	NS	NS	ND	NS	NS
Trichloroethene	µg/L	NS	NS	NS	ND	NS	NS
1,2-Dichloropropane	µg/L	NS	NS	NS	ND	NS	NS
Methyl Isobutyl Ketone (MIBK)	µg/L	NS	NS	NS	ND	NS	NS
cis-1,3-Dichloropropene	µg/L	NS	NS	NS	ND	NS	NS
Toluene	µg/L	NS	NS	NS	**3,630**	NS	NS
trans-1,3-Dichloropropene	µg/L	NS	NS	NS	ND	NS	NS
1,1,2-Trichloroethane	µg/L	NS	NS	NS	ND	NS	NS
2-Hexanone (MBK)	µg/L	NS	NS	NS	ND	NS	NS
Tetrachloroethene	µg/L	NS	NS	NS	ND	NS	NS
Chlorobenzene	µg/L	NS	NS	NS	ND	NS	NS
1,1,1,2-Tetrachloroethane	µg/L	NS	NS	NS	ND	NS	NS
Ethylbenzene	µg/L	NS	NS	NS	**65.8**	NS	NS
Styrene	µg/L	NS	NS	NS	**1,040**	NS	NS
Bromoform	µg/L	NS	NS	NS	ND	NS	NS
1,1,2,2-Tetrachloroethane	µg/L	NS	NS	NS	ND	NS	NS
1,3,5-Trimethylbenzene	µg/L	NS	NS	NS	ND	NS	NS
1,2,4-Trimethylbenzene	µg/L	NS	NS	NS	ND	NS	NS
Xylenes, Total	µg/L	NS	NS	NS	**2,280**	NS	NS
Semi-Volatiles							
Naphthalene	µg/L	NS	NS	NS	**145,000**	NS	NS
Total Volatile Organics	µg/L	**0**	**0**	**0**	**164,316**	**0**	**0**

Notes:

Bold = Analyte Detected

ND = Analyte not detected above laboratory reporting limit

µg/L = Micrograms per liter

NS = Not Sampled

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

Well	LNAPL Occurrence During Third Quarter 2014 (ft)	Total LNAPL Recovery Period		Cumulative Total LNAPL Recovered		Estimate LNAPL Recovered During Third Quarter 2014	
		Begin	End	(gal)	(lbs) (a)	(gal)	(lbs) (a)
RW-04	2.27	23-Jul-10	On-going (b)	1,239	9,079	116	850
BP-MW-05	0.85	28-Jan-10	On-going (b)	8,725	63,930	253	1,854
BP-MW-08	2.03	8-Sep-10	On-going (b)	1,220	8,933	81	594
BP-MW-11	5.05	23-Jul-10	9/8/2010	7.8	57	0	0
RW-02	0.13	28-Jan-11	On-going (c)	0.8	5.9	0	0
RW-03	1	24-Nov-10	On-going (c)	19.3	141	0	0
RW-01	0.21	28-Oct-11	On-going (c)	1.3	10	0	0
BP-MW-10	0.53	na	na	0	0	0	0
BP-MW-07	0.13	na	na	0	0	0	0
BP-MW-06	none	na	na	0	0	0	0
RW-05	none	na	na	0	0	0	0
BP-MW-09	none	na	na	0	0	0	0
CO19-PZM004	none	na	na	0	0	0	0
			Total Recovery:	**11,213**	**82,156**	**450**	**3,298**

Notes:

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

(b) Skimmer

(c) Bailing

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

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

Date	RW-01			RW-02			RW-03		
	Depth to LNAPL	Depth to Water	LNAPL Thickness	Depth to LNAPL	Depth to Water	LNAPL Thickness	Depth to LNAPL	Depth to Water	LNAPL Thickness
9/30/2014	11.47	11.68	0.21	11.62	11.75	0.13	9.6	10.6	1

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
9/30/2014	9.52	11.79	2.27	11.25	12.1	0.85	11.11	11.24	0.13

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
9/30/2014	12.17	14.2	2.03	9.17	9.7	0.53	12.9	17.95	5.05

All measurement are presented in feet

FIGURES

LEGEND

- New Monitoring Well
- 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

N

0 400 800 FEET

APPROXIMATE SCALE

Sparrows Point LLC

Project

Sparrows Point, LLC

Baltimore, Maryland

INTERIM MEASURES TREATMENT AREAS

Project Number	File Number	
Date: April 30, 2013		Figure: 1
PE/PG	PM	Drafter

Y:\gis_cad_dbvet_spamowspoint\Maps\2013\monthlyreport_february\E2439-2013-02-01 04/30/2013

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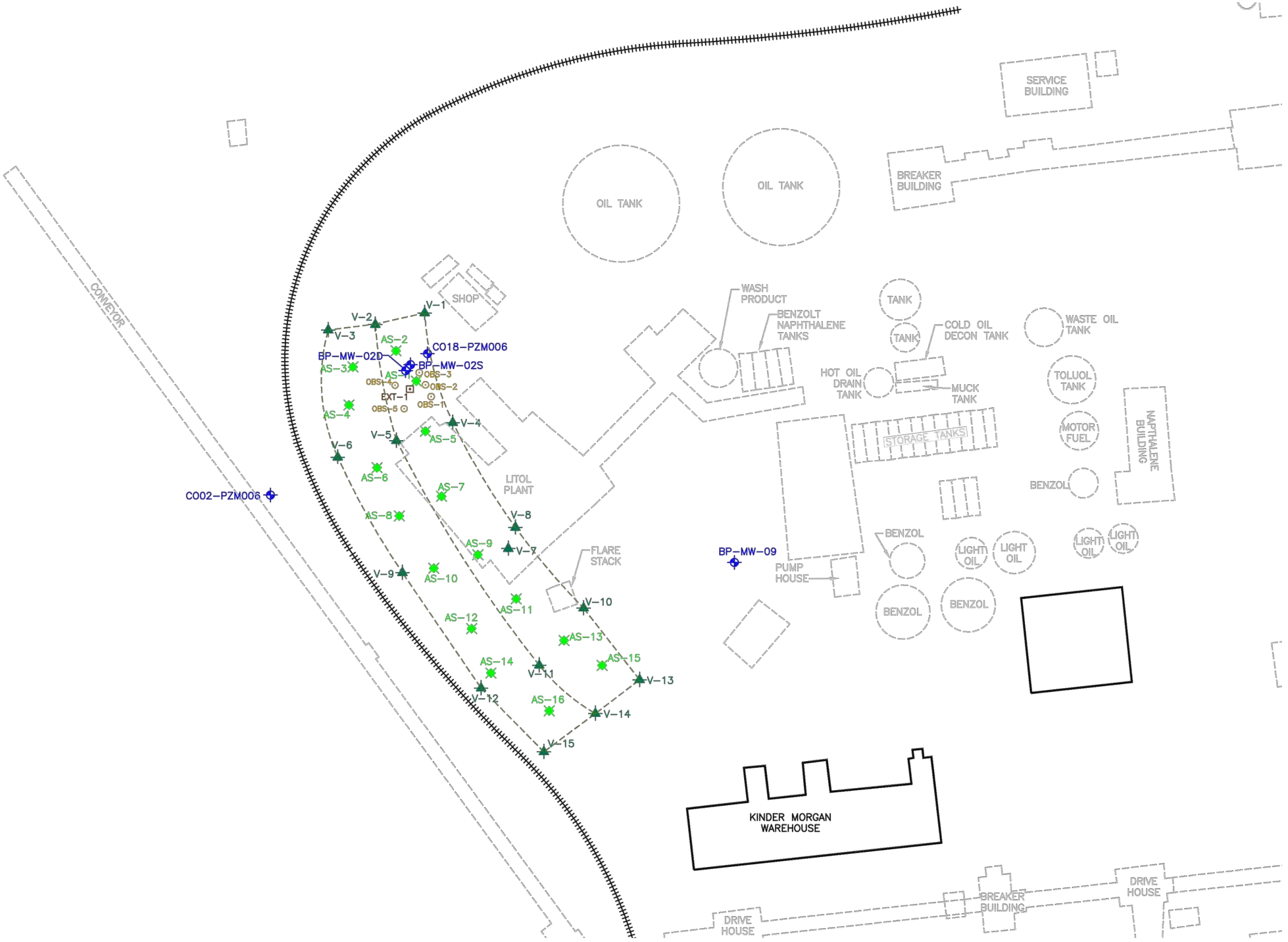


LEGEND

- 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)

N

0 100 200 FEET

APPROXIMATE SCALE

Sparrows Point LLC

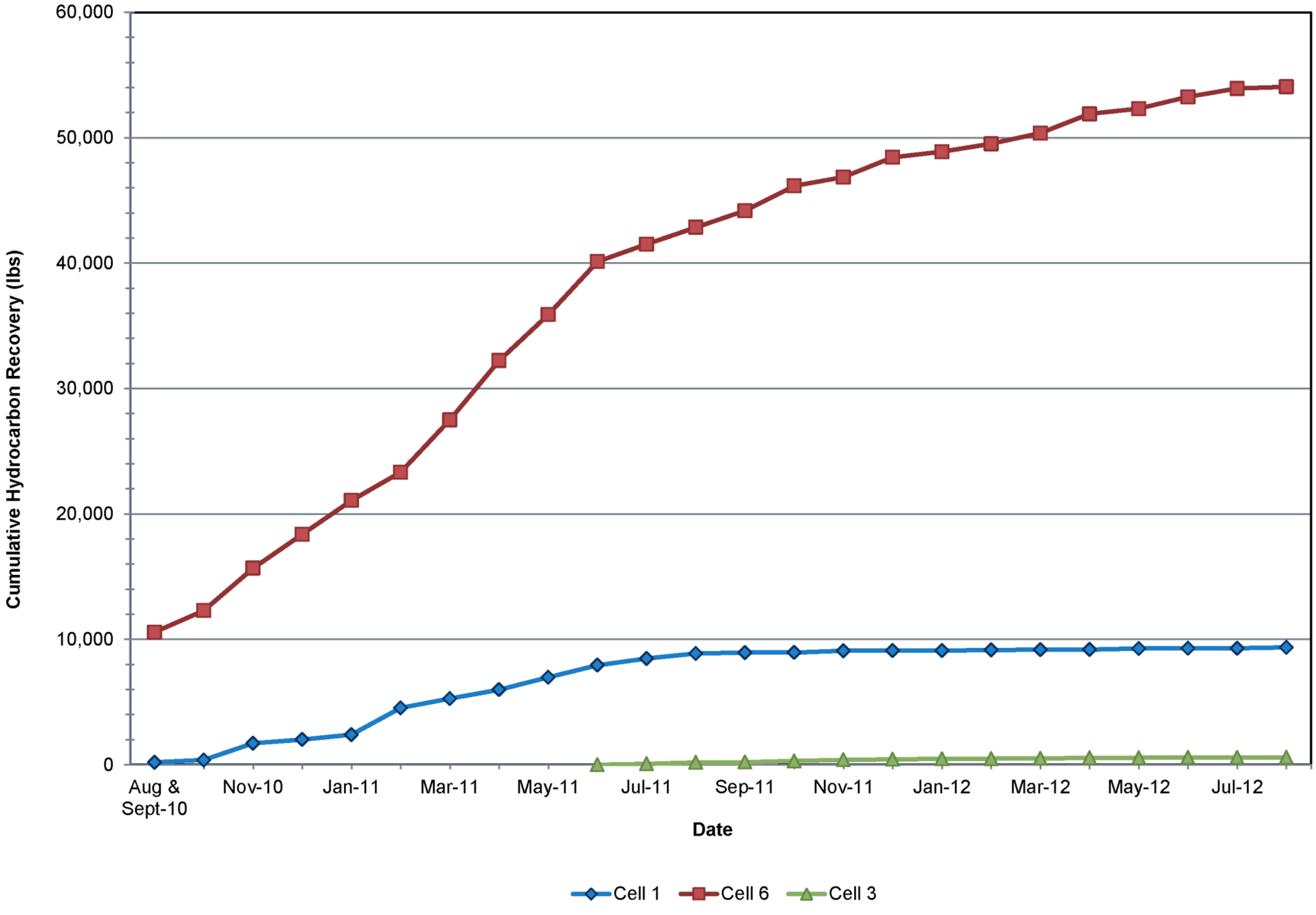
Project

Sparrows Point, LLC

Baltimore, Maryland

AS-BUILT LAYOUT PLAN

Project Number	File Number	Figure
		2
Date: April 30, 2013		
PE/PG	PM	Drafter



Sparrows Point LLC

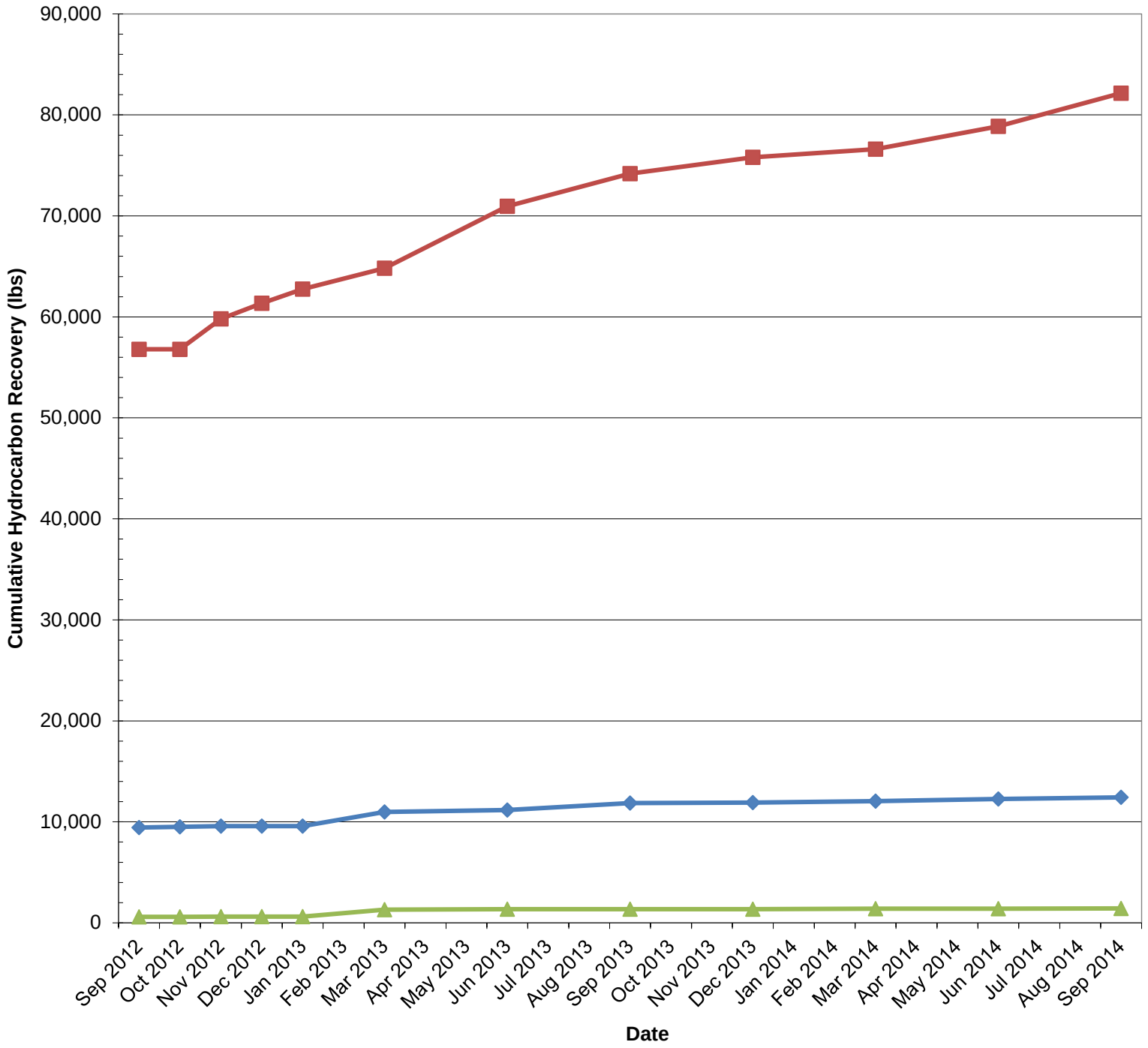
Project
Sparrows Point, LLC
Baltimore, Maryland

CUMULATIVE SUMMARY OF ESTIMATED HYDROCARBON RECOVERY
FORMER COKE OVEN AREA INTERIM REMEDIAL MEASURES
AUGUST 2010 – AUGUST 2012

Project Number	File Number

Date	Figure
April 30, 2013	3

PE/RG	PM	DR



LEGEND

- Cell 1
- Cell 3
- Cell 6

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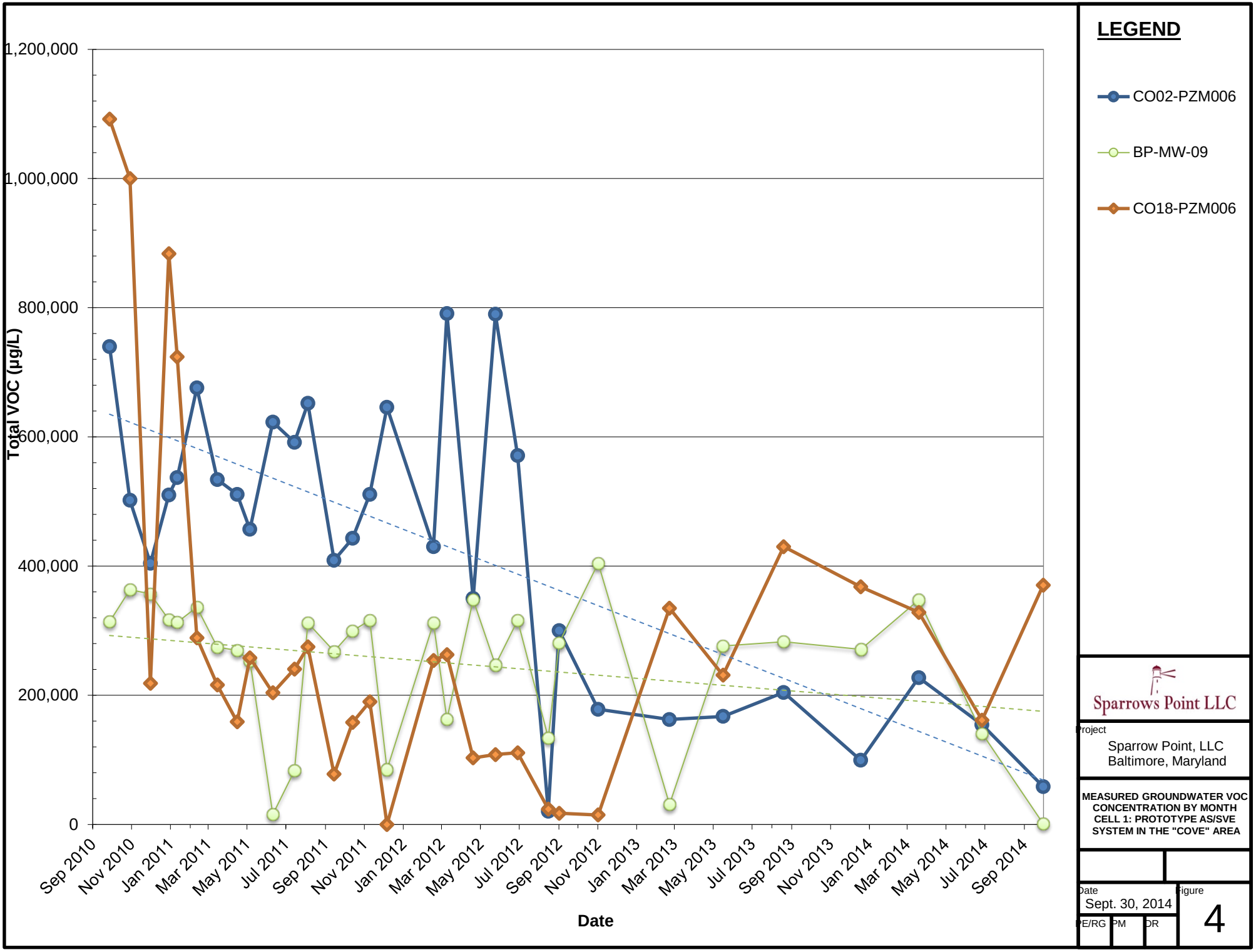
Sparrow Point, LLC
Baltimore, Maryland

CUMULATIVE SUMMARY OF ESTIMATED HYDROCARBON RECOVERY
FORMER COKE OVEN AREA
INTERIM REMEDIAL MEASURES
SEPTEMBER 2012 AND BEYOND

Project Number	File Number

Date	Figure
Sept. 30, 2014	3A

PE/RG	PM	DR



Sparrows Point LLC

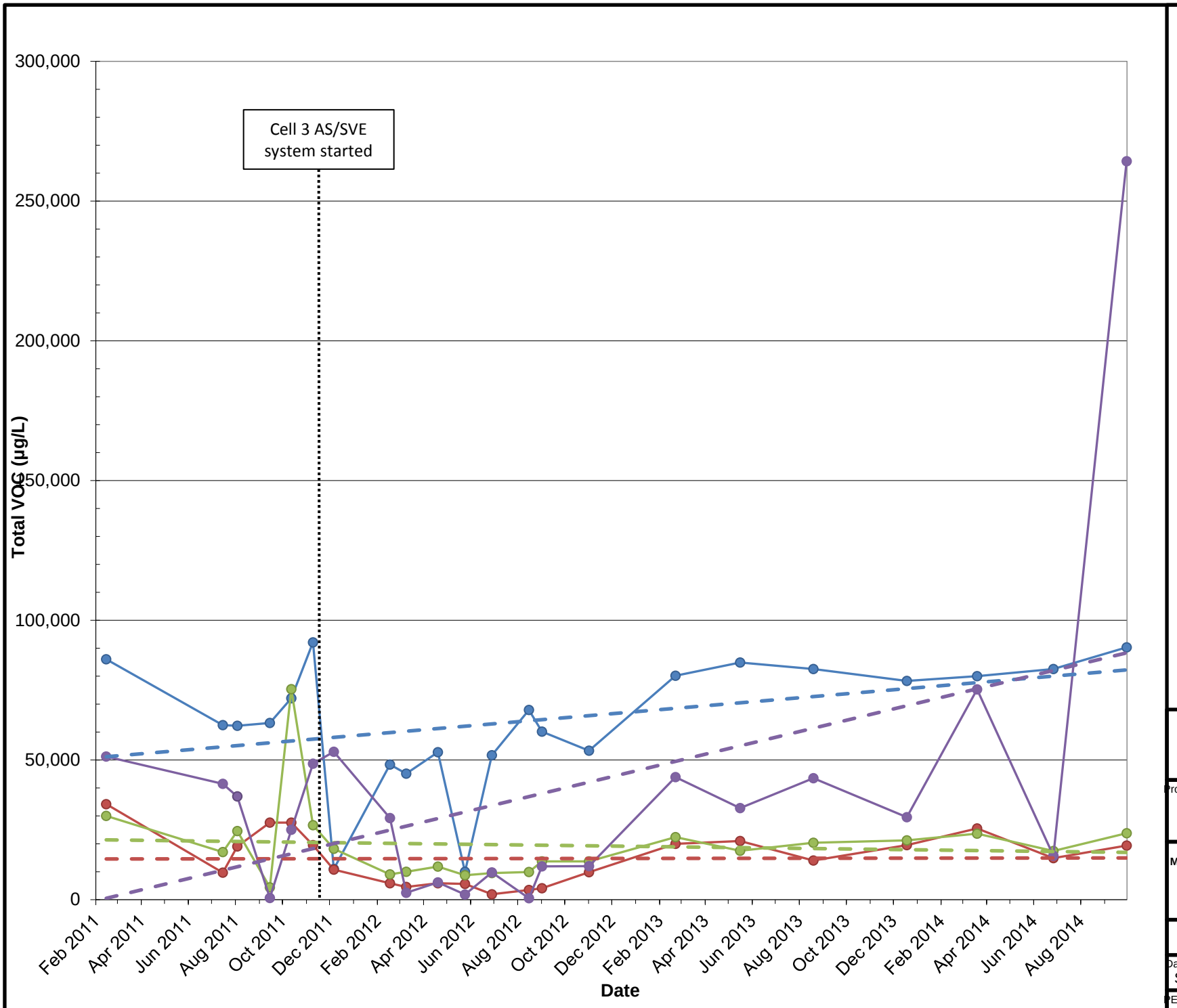
Project
Sparrow Point, LLC
Baltimore, Maryland

MEASURED GROUNDWATER VOC CONCENTRATION BY MONTH CELL 1: PROTOTYPE AS/SVE SYSTEM IN THE "COVE" AREA

Date
Sept. 30, 2014

Figure
4

PE/RG | PM | QR



LEGEND

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

Sparrows Point LLC

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Sparrow Point, LLC
Baltimore, Maryland

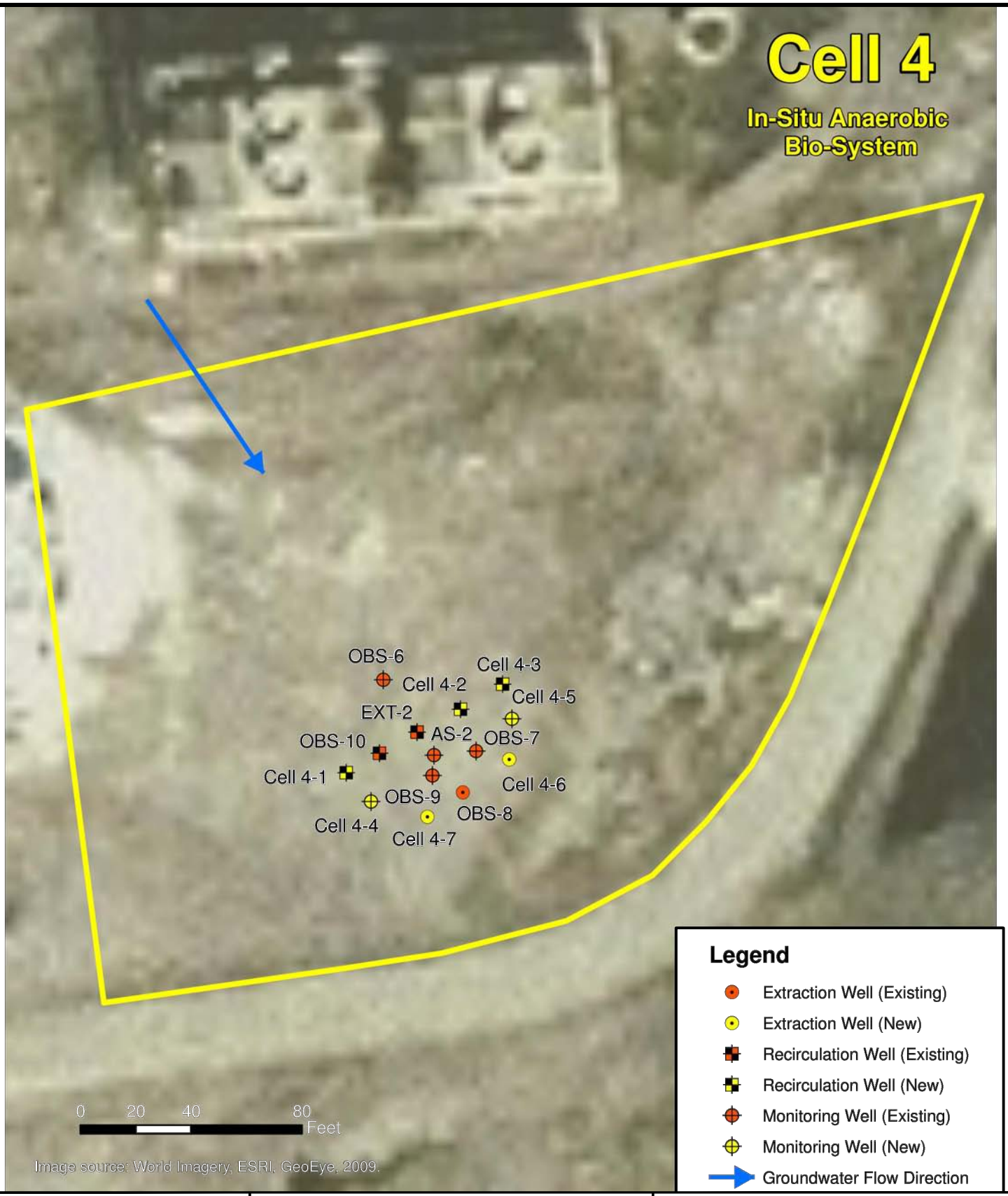
MEASURED GROUNDWATER VOC CONCENTRATION BY MONTH CELL 3: PROTOTYPE AS/SVE SYSTEM IN THE COVE AREA

Date
Sept. 30, 2014

Figure
5

PE/RG | PM | QR

Y:\gis_cad_dblelt_sparrowspoint\Maps\2013\monthlyreport_february\E2439-2013-02-07 - 04/30/2013



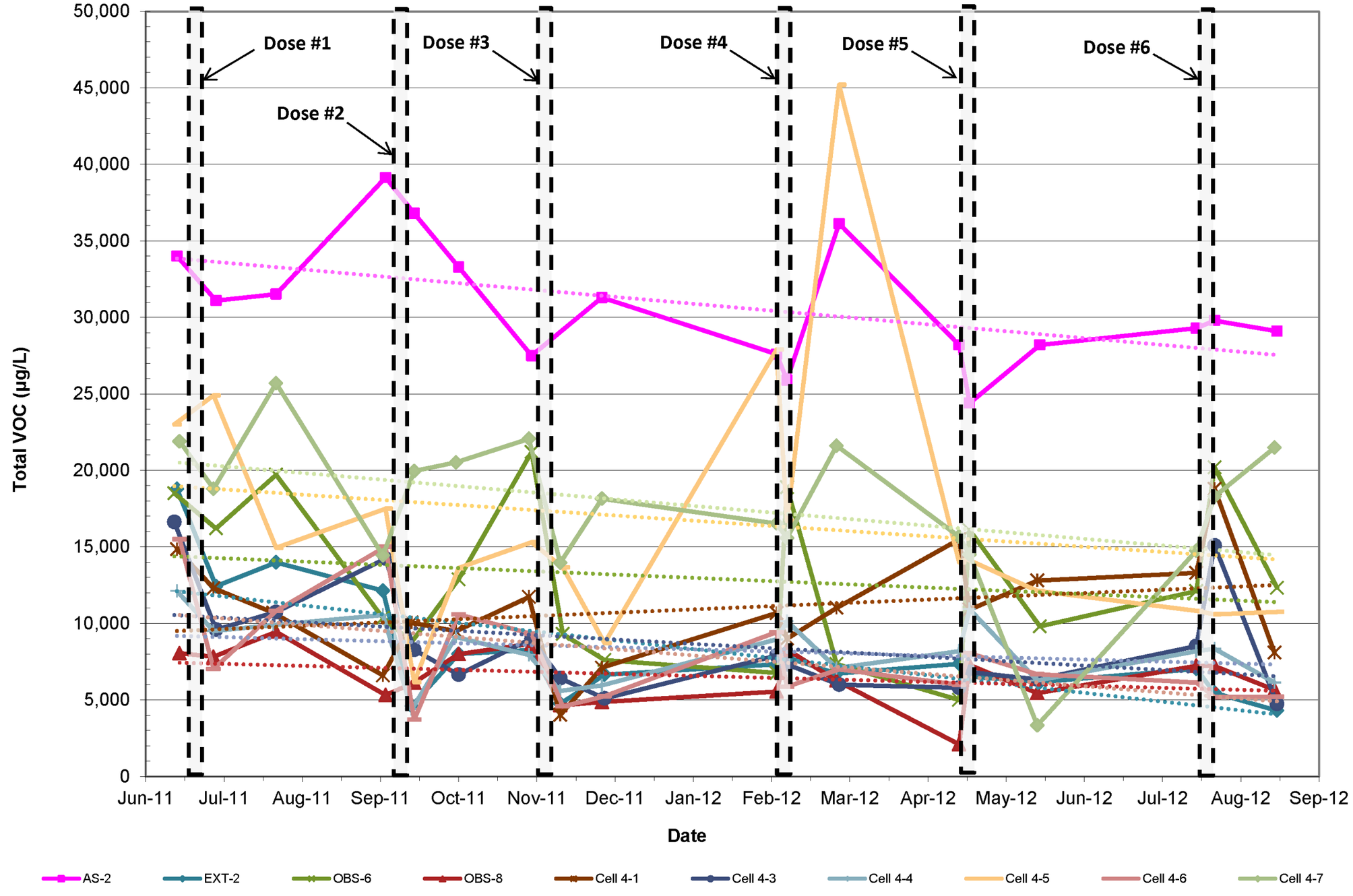
Sparrows Point LLC

CELL 4 WELLS

Sparrows Point, LLC

Baltimore, Maryland

Date	Drafter	PE/PG	Project Number	Figure
April 30, 2013		Project Manager	File	7



Sparrows Point LLC

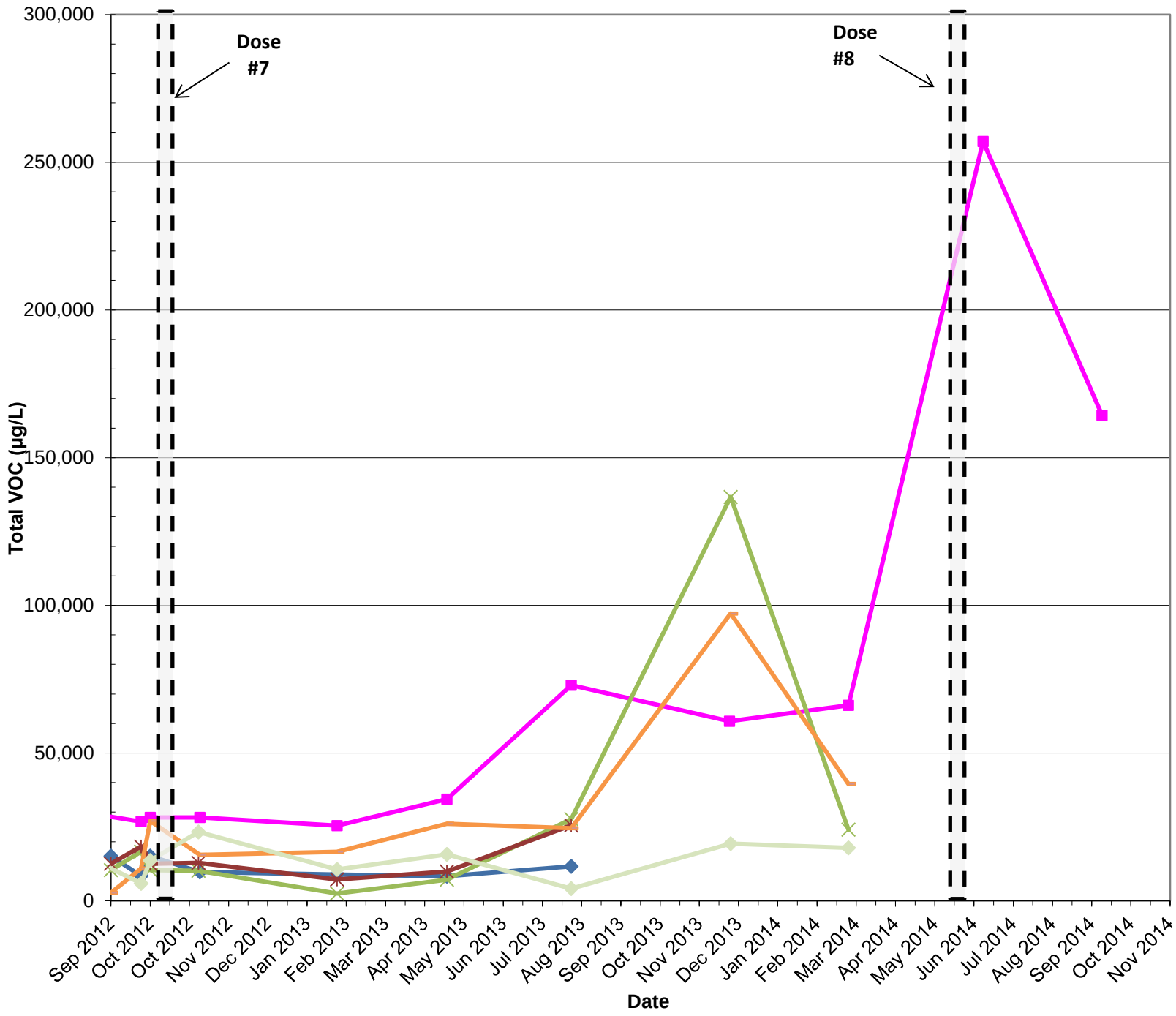
Project
Sparrows Point, LLC
Baltimore, Maryland

MEASURED GROUNDWATER VOC CONCENTRATION BY MONTH
CELL 4: IN-SITU ANAEROBIC BIO-TREATMENT AREA
JUNE 2011 – AUGUST 2012

Project Number	File Number

Date	Figure
April 30, 2013	**8**

PE/RG	PM	DR



LEGEND

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

Sparrows Point LLC

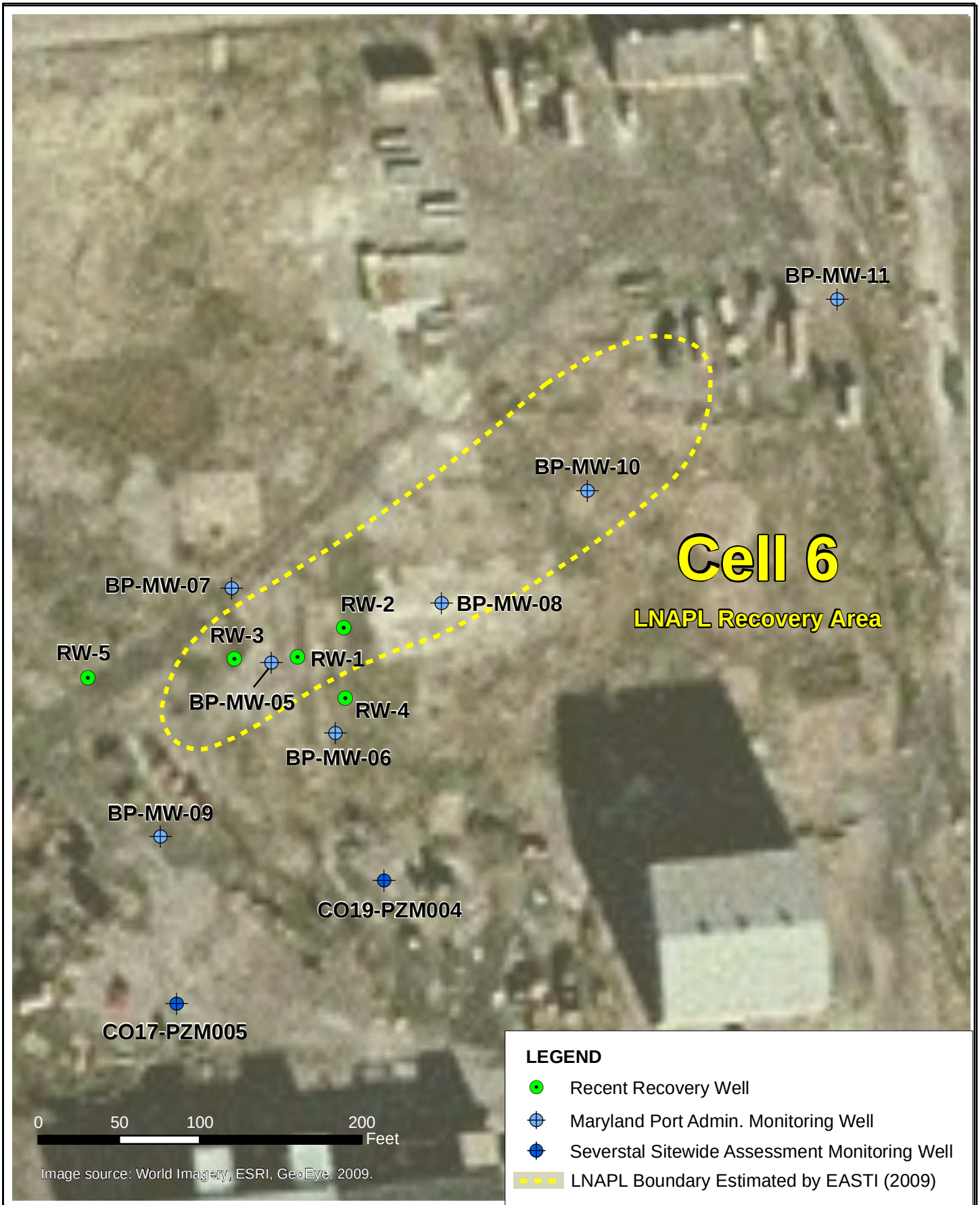
Project
Sparrow Point, LLC
Baltimore, Maryland

MEASURED GROUNDWATER VOC CONCENTRATION BY MONTH CELL 4: IN-SITU ANAEROBIC BIO-TREATMENT AREA SEPTEMBER 2012 AND BEYOND

Date
Sept. 30, 2014

Figure
8A

PE/RG | PM | DR



CLIENT	Sparrows Point
LOCATION	Baltimore, MD

Sparrows Point LLC

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

N

Figure 9

LNAPL Monitoring and Recovery Wells

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