COKE OVEN AREA INTERIM MEASURES PROGRESS REPORT
(THROUGH SEPTEMBER 2010)

Prepared for

Severstal-Sparrows Point, LLC
Sparrows Point, Maryland

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Introduction

In accordance with US EPA's September 2, 2010 letter, this document is the first progress report that summarizes implementation progress for the United States Environmental Protection Agency (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 Severstal Sparrows Point Facility located in Sparrows Point, Maryland. This progress report summarizes IM progress through September 30, 2010.

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 in Coal Tar Area,
- Cell 5: Groundwater Extraction at the Turning Basin Area, and
- Cell 6: LNAPL Recovery at the Former Benzol Processing Area.

As of September 30, 2010, Cell 1 and Cell 6 are operational and Cell 4 is undergoing baseline groundwater chemistry evaluation. All three Cells are addressed in this progress report. Cell 4 groundwater analytical results and initial "Bio-Trap" evaluation are also addressed in this progress report. The other Cells 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

US EPA's March 2, 2010 letter approved the air sparge/soil vapor extraction (AS/SVE) interim measure for Cell 1, as originally proposed by Severstal. This cell consists of a prototype IM, which includes AS/SVE coupled with vapor destruction via an internal combustion engine (ICE). Design of this system includes air sparging groundwater wells and vapor collection trenches as shown schematically on **Figure 2**.

Construction of the prototype Cell 1 AS/SVE system began in May 2010 and was substantially completed by July 23, 2010 when preliminary startup/shakedown of the system was initiated. Several days of initial system testing were completed and the prototype startup/shakedown began on August 2, 2010.

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 DR-17 high-density polyethylene (HDPE) pipe. Fifteen (15) vertical extraction risers are connected to a common suction header,
- Sixteen (16) air sparge wells located between the trenches,
- At-grade, 4-inch DR-17 HDPE sparge and suction headers fitted with control valves for 2-inch DR-17 HDPE sparge and suction laterals,
- One (1) ICE unit for extraction vacuum and vapor destruction, which is equipped with an integral Becker KDT series air compressor for sparge air, and
- Perimeter slag berm for system demarcation and protection from vehicular traffic.

Vapor collection trench installation photographs are shown on **Figure 4**. The ICE unit and overview of completed Cell 1 are shown on **Figure 5**.

Operational performance of Cell 1 during this reporting period is summarized in **Table 1**. In summary, the ICE operated just over half the time during this reporting period. This level of performance is typical during startup/shakedown conditions, which prevailed during essentially the entire period. The ICE catalytic converter has been providing hydrocarbon destruction efficiency greater than 95%.

Soil gas and ICE exhaust gas samples were collected on a monthly basis (at a minimum) to evaluate system performance. Calibrated field instruments (e.g., photoionization detector [PID]) and ICE system-calculated vapor concentrations were also used to evaluate system performance. The untreated soil gas samples were collected in Tedlar® bags and the ICE exhaust samples collected in 6-liter SUMMA canisters. All gas samples were submitted to TestAmerica Laboratories, Inc. Knoxville, Tennessee laboratory for analysis by US EPA Method TO-15. These data are summarized in **Table 2**.

From **Table 2**, influent soil gas hydrocarbon concentrations varied from a low of 343.6 parts per million by volume (ppmv) on August 26 to 9,720 ppmv on September 2, 2010. Hydrocarbon removal rates, based on these data, ranged from approximately 0.2 to 4.5 pounds per hour.

Groundwater samples were collected on a monthly basis; once on July 7 and 8 before system startup and twice after startup on August 25 and September 27, 2010 from the following wells:

- BP-MW-09 (upgradient of Cell 1),
- CO18-PZM006 (within Cell 1 at edge of berm), and
- CO02-PZM006 (downgradient of Cell 1).

The groundwater samples were submitted to Analytical Laboratory Services, Inc. of Middletown, Pennsylvania for the analyses summarized in **Table 3**. The data of **Table 3** indicate benzene is the most prevalent volatile organic compound (VOC) constituent and there appears to be no significant concentration trend in either upgradient well BP-MW-09 or downgradient well CO02-PZM006. An increasing benzene trend over the two-month sampling period in well CO18-PZM006 is apparent from the limited data. Subsequent groundwater sampling data should enable further comparison of water quality trends.

Severstal is continuing to operate the prototype system and is evaluating measures to maximize hydrocarbon concentration in the extracted soil gas in order to maximize hydrocarbon recovery and destruction. These measures include:

- Performing tests to assess trench vapor capture effectiveness,
- Varying sparge air and vapor extraction locations using different configurations than previously tested,
- Varying sparge air volume and pressure at levels different than previously applied.

Cell 4: In-Situ Anaerobic Bio-treatment Area in Coal Tar Area

US EPA's March 2, 2010 letter approved the in-situ bio-treatment concept for Cell 4, as originally proposed by Severstal. In July 2010, baseline groundwater data and a microbial conditions evaluation using Bio-Trap® Samplers (Bio-Traps) were performed as the first steps to developing a preliminary conceptual design.

The groundwater samples were collected on July 9, 2010 from OBS-6, OBS-7 and EXT-2 (**Figure 6**) and submitted to Analytical Laboratory Services, Inc. of Middletown, Pennsylvania for the analyses summarized in **Table 4**. The data of **Table 4** indicate naphthalene is the most prevalent VOC constituent at 2,180, 8,120 and 8,930 micrograms per liter (µg/L) in OBS-7, EXT-2 and OBS-6, respectively.

On July 12, 2010, Bio-Traps were deployed in OBS-6 and OBS-7 to evaluate subsurface conditions to define in-situ bio-treatment conditions and to provide data to support the design of the amendments needed for in-situ bio-treatment. The traps were left in the wells until August 16, 2010 and sent to Microbial Insights Laboratories for analysis located in Rockford, Tennessee.

Via Phospholipids Fatty Acids (PLFAs) analysis and monitoring in-situ transformation of isotopically labeled benzene and naphthalene, the Bio-Traps have enabled answering these questions which, collectively, address the issue of in-situ bio-remediation viability:

1. *Who are the predominant microbes at our Site in this discrete time frame?*
2. *Are on-Site microbes capable of breaking down (degrading) benzene and naphthalene?*
3. *If yes, then which specific microbes are responsible for the degradation?*
4. *What is the metabolic status of these degrading microbes?*

The remaining Cell 4 findings discussion is organized into these subsections: Summary, Site Geochemistry, Naphthalene PLFA Results, and Benzene PLFA Results.

Summary

- OBS-6 is under the influence of iron-reducing conditions; OBS-7 is under the influence of sulfate-reducing conditions,
- Both benzene and naphthalene were degraded in both observation wells,
- Benzene and naphthalene degraders in both observation wells reported significantly enriched levels of 13C in their biomass, confirming the biological breakdown of each contaminant in each observation well,
- Neither benzene nor naphthalene appear to be fully mineralized to carbon dioxide in either observation well,
- The dominant benzene and naphthalene-degrading population in each observation well is composed of Proteobacteria, a group of microbes known for their ability to degrade a wide range of contaminants, survive a wide range of environments, and adjust quickly to changes in their environment,
- None of the target-compound degrading Proteobacteria appear to be experiencing environmental stresses such as an exposure to toxic levels of compounds, and
- In-situ biological degradation of Site constituents of concern appears to be a viable and appropriate approach at this Site.

Site Geochemistry

Observation well OBS-6 is primarily under the influence of iron-reducing conditions. This is based on oxidation-reduction potential (ORP) values as well as groundwater concentrations of ferric iron, ferrous iron, nitrate, and sulfate. The dissolved oxygen (DO) concentration measured during well purging (4.90 mg/L) indicates otherwise, however, such field-measured DO values are commonly relatively unreliable. Thus, the conclusion that this observation well is dominated by iron-reduction is based on the preponderance of the evidence available. Unlike OBS-6, OBS-7 is primarily under the influence of sulfate-reducing conditions. This is based on agreeing ORP values, DO concentrations, and groundwater concentrations of ferric iron, ferrous iron, nitrate, and sulfate.

Nitrate concentrations are significantly depleted in both observation wells, to the degree of being below detection levels. The same is reported for phosphorous. Both observation wells report moderate ferric and ferrous iron concentrations as well as substantial sulfate concentrations.

Typically, there is an expected pattern of plume natural attenuation and contaminant concentrations. Higher contaminants are located within the plume core, and are typically associated with a lower energy-yielding metabolic process than what is found at the plume periphery. The lower contaminant concentrations located away from the plume's center are commonly accompanied with higher energy-yielding metabolic processes. This is why the natural attenuation of a contaminant plume is more active at the plume's periphery and works inward towards the plume core. At Cell 4, substantially higher concentrations of organic constituents occur in OBS-6 compared to OBS-7, however, the higher energy-yielding microbial process (iron-reduction) also occurs in OBS-6. This may be a result of these two wells being relatively close to one another, such that neither benefits from a 'periphery' advantage.

PLFA-SIP (Stable Isotope Probe) Analyses, Benzene:

Prior to inception of these analyses, approximately 1.11 milligrams (mg) of benzene was loaded into each Bio-Sep® bead. After 35 days of in-situ incubation, an average of 0.64 mg/bead remained. Thus, the Bio-Traps experienced an average benzene loss of 43% in both OBS-6 and OBS-7. Both observation wells demonstrated a moderately sized, indigenous microbial community. An average of 7.58 $x10^4$ and 1.05 $x10^5$ cells per bead were reported in OBS-6 and OBS-7, respectively. This population size is common for a site with multiple contaminants present. Of this population, 1.01 $x10^2$ and 2.02 $x10^2$ cells reported 13C-enriched biomass in OBS-6 and OBS-7, respectively. This incorporation of 13C into the indigenous is absolute proof of in-situ degradation, and resulted in an average PLFA del value of 137 and 32 ‰ (OBS-6 and OBS-7, respectively). In comparison, PLFA molecules formed from the metabolism of non-isotopically enriched compounds have an average del between -20 and -30‰. A higher (more positive) PLFA del number translates to greater incorporation of the enriched compound into microbial biomass.

Since both observation wells demonstrated a similar loss of compound and a roughly similar indigenous microbial population, it appears that the population in OBS-6 is incorporating significantly greater amounts of the degraded compound into its biomass than is the population in OBS-7. Neither population appears to be mineralizing the benzene to carbon dioxide. This is reflected in the del 13C for the detected dissolved inorganic carbon (DIC), which ranged from -27 to -24. These values are no different than what would be expected if the microbes had degraded non-enriched benzene.

As expected, the indigenous microbial community responsible for benzene degradation in both observation wells is primarily composed of Proteobacteria (as determined by the percentage of monoenoic PLFAs). This class of microbes is composed of both aerobic and anaerobic bacteria that are reputed for their ability to consume a wide range of complex compounds including aromatic and polyaromatic hydrocarbons. The Proteobacteria in the sampled wells are likely dominated by anaerobic forms. The Proteobacteria are also recognized for their ability to quickly and successfully adjust to new and changing environments. The second most prevalent class of PLFAs in the samples was the normal-saturated (Nsats). These PLFAs, although found in all microbes, signify a low level of microbial community diversity when present in large amounts. Although the Nsat PLFAs ranged below 20% of the total, they were present in moderate amounts (14.4 and 18.8%), reaffirming the remaining PLFA data that suggests that community diversity is somewhat low. This pattern is commonly seen at contaminated sites, and suggests that selective pressures (the presence of the contaminant) have removed a wide range of indigenous microbes, leaving behind those best capable of surviving the impacted environment. The remaining PLFAs were from Eukaryotes (likely fungi) and were present in low amounts (5.5 to 6.3%). Again, this fits with a well-established pattern often observed at contaminated sites.

None of the Bio-Traps reported a colonizing population that demonstrated either slowed growth or decreased cellular permeability. This means that there is no indication that the indigenous Proteobacterial population is feeling the effects of any environmental stresses. When this information is coupled with Site geochemistry, it appears that the two observation wells are inhabited by healthy microbial populations that are actively degrading benzene under iron-reducing and sulfate-reducing conditions.

PLFA-SIP Analyses, Naphthalene:

Prior to inception of these analyses, approximately 0.54 mg of naphthalene was loaded into each Bio-Sep® bead. After 35 days of in-situ incubation, between 0.30 and 0.46 mg/bead remained. Thus, the Bio-Traps in OBS-6 experienced a 15% loss of compound while OBS-7 demonstrated a 44% loss. The reduced degradation in OBS-6 may be a result of the significantly higher naphthalene concentrations in the area of this observation well, as natural contaminant degradation typically occurs from areas of lower concentration inward towards areas of higher concentrations.

The colonizing microbial population within each Bio-Sep® bead reached an average size of 7.41 $x10^4$ and 4.19 $x10^4$ cells per bead. A substantial portion of this population demonstrated incorporation of the 13C isotope into its biomass. Approximately 2.44 $X10^2$ and 7.69 $X10^1$ cells per bead showed 13C enrichment in OBS-6 and OBS-7, respectively. This incorporation of 13C into the indigenous is absolute proof of in-situ degradation, and resulted in an average PLFA del value of 24 and 100‰ (OBS-6 and OBS-7, respectively). In comparison, PLFA molecules formed from the metabolism of non-isotopically enriched compounds have an average del between -20 and -30‰. A higher (more positive) PLFA del number translates to greater incorporation of the enriched compound into microbial biomass.

Both observation wells demonstrated a similar loss of naphthalene and a roughly similar indigenous microbial population size. It appears that the population in OBS-7 is incorporating significantly greater amounts of the degraded compound into its biomass than is the population in OBS-6. Neither population appears to be mineralizing the naphthalene to carbon dioxide. This is reflected in the del 13C for the DIC, which ranged from -19 to -21. These values are no different than what would be expected if the microbes had degraded non-enriched naphthalene.

The indigenous microbial community responsible for naphthalene degradation in both wells is primarily composed of Proteobacteria (57.5 and 67.1%, OBS-7 and OBS-6, respectively). As stated above, this class of microbes is composed of both aerobic and anaerobic bacteria that are reputed for their ability to consume a wide range of complex compounds including aromatic and polyaromatic hydrocarbons. Site Proteobacteria are dominated by anaerobic forms. Proteobacteria are also recognized for their ability to quickly and successfully adjust to new and

changing environments – a positive trait for a remediation site. As with the benzene baited Bio-Traps, the second most prevalent class of PLFA in the naphthalene samples were the Nsats (19 and 23.5%). This suggests that a low level of microbial community diversity is present in the sampled observation wells. This pattern is commonly seen at contaminated sites, and suggests that selective pressures (the presence of the various contaminants) have selected for those microbes best capable of surviving the impacted environment. The remaining PLFAs were from Eukaryotes (likely fungi). Again, this fits with a well-established pattern often observed at contaminated sites. It should be noted that a significantly higher percentage of Eukaryotes were identified from the naphthalene-baited Bio-Traps than those baited with benzene. This is not unexpected – fungi are known for their ability to break large, complex, multi-ringed compounds such as naphthalene, whereas benzene is a simple enough compound for bacteria to be the most common degraders.

None of the naphthalene-baited Bio-Traps reported a colonizing population that demonstrated either slowed growth or decreased cellular permeability. This means that there is no indication that the indigenous Proteobacterial population is feeling the effects of any environmental stresses. Similarly with the benzene-degrading microbial population, it appears that the two observation wells are inhabited by healthy microbial populations that are actively degrading naphthalene under iron-reducing and sulfate-reducing conditions.

Planned Actions – Cell 4

Severstal is moving forward toward designing, installing, and operating the planned in-situ enhanced anaerobic bioremediation system at Cell 4. Planned activities include:

1. Design and install a groundwater re-circulation system to deliver bionutrients to the subsurface.

2. Supplement the depleted nutrients that are necessary to support general microbial activities, including nitrate and phosphorous. Commercially available bionutrients (such as VB591 from BioNutra Tech) are being evaluated.

3. Monitor the progress of target compound degradation and microbial activities by sampling and analyzing groundwater as necessary.

Cell 6: LNAPL Extraction at the Former Benzol Processing Area

This progress report for Cell 6 IM activities addresses the time period from the start-up of Cell 6 IM activities (January 2010) through October 15, 2010. Major activities are summarized below, followed by a discussion of pertinent issues.

- Existing site assessment data (EA, 2009) were reviewed to identify the optimum location to install an automatic oil skimmer,
- Based on this review, in January 2010 an automated oil skimmer and 500-gallon storage tank were installed at BP-MW-05, an existing 2-inch diameter monitoring well using a solar-powered and nitrogen gas-powered, automatic light non-aqueous phase liquid (LNAPL) recovery system,
- Two (2) new 4-inch-diameter recovery wells were installed (RW-1 and RW-2 [**Figure 7**]) in late May 2010 and redeveloped in mid-June 2010,
- In late July, a new oil skimmer and 500-gallon tank were installed at existing wells BP-MW-08 and BP-MW-11,
- In early September three (3) new 4-inch diameter recovery wells (RW-3, RW-4 and RW-5) were installed, the oil skimmer and storage tank at BP-MW-11 were moved to RW-04 due to low production from BP-MW-11), and recovered LNAPL contained in the Cell 6 storage tanks was disposed off-Site by a permitted waste management facility,
- The recovery systems have undergone approximately weekly monitoring and maintenance since January, and
- From January through October 15, a total of 1,668 gallons of LNAPL has been recovered, primarily from well BP-MW-05.

New Recovery Wells, RW-1 and RW-2

RW-1 is located approximately 15 feet northeast of BP-MW-05, the most productive LNAPL well. The RW-1 location was selected to increase the likelihood of encountering additional LNAPL. Surprisingly, significant LNAPL has not entered RW-1. From June through August, only trace LNAPL has been measured. A drill rig was mobilized to the well in mid-June to redevelop RW-1 in an attempt to increase LNAPL in-flow. Development had no obvious immediate effect. Beginning in mid-August, LNAPL increased thickness ranged between 3 and

4 inches. This contrasts with about 3 feet of LNAPL in BP-MW-05 despite continual skimming of LNAPL from BP-MW-05 (the skimming rate is adjusted to maintain LNAPL in the well because its presence increases LNAPL flow into the well). Six inches of LNAPL was observed in RW-1 in October, immediately following several days of very heavy rain. Upon removal of any accumulated LNAPL in RW-1, LNAPL only very slowly re-enters the well over several days.

RW-2 is located approximately 50 feet northeast of BP-MW-05. At the time of drilling RW-2 it was presumed that LNAPL would occur in RW-1 and therefore RW-2 would help define the northeastward LNAPL extent. LNAPL occurrence in RW-2 has been even less than that observed in RW-1. Only trace LNAPL has been observed.

Observations involving recovery wells RW-1 and RW-2 indicate that the abundant LNAPL occurrence at BP-W-05 may be localized.

New Recovery Wells, RW-3, RW-4 and RW-5

These wells were installed in early September, 2010. The rationale for the RW-3 location is the same as discussed for RW-1, expect the area of interest was west of BP-MW-05 (in the inferred groundwater flow direction based on prior site assessments). At the time of drilling RW-3 it was presumed that LNAPL would occur in RW-3 and, therefore, RW-5 would help define the westward LNAPL extent. Also, RW-5 is located close to an underground storm drain, suggesting that the subsurface conditions might be more favorable for LNAPL occurrence (assuming subsurface ground disturbance during storm drain construction). Only trace LNAPL occurrence has been observed in RW-3 and RW-5 (and expression is the observation of about 3 inches of LNAPL observed in RW-3 on October 15.

Observations involving recovery wells RW-3 and RW-5 indicate that the abundant LNAPL occurrence at BP-MW-05 may be localized.

Old facility drawings were considered when selecting the RW-4 location. The drawings show a sump southeast of BP-MW-05, which became the selected location for RW-4. Recoverable LNAPL occurs in RW-4. The overall LNAPL recovery rate from RW-4 has averaged about 3.5 gallons per day (gpd), compared to about 5.6 gpd for the greatest LNAPL producing well (BP-MW-05). It is possible that LNAPL occurrence in RW-4 is unrelated to the mapped sump. No unique subsurface conditions were observed during drilling.

Oil Skimmer Locations

In January, LNAPL occurrence/recovery data (EA, 2009) for BP-MW-05, BP-MW-08, and BP-MW-11 were evaluated for the purpose of positioning the first oil skimmer (**Table 5**). Based on the predicted LNAPL recovery rates, an oil skimmer and 500-gallon storage tank were installed at BP-MW-05 in January. Two (2) additional oil skimmers were subsequently mobilized to the site to service BP-MW-11 and RW-4. The oil skimmer at BP-MW-11 was subsequently moved to BP-MW-08 due to negligible LNAPL production from BP-MW-11.

LNAPL Occurrence and Recovery

Table 6 summarizes LNAPL occurrence and recovery observed during the reporting period. The wells are presented in **Table 6** in the order of decreasing LNAPL occurrence/recovery. The following three (3) wells afford viable LNAPL recovery and, therefore, are fitted with oil skimmers:

- BP-MW-05,
- RW-4, and
- BP-MW-08.

Initially an oil skimmer was at BP-MW-11, however, due to negligible LNAPL production the unit was moved to BP-MW-08 in September. Long-term average LNAPL recovery rates for individual wells have varied from 0.2 to 5.6 gallons per day. The greatest amount of LNAPL has been recovered from BP-MW-05 (1,467 gallons). Total recovered LNAPL for Cell 6 has been is 1,668 gallons.

Depth to Water and Screened Intervals

Across the Site, the depth to the water table typically ranges from about 8 to 11 feet below ground surface (bgs). The new 4-inch diameter recovery wells (RW-1 through RW-5) have ten-foot long screen intervals with screen tops at about 4 to 5 feet bgs. **Attachment A** presents the boring logs and well construction diagrams for RW-1 through RW-5.

Planned Actions – Cell 6

Severstal will continue to operate the existing LNAPL recovery systems and make periodic adjustments to the pumps and other components to maximize product recovery.

References

EA Engineering, Science, and Technology, Inc. (EA), 2009, *Site Assessment for the Proposed Coke Point Dredged Material Containment Facility at Sparrows Point,* prepared for Maryland Port Administration.

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
Severstal Sparrows Point, LLC

Parameter	Units	Quantity
Total ICE Operating Time (August 3 - September 30, 2010)	hours	721
Overall ICE Operational Time	%	51.0
Estimated Total Hydrocarbons Destroyed	pounds	203
Estimated Range of Hydrocarbon Removal Rate	pounds/hour	0.2 - 4.5

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

Analyte	Units	Sample ID: ICE Influent	ICE Exhaust	ICE Influent	ICE Influent	ICE Influent	ICE Influent	ICE Exhaust
		Date: 8/16/2010	8/16/2010	8/26/2010	9/2/2010	9/2/2010	9/16/2010	9/16/2010
		Time: 11:31	11:35	12:00	10:05	13:05	10:30	10:30
		Dilution Factor: 111967.32	9549.88	21086.57	116720.56	534140.55	67339.82	4629.1
TO-15 Volatile Organics								
trans-1,3-Dichloropropene	ppb		< 1,900 U	< 4,200 U	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
Acetone	ppb		< 48,000 U	< 110,000 U	< 580,000 U	< 2, 700,000 U	< 340,000 U	< 23,000 U
Ethylbenzene	ppb		< 1,900 U	**4,600**	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
2-Hexanone	ppb		< 4,800 U	< 11,000 U	< 58,000 U	< 270,000 U	< 34,000 U	< 2,300 U
Methylene Chloride	ppb		< 4,800 U	< 11,000 U	< 58,000 U	< 270,000 U	< 34,000 U	< 2,300 U
Benzene	ppb	**660,000**	**240,000**	**190,000**	**1,000,000**	**7,900,000**	**1,400,000**	**69,000**
1,1,2,2-Tetrachloroethane	ppb		< 1,900 U	< 4,200 U	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
Tetrachloroethene	ppb		< 1,900 U	< 4,200 U	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
Toluene	ppb		**36,000**	**85,000**	**290,000**	**1,400,000**	**260,000**	**7,900**
1,1,1-Trichloroethane	ppb		< 1,900 U	< 4,200 U	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
1,1,2-Trichloroethane	ppb		< 1,900 U	< 4,200 U	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
Trichloroethene	ppb		< 1,900 U	< 4,200 U	< 23,000 U	**160,000**	< 13,000 U	< 930 U
Vinyl Chloride	ppb		< 1,900 U	< 4,200 U	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
o-Xylene	ppb		< 1,900 U	**15,000**	**27,000**	< 110,000 U	**16,000**	< 930 U
m-Xylene & p-Xylene	ppb		**4,700**	**49,000**	**100,000**	**260,000**	**61,000**	**1,600**
2-Butanone(MEK)	ppb		< 9,500 U	< 21,000 U	< 120,000 U	< 530,000 U	< 67,000 U	< 4,600 U
4-Methyl-2-pentanone (MIBK)	ppb		< 4,800 U	< 11,000 U	< 58,000 U	< 270,000 U	< 34,000 U	< 2,300 U
Bromoform	ppb		< 1,900 U	< 4,200 U	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
Carbon Disulfide	ppb		< 4,800 U	< 11,000 U	< 58,000 U	< 270,000 U	< 34,000 U	< 2,300 U
Carbon tetrachloride	ppb		< 1,900 U	< 4,200 U	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
Chlorobenzene	ppb		< 1,900 U	< 4,200 U	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
Chloroethane	ppb		< 1,900 U	< 4,200 U	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
Chloroform	ppb		< 1,900 U	< 4,200 U	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
1,1-Dichloroethane	ppb		< 1,900 U	< 4,200 U	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
1,2-Dichloroethane	ppb		< 1,900 U	< 4,200 U	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
1,1-Dichloroethene	ppb		< 1,900 U	< 4,200 U	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
trans-1,2-Dichloroethene	ppb		< 1,900 U	< 4,200 U	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
1,2-Dichloropropane	ppb		< 1,900 U	< 4,200 U	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
cis-1,3-Dichloropropene	ppb		< 1,900 U	< 4,200 U	< 23,000 U	< 110,000 U	< 13,000 U	< 930 U
Total Volatile Organics	ppb	**660,000**	**276,000**	**343,600**	**1,417,000**	**9,720,000**	**1,737,000**	**78,500**
Other Hydrocarbons								
Methane	%				0.21	0.23	< 0.19 U	< 0.18 U

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
Severstal Sparrows Point, LLC

	Sample ID	CO016-PZM006	CO-15-PZM005	CO02-PZM006	CO02-PZM006	CO02-PZM006	CO18-PZM006	CO18-PZM006	CO18-PZM006	BP-MW-09	BP-MW-09	BP-MW-09
	Date	7/7/2010	7/8/2010	7/7/2010	8/25/2010	9/27/2010	7/8/2010	8/25/2010	9/27/2010	7/8/2010	8/25/2010	9/27/2010
Analyte	Units											
Water Quality Parameters												
Temperature	deg C	17.64	17.76	19.67	19.46	20.08	18.20	21.46	22.28	18.21	18.76	20.45
pH	std units	12.51	8.58	8.72	8.06	8.15	7.43	7.25	7.8	12.51	11.32	11.68
ORP	mV	-325	-211	-208	-269	-255	-178	-140	-143	-289	-261	-380
Conductivity	mS/cm	0.772	0.654	0.900	1.220	1.130	0.869	1.520	1.750	1.840	2.270	2.000
Turbidity	NTU	0.1	0.0	0.0	1.5	0.9	0.0	11.3	24.5	0.0	3.8	1.5
DO	mg/L	0.21	0.00	0.00	0.45	0.00	0.00	0.44	0.00	0.00	1.70	0.00
Volatile Organics												
Acetone	µg/L	< 50.0 U	< 5,000 U	< 50.0 U	< 5,000 U	< 50.0 U	< 5,000 U	< 5,000 U	< 50.0 U	< 5,000 U	< 5,000 U	< 50.0 U
Benzene	µg/L	**176,000**	**539,000**	**692,000**	**441,000**	**672,000**	**689,000**	**941,000**	**1,010,000**	**239,000**	**204,000**	**221,000**
Bromoform	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
2-Butanone	µg/L	< 50.0 U	< 5,000 U	< 50.0 U	< 5,000 U	< 50.0 U	< 5,000 U	< 5,000 U	< 50.0 U	< 5,000 U	< 5,000 U	< 50.0 U
Carbon Disulfide	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
Carbon Tetrachloride	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
Chlorobenzene	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
Chloroethane	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
Chloroform	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
1,1-Dichloroethane	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
1,2-Dichloroethane	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
1,1-Dichloroethene	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
trans-1,2-Dichloroethene	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
1,2-Dichloropropane	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
cis-1,3-Dichloropropene	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
trans-1,3-Dichloropropene	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
Ethylbenzene	µg/L	**438**	**1,270**	**715**	**786**	**780**	**1,050**	< 500 U	**340**	**3,420**	**2,630**	**2,580**
2-Hexanone	µg/L	< 25.0 U	< 2,500 U	< 25.0 U	< 2,500 U	< 25.0 U	< 2,500 U	< 2,500 U	< 25.0 U	< 2,500 U	< 2,500 U	< 25.0 U
4-Methyl-2-Pentanone (MIBK)	µg/L	< 25.0 U	< 2,500 U	< 25.0 U	< 2,500 U	< 25.0 U	< 2,500 U	< 2,500 U	< 25.0 U	< 2,500 U	< 2,500 U	< 25.0 U
Methylene Chloride	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
1,1,1,2-Tetrachloroethane	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
1,1,2,2-Tetrachloroethane	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
Tetrachloroethene	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
Toluene	µg/L	**30,200**	**72,900**	**82,200**	**72,800**	**60,900**	**77,100**	**91,000**	**75,700**	**75,300**	**81,100**	**54,100**
Xylenes, Total	µg/L	**2,870**	**9,270**	**7,610**	**6,110**	**6,200**	**14,100**	**8,680**	**5,960**	**50,300**	**40,700**	**36,300**
1,1,1-Trichloroethane	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
1,1,2-Trichloroethane	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
Trichloroethene	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
Vinyl Chloride	µg/L	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U	< 500 U	< 500 U	< 5.0 U
Semi-Volatiles												
Acenaphthene	µg/L	**11.0**	**3.4**	**3.7**			< 1.4 U			**1.5**		
Acenaphthylene	µg/L	< 1.4 U	**14.0**	**1.9**			**1.6**			**1.5**		
Anthracene	µg/L	< 1.4 U	**3.5**	**1.7**			< 1.4 U			**2.0**		
Benzo(a)anthracene	µg/L	< 1.4 U	< 1.4 U	< 1.4 U			< 1.4 U			< 1.4 U		
Benzo(a)pyrene	µg/L	< 1.4 U	< 1.4 U	< 1.4 U			< 1.4 U			< 1.4 U		
Benzo(b)fluoranthene	µg/L	< 1.4 U	< 1.4 U	< 1.4 U			< 1.4 U			< 1.4 U		
Benzo(g,h,i)perylene	µg/L	< 1.4 U	< 1.4 U	< 1.4 U			< 1.4 U			< 1.4 U		
Benzo(k)fluoranthene	µg/L	< 1.4 U	< 1.4 U	< 1.4 U			< 1.4 U			< 1.4 U		
4-Bromophenyl-phenylether	µg/L	< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
Butylbenzylphthalate	µg/L	< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
4-Chloro-3-methylphenol	µg/L	< 7.5 U	< 7.5 U	< 7.6 U			< 7.5 U			< 7.5 U		
Bis(2-Chloroethoxy)methane	µg/L	< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
Bis(2-Chloroethyl)ether	µg/L	< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
Bis(2-Chloroisopropyl)ether	µg/L	< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
2-Chloronaphthalene	µg/L	< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
2-Chlorophenol	µg/L	< 7.5 U	< 7.5 U	< 7.6 U			< 7.5 U			< 7.5 U		
4-Chlorophenyl-phenylether	µg/L	< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
Chrysene	µg/L	< 1.4 U	< 1.4 U	< 1.4 U			< 1.4 U			< 1.4 U		
m,p-Cresol	µg/L	**43.3**	**64.7**	**97.6**			**120**			**92.1**		
o-Cresol	µg/L	**46.1**	**62.4**	**79.2**			**162**			**55.6**		
Di-n-Butylphthalate	µg/L	< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
Di-n-Octylphthalate	µg/L	< 7.5 U	< 7.5 U	< 7.6 U			< 7.5 U			< 7.5 U		
Dibenz(a,h)anthracene	µg/L	< 1.4 U	< 1.4 U	< 1.4 U			< 1.4 U			< 1.4 U		
Dibenzofuran	µg/L	**5.6**	**7.4**	**4.1**			< 2.8 U			**3.1**		
1,2-Dichlorobenzene	µg/L	< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
1,3-Dichlorobenzene	µg/L	< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
1,4-Dichlorobenzene	µg/L	< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
3,3-Dichlorobenzidine	µg/L	< 15.1 U	< 15.1 U	< 15.2 U			< 15.1 U			< 15.1 U		
2,4-Dichlorophenol	µg/L	< 7.5 U	< 7.5 U	< 7.6 U			< 7.5 U			< 7.5 U		
Diethylphthalate	µg/L	< 7.5 U	< 7.5 U	< 7.6 U			< 7.5 U			< 7.5 U		
3,3'-Dimethylbenzidine	µg/L	< 7.5 U	< 7.5 U	< 7.6 U			< 7.5 U			< 7.5 U		
2,4-Dimethylphenol	µg/L	**20.0**	**30.4**	**52.1**			**49.8**			**45.2**		
Dimethylphthalate	µg/L	< 7.5 U	< 7.5 U	< 7.6 U			< 7.5 U			< 7.5 U		
2,4-Dinitrophenol	µg/L	< 15.1 U	< 15.1 U	< 15.2 U			< 15.1 U			< 15.1 U		
2,4-Dinitrotoluene	µg/L	< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		

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
Severstal Sparrows Point, LLC

Analyte	Units	Sample ID / Date	CO016-PZM006 7/7/2010	CO-15-PZM005 7/8/2010	CO02-PZM006 7/7/2010	CO02-PZM006 8/25/2010	CO02-PZM006 9/27/2010	CO18-PZM006 7/8/2010	CO18-PZM006 8/25/2010	CO18-PZM006 9/27/2010	BP-MW-09 7/8/2010	BP-MW-09 8/25/2010	BP-MW-09 9/27/2010
Semi-Volatiles													
2,6-Dinitrotoluene	µg/L		< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
Bis(2-Ethylhexyl)phthalate	µg/L		< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
Fluoranthene	µg/L		< 1.4 U	**3.8**	**3.0**			< 1.4 U			**2.1**		
Fluorene	µg/L		**7.9**	**11.4**	**8.5**			**5.5**			**6.8**		
Hexachlorobenzene	µg/L		< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
Hexachlorobutadiene	µg/L		< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
Hexachlorocyclopentadiene	µg/L		< 7.5 U	< 7.5 U	< 7.6 U			< 7.5 U			< 7.5 U		
Hexachloroethane	µg/L		< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
Indeno(1,2,3-cd)pyrene	µg/L		< 1.4 U	< 1.4 U	< 1.4 U			< 1.4 U			< 1.4 U		
Isophorone	µg/L		< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
2-Methyl-4,6-dinitrophenol	µg/L		< 7.5 U	< 7.5 U	< 7.6 U			< 7.5 U			< 7.5 U		
2-Methylnaphthalene	µg/L		**20.0**	**19.2**	**11.5**			**12.4**			**19.0**		
Naphthalene	µg/L		**386**	**744**	**518**			**715**			**1,260**		
Nitrobenzene	µg/L		< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
2-Nitrophenol	µg/L		< 7.5 U	< 7.5 U	< 7.6 U			< 7.5 U			< 7.5 U		
4-Nitrophenol	µg/L		< 7.5 U	< 7.5 U	< 7.6 U			< 7.5 U			< 7.5 U		
Pentachloroethane	µg/L		< 7.5 U	< 7.5 U	< 7.6 U			< 7.5 U			< 7.5 U		
Pentachlorophenol	µg/L		< 15.1 U	< 15.1 U	< 15.2 U			< 15.1 U			< 15.1 U		
Phenanthrene	µg/L		**6.7**	**15.6**	**10.2**			**2.8**			**8.3**		
Phenol	µg/L		**72.1**	**64.2**	**97.1**			**167**			**115**		
Pyrene	µg/L		< 1.4 U	**1.9**	**1.6**			< 1.4 U			< 1.4 U		
Pyridine	µg/L		**21.5**	**98.6**	**228**			**238**			**24.3**		
1,2,4-Trichlorobenzene	µg/L		< 2.8 U	< 2.8 U	< 2.9 U			< 2.8 U			< 2.8 U		
2,4,5-Trichlorophenol	µg/L		< 7.5 U	< 7.5 U	< 7.6 U			< 7.5 U			< 7.5 U		
2,4,6-Trichlorophenol	µg/L		< 7.5 U	< 7.5 U	< 7.6 U			< 7.5 U			< 7.5 U		
Wet Chemistry													
Ferrous Iron	mg/L		< 0.10 U	**0.22**	**0.11**			**3.90**			< 0.10 U		
Nitrate-N	mg/L		< 0.20 U	< 0.20 U	< 0.20 U			< 0.20 U			< 0.20 U		
Nitrate/Nitrite-N	mg/L		< 0.20 U	< 0.20 U	< 0.20 U			< 0.20 U			< 0.20 U		
Nitrite-N	mg/L		< 0.20 U	< 0.20 U	< 0.20 U			< 0.20 U			< 0.20 U		
Phosphorous, Total	mg/L		< 0.10 U	< 0.10 U	**0.11**			**0.14**			< 0.10 U		
Sulfate	mg/L		**75.1**	**160**	**408**			**372**			**116**		
Metals													
Ferric Iron	mg/L		**0.12**	**0.10**	**0.15**			< 0.10 U			**0.14**		
Aluminum, Total	mg/L		**0.43**	< 0.11 U	< 0.11 U			< 0.11 U			**0.99**		
Antimony, Total	mg/L		< 0.030 U	< 0.030 U	< 0.030 U			< 0.030 U			< 0.030 U		
Arsenic, Total	mg/L		< 0.0090 U	**0.036**	**0.018**			**0.048**			**0.023**		
Barium, Total	mg/L		**0.065**	**0.039**	**0.074**			**0.040**			**0.095**		
Beryllium, Total	mg/L		< 0.0044 U	< 0.0044 U	< 0.0044 U			< 0.0044 U			< 0.0044 U		
Cadmium, Total	mg/L		< 0.0022 U	< 0.0022 U	< 0.0022 U			< 0.0022 U			< 0.0022 U		
Calcium, Total	mg/L		**81.2**	**76.0**	**164**			**192.0**			**203**		
Chromium, Total	mg/L		< 0.0060 U	< 0.0060 U	< 0.0060 U			< 0.0060 U			< 0.0060 U		
Cobalt, Total	mg/L		< 0.0060 U	< 0.0060 U	< 0.0060 U			< 0.0060 U			< 0.0060 U		
Copper, Total	mg/L		< 0.011 U	< 0.011 U	< 0.011 U			< 0.011 U			< 0.011 U		
Iron, Total	mg/L		**0.12**	**0.32**	**0.26**			**3.9**			**0.14**		
Lead, Total	mg/L		< 0.0067 U	**0.011**	< 0.0067 U			**0.014**			< 0.0067 U		
Magnesium, Total	mg/L		< 0.11 U	**27.3**	**39.0**			**38.2**			**0.61**		
Manganese, Total	mg/L		**0.0084**	**0.31**	**0.33**			**0.72**			**0.019**		
Nickel, Total	mg/L		< 0.022 U	< 0.022 U	< 0.022 U			< 0.022 U			< 0.022 U		
Potassium, Total	mg/L		**34.6**	**17.4**	**18.3**			**13.0**			**16.3**		
Selenium, Total	mg/L		< 0.022 U	**0.022**	< 0.022 U			**0.028**			< 0.022 U		
Silver, Total	mg/L		< 0.0044 U	< 0.0044 U	< 0.0044 U			< 0.0044 U			< 0.0044 U		
Sodium, Total	mg/L		**77.8**	**81.0**	**79.2**			**59.5**			**136**		
Thallium, Total	mg/L		< 0.022 U	< 0.022 U	< 0.022 U			< 0.022 U			< 0.022 U		
Vanadium, Total	mg/L		**0.45**	**0.0079**	< 0.0060 U			**0.015**			< 0.0060 U		
Zinc, Total	mg/L		< 0.022 U	< 0.022 U	< 0.022 U			**0.051**			< 0.022 U		

Notes:

<Blank>	= 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

Table 4
Summary of Groundwater Analytical Results
Cell 4: In-Situ Anaerobic Bio-Treatment System in Coal Tar Area
Former Coke Oven Area Interim Remedial Measures
Severstal Sparrows Point, LLC

Analyte	Sample ID / Date / Units	OBS-6 7/9/2010	EXT-2 7/9/2010	OBS-7 7/9/2010
Water Quality Parameters				
Temperature	deg C	20.85	17.23	16.40
pH	std units	10.67	11	10.35
ORP	mV	-169	-182	-298
Conductivity	mS/cm	2.800	3.190	1.320
Turbidity	NTU	0.0	0.0	0.0
DO	mg/L	4.90	1.46	0.00
Volatile Organics				
Acetone	µg/L	< 50.0 U	< 50.0 U	< 50.0 U
Benzene	µg/L	**1,510**	**999**	**798**
Bromoform	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
2-Butanone	µg/L	< 50.0 U	< 50.0 U	< 50.0 U
Carbon Disulfide	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
Carbon Tetrachloride	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
Chlorobenzene	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
Chloroethane	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
Chloroform	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethane	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloroethane	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethene	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
trans-1,2-Dichloroethene	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloropropane	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
cis-1,3-Dichloropropene	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
trans-1,3-Dichloropropene	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
Ethylbenzene	µg/L	< 5.0 U	< 5.0 U	**38.3**
2-Hexanone	µg/L	< 25.0 U	< 25.0 U	< 25.0 U
4-Methyl-2-Pentanone (MIBK)	µg/L	< 25.0 U	< 25.0 U	< 25.0 U
Methylene Chloride	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
1,1,1,2-Tetrachloroethane	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2,2-Tetrachloroethane	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
Toluene	µg/L	**1,140**	**874**	**620**
Xylenes, Total	µg/L	**1,130**	**1,220**	**751**
1,1,1-Trichloroethane	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2-Trichloroethane	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
Trichloroethene	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
Vinyl Chloride	µg/L	< 5.0 U	< 5.0 U	< 5.0 U
Semi-Volatiles				
Acenaphthene	µg/L	**11.4**	**13.2**	**4.4**
Acenaphthylene	µg/L	**223**	**335**	**24.4**
Anthracene	µg/L	**15.7**	**18.1**	**2.6**
Benzo(a)anthracene	µg/L	< 1.4 U	< 1.4 U	< 1.4 U
Benzo(a)pyrene	µg/L	< 1.4 U	< 1.4 U	< 1.4 U
Benzo(b)fluoranthene	µg/L	< 1.4 U	< 1.4 U	< 1.4 U
Benzo(g,h,i)perylene	µg/L	< 1.4 U	< 1.4 U	< 1.4 U
Benzo(k)fluoranthene	µg/L	< 1.4 U	< 1.4 U	< 1.4 U
4-Bromophenyl-phenylether	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
Butylbenzylphthalate	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
4-Chloro-3-methylphenol	µg/L	< 7.5 U	< 7.5 U	< 7.5 U
Bis(2-Chloroethoxy)methane	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
Bis(2-Chloroethyl)ether	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
Bis(2-Chloroisopropyl)ether	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
2-Chloronaphthalene	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
2-Chlorophenol	µg/L	< 7.5 U	< 7.5 U	< 7.5 U
4-Chlorophenyl-phenylether	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
Chrysene	µg/L	< 1.4 U	< 1.4 U	< 1.4 U
m,p-Cresol	µg/L	**202**	**191**	**192**
o-Cresol	µg/L	**120**	**112**	**138**
Di-n-Butylphthalate	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
Di-n-Octylphthalate	µg/L	< 7.5 U	< 7.5 U	< 7.5 U
Dibenz(a,h)anthracene	µg/L	< 1.4 U	< 1.4 U	< 1.4 U
Dibenzofuran	µg/L	**81.0**	**97.4**	**16.6**
1,2-Dichlorobenzene	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
1,3-Dichlorobenzene	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
1,4-Dichlorobenzene	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
3,3-Dichlorobenzidine	µg/L	< 15.1 U	< 15.1 U	< 15.1 U
2,4-Dichlorophenol	µg/L	< 7.5 U	< 7.5 U	< 7.5 U
Diethylphthalate	µg/L	< 7.5 U	< 7.5 U	< 7.5 U
3,3'-Dimethylbenzidine	µg/L	< 7.5 U	< 7.5 U	< 7.5 U
2,4-Dimethylphenol	µg/L	< 15.1 U	**140**	**90.1**
Dimethylphthalate	µg/L	< 7.5 U	< 7.5 U	< 7.5 U
2,4-Dinitrophenol	µg/L	< 15.1 U	< 15.1 U	< 15.1 U
2,4-Dinitrotoluene	µg/L	< 2.8 U	< 2.8 U	< 2.8 U

Table 4
Summary of Groundwater Analytical Results
Cell 4: In-Situ Anaerobic Bio-Treatment System in Coal Tar Area
Former Coke Oven Area Interim Remedial Measures
Severstal Sparrows Point, LLC

Analyte	Sample ID / Date / Units	OBS-6 7/9/2010	EXT-2 7/9/2010	OBS-7 7/9/2010
Semi-Volatiles				
2,6-Dinitrotoluene	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
Bis(2-Ethylhexyl)phthalate	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
Fluoranthene	µg/L	**10.6**	**12.0**	**1.5**
Fluorene	µg/L	**74.0**	**90.4**	**16.4**
Hexachlorobenzene	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
Hexachlorobutadiene	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
Hexachlorocyclopentadiene	µg/L	< 7.5 U	< 7.5 U	< 7.5 U
Hexachloroethane	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
Indeno(1,2,3-cd)pyrene	µg/L	< 1.4 U	< 1.4 U	< 1.4 U
Isophorone	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
2-Methyl-4,6-dinitrophenol	µg/L	< 7.5 U	< 7.5 U	< 7.5 U
2-Methylnaphthalene	µg/L	**327**	**510**	**80.0**
Naphthalene	µg/L	**8,930**	**8,120**	**2,180**
Nitrobenzene	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
2-Nitrophenol	µg/L	< 7.5 U	< 7.5 U	< 7.5 U
4-Nitrophenol	µg/L	< 7.5 U	< 7.5 U	< 7.5 U
Pentachloroethane	µg/L	< 7.5 U	< 7.5 U	< 7.5 U
Pentachlorophenol	µg/L	< 15.1 U	< 15.1 U	< 15.1 U
Phenanthrene	µg/L	**71.0**	**86.1**	**16.2**
Phenol	µg/L	**102**	**155**	**126**
Pyrene	µg/L	**5.8**	**6.5**	< 1.4 U
Pyridine	µg/L	**237**	**168**	**39.5**
1,2,4-Trichlorobenzene	µg/L	< 2.8 U	< 2.8 U	< 2.8 U
2,4,5-Trichlorophenol	µg/L	< 7.5 U	< 7.5 U	< 7.5 U
2,4,6-Trichlorophenol	µg/L	< 7.5 U	< 7.5 U	< 7.5 U
Wet Chemistry				
Ferrous Iron	mg/L	**0.18**	**0.22**	**0.19**
Nitrate-N	mg/L	< 0.20 U	< 0.20 U	< 0.20 U
Nitrate/Nitrite-N	mg/L	**0.44**	< 0.20 U	< 0.20 U
Nitrite-N	mg/L	**0.44**	< 0.20 U	< 0.20 U
Phosphorous, Total	mg/L	< 0.10 U	< 0.10 U	< 0.10 U
Sulfate	mg/L	**581**	**549**	**335**
Metals				
Ferric Iron	mg/L	**0.26**	**0.19**	**0.29**
Aluminum, Total	mg/L	< 0.11 U	< 0.11 U	< 0.11 U
Antimony, Total	mg/L	< 0.030 U	< 0.030 U	< 0.030 U
Arsenic, Total	mg/L	< 0.0090 U	< 0.0090 U	< 0.0090 U
Barium, Total	mg/L	**0.094**	**0.079**	**0.039**
Beryllium, Total	mg/L	< 0.0044 U	< 0.0044 U	< 0.0044 U
Cadmium, Total	mg/L	< 0.0022 U	< 0.0022 U	< 0.0022 U
Calcium, Total	mg/L	**345**	**333**	**176**
Chromium, Total	mg/L	< 0.0060 U	< 0.0060 U	< 0.0060 U
Cobalt, Total	mg/L	< 0.0060 U	< 0.0060 U	< 0.0060 U
Copper, Total	mg/L	< 0.011 U	< 0.011 U	< 0.011 U
Iron, Total	mg/L	**0.44**	**0.41**	**0.48**
Lead, Total	mg/L	< 0.0067 U	< 0.0067 U	< 0.0067 U
Magnesium, Total	mg/L	< 0.11 U	< 0.11 U	< 0.11 U
Manganese, Total	mg/L	**0.014**	< 0.0060 U	**0.015**
Nickel, Total	mg/L	< 0.022 U	< 0.022 U	< 0.022 U
Potassium, Total	mg/L	**31.0**	**26.4**	**20.8**
Selenium, Total	mg/L	< 0.022 U	< 0.022 U	< 0.022 U
Silver, Total	mg/L	< 0.0044 U	< 0.0044 U	< 0.0044 U
Sodium, Total	mg/L	**126**	**123**	**93.9**
Thallium, Total	mg/L	< 0.022 U	< 0.022 U	< 0.022 U
Vanadium, Total	mg/L	**0.68**	**0.68**	**0.91**
Zinc, Total	mg/L	< 0.022 U	< 0.022 U	< 0.022 U

Notes:

<Blank>	= 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

Table 5
LNAPL Measurements Made by EA (2009)
Cell 6: LNAPL Recovery System at the Former Benzol Processing Area
Former Coke Oven Area Interim Remedial Measures
Severstal Sparrows Point, LLC

Well	Floating LNAPL Thickness (ft)[1]	Predicted LNAPL Recovery Rate (gpd)[1]
BP-MW-05	4.1	14.5
BP--MW-08	4.5	0.4
BP-MW-11	0.7	0.07

[1] EA, 2009

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

Well	LNAPL Occurrence (ft)	LNAPL Recovery Period		LNAPL Recovered (gal)	Recovery Rate (gpd)
		Begin	End		
BP-MW-05	generally about 3	28-Jan	On-going	1,467	5.6
RW-04	0.1 to 1.6	23-Jul	On-going	94.7	3.4
BP-MW-08	trace to 2.9	8-Sep	On-going	98	1.2
BP-MW-11	trace to 0.3	23-Jul	8-Sep	7.8	0.2
BP-MW-10	trace to 0.29	NA	NA	0	NA
RW-1	generally trace, up to 0.6	NA	NA	0	NA
RW-2	generally trace, up to 0.5	NA	NA	0	NA
RW-3	0.16 to 0.23	NA	NA	0	NA
RW-5	None	NA	NA	0	NA
BP-MW-07	None	NA	NA	0	NA
BP-MW-06	None	NA	NA	0	NA
BP-MW-09	None	NA	NA	0	NA
CO19-PZM004	None	NA	NA	0	NA

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

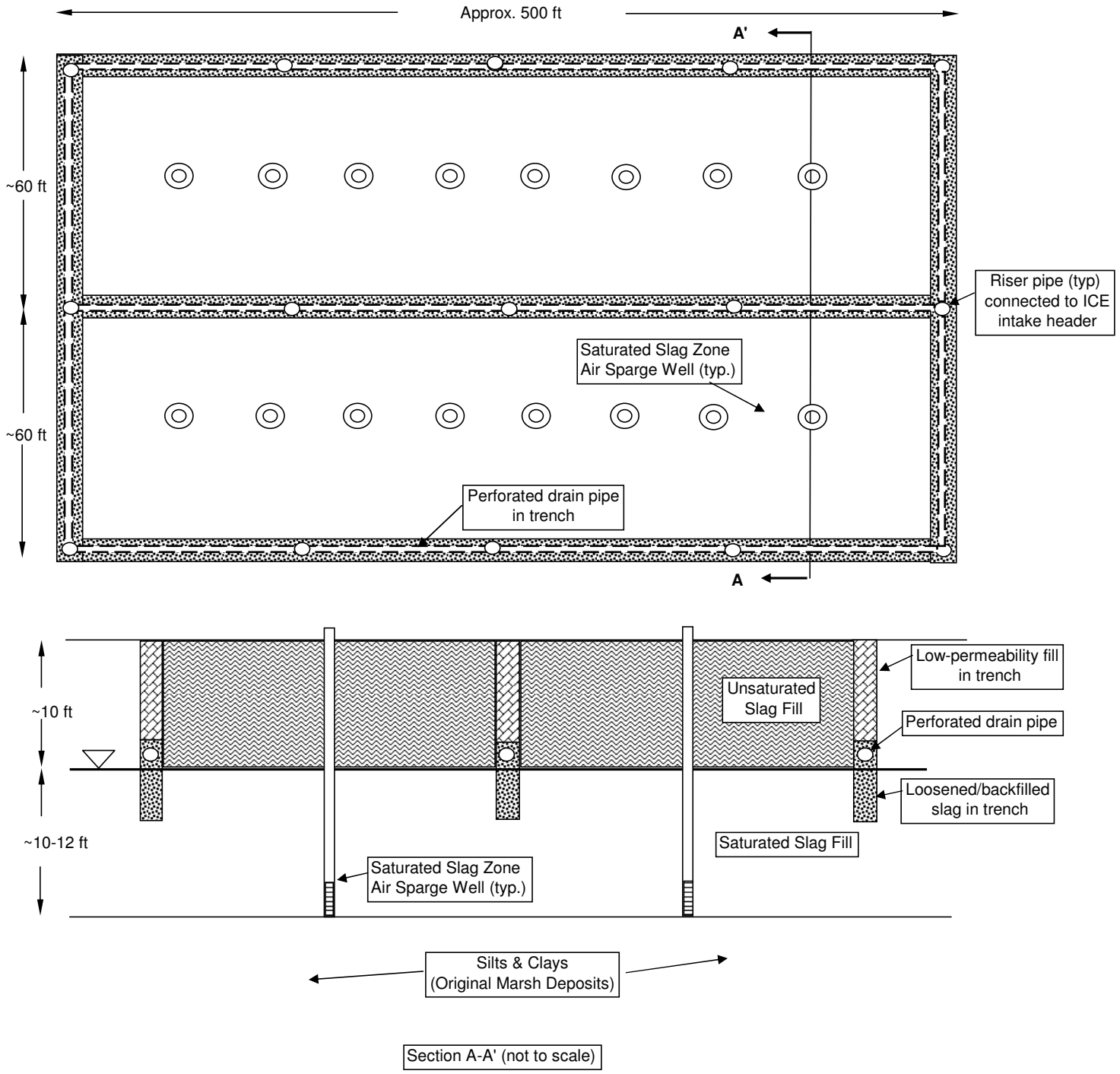
CLIENT: Sparrows Point	LOCATION: Baltimore, MD
DATE: 06/11/10	FILE: G:\Projects\SparrowsPoint\Projects\2010\CokeOven-and-CokePoint-6Prototype Cells_rev1.mxd
GIS: AER	
CHECKED: RL	
SENIOR: BE	

URS
200 Orchard Ridge Drive
Gaithersburg, MD 20878

Figure 1

Interim Measures Treatment Areas

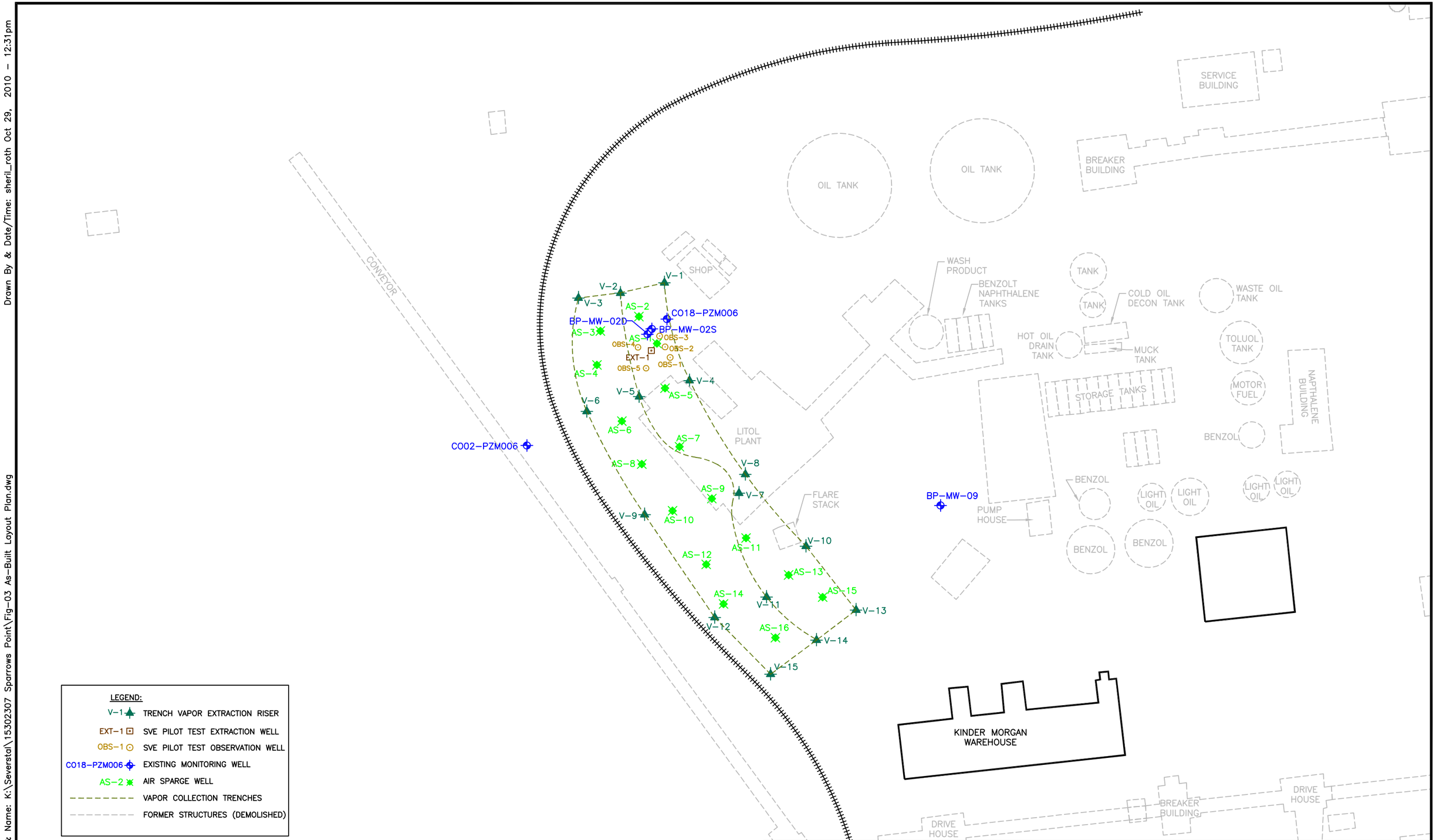
Figure 2
Schematic Diagram
Cell 1: Prototype AS/SVE System in Former Benzol Processing Area
Former Coke Oven Area Interim Remedial Measures
Severstal Sparrows Point, LLC



Section A-A' (not to scale)

Drawn By & Date/Time: sheril_roth Oct 29, 2010 - 12:31pm

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
- 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
SEVERSTAL SPARROWS POINT, LLC FACILITY
BALTIMORE, MARYLAND

FIGURE 3

Figure 4
Vapor Collection Trench Construction
Cell 1: Prototype AS/SVE System in Former Benzol Processing Area
Former Coke Oven Area Interim Remedial Measures
Severstal Sparrows Point, LLC

Figure 4A - Start of Vapor Recovery Trench Construction

Figure 4B - Vapor Collection Trench Components

Figure 5
Internal Combustion Engine and Completed Construction
Cell 1: Prototype AS/SVE System in Former Benzol Processing Area
Former Coke Oven Area Interim Remdial Measures
Severstal Sparrows Point, LLC

Figure 5A - ICE Unit

Figure 5B - Completed Cell 1 Prototype System - Looking Southeast

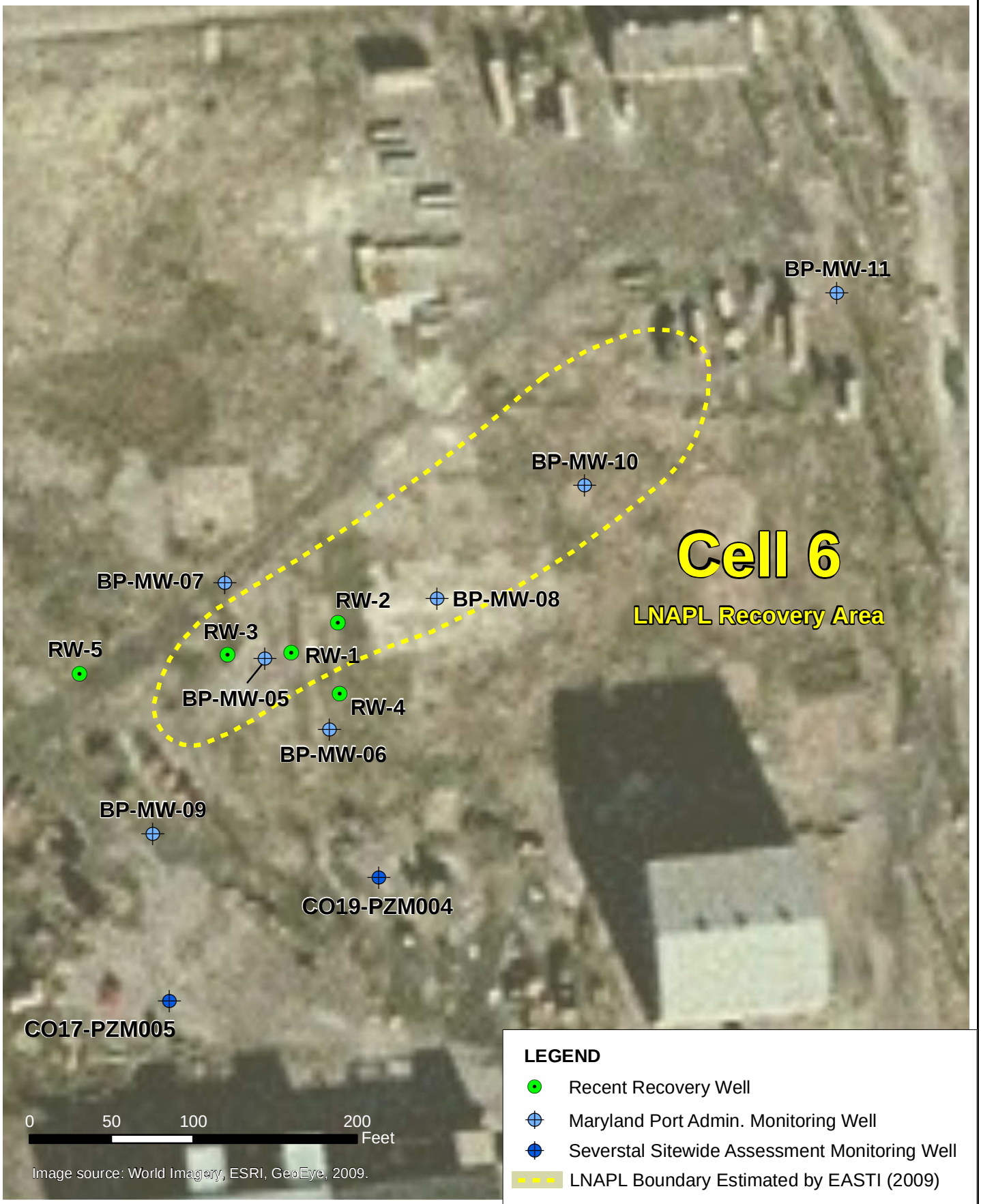
CLIENT	Sparrows Point		
LOCATION	Baltimore, MD		
URS 200 Orchard Ridge Drive Gaithersburg, MD 20878	GIS BY	JK	10/13/10
	CHK BY	BE	10/14/10
	PM	BE	10/14/10

N

Figure 6

Existing Cell 4 Wells

G:\Projects\SparrowsPoint\Projects\2010\CokeOven-and-CokePoint-Cell4closeup_rev.mxd



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 7

Cell 6 LNAPL Monitoring and Recovery Wells

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

ATTACHMENTS

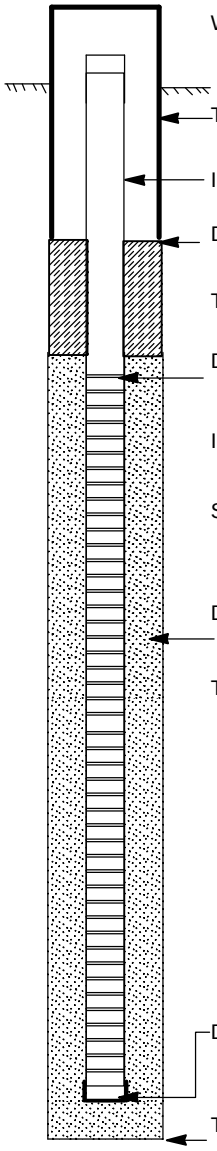
Project: Severstal-Sparrows Point **Project Location: Sparrows Point, MD** **Project Number: 15302058**	**Cell 6 NAPL Area Boring RW01** Sheet 1 of 1

Date(s) Drilled	**05/20/10**	Logged By	**T. Fox**	Client	**Severstal Sparrows Point**
Location	**Cell 6 NAPL Area**	Sampler Type	**2 in. OD split spoon sampler**	Drilling Contractor	**Summit Site Services**

SAMPLES

Depth (ft)	Sample ID	PID (ppm)	Blow Count	Graphic Log	MATERIAL DESCRIPTION
0					Dry gravel/concrete. Cuttings are gray to light gray, dusty.
					SLAG. Dense black fine to coarse slag with occasional glass, metal, and rock fragments. Strong contamination odor throughout.
5	--	307	50/5-25/0		
10	--	463	25/2 -25/0		
	--	1254	25/1-25/1		Free product encountered in 13'-14' split spoon sample.

WELL CONSTRUCTION



Well Diameter
4"

Type of Surface Casing:
Stainless Steel

ID/Type of Riser Pipe:
PVC

Depth of Seal:
0.5 ft bgs

Type of Seal:
Bentonite

Depth of Top of Screen:
4.0 ft bgs

ID/Type of Screen:
PVC

Screen Slot Size:
0.010 Inch

Depth of Top of Filter Pack:
3.0 ft bgs

Type of Filter Pack:
Millersville #2 sand

Depth of Bottom of Screen:
14.0 ft bgs

Total Depth of Boring:
14.0 ft ft bgs

URS

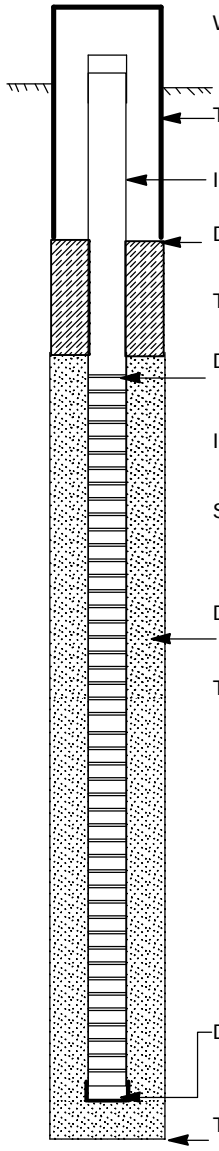
Project: Severstal-Sparrows Point **Project Location: Sparrows Point, MD** **Project Number: 15302058**	**Cell 6 NAPL Area Boring RW02** Sheet 1 of 1

Date(s) Drilled	**05/27/10**	Logged By	**T. Fox**	Client	**Severstal Sparrows Point**
Location	**Cell 6 NAPL Area**	Sampler Type	**2 in. OD split spoon sampler**	Drilling Contractor	**Summit Site Services**

SAMPLES

Depth (ft)	Sample ID	PID (ppm)	Blow Count	Graphic Log	MATERIAL DESCRIPTION
0					SLAG. Dense black fine to coarse slag with occasional glass, metal, and rock fragments. Strong contamination odor throughout.
5		132	14-50/5		
10		414	50/5		
15		197	7-3-3		Cindery slag. Gray to light gray cindery coarse slag with brick pieces. Wet. No indication of free product.

WELL CONSTRUCTION



Well Diameter
4"

Type of Surface Casing:
Stainless Steel

ID/Type of Riser Pipe:
PVC

Depth of Seal:
0.5 ft bgs

Type of Seal:
Bentonite

Depth of Top of Screen:
4.0 ft bgs

ID/Type of Screen:
PVC

Screen Slot Size:
0.010 Inch

Depth of Top of Filter Pack:
3.0 ft bgs

Type of Filter Pack:
Millersville #2 sand

Depth of Bottom of Screen:
14.0 ft bgs

Total Depth of Boring:
15.0 ft ft bgs

URS

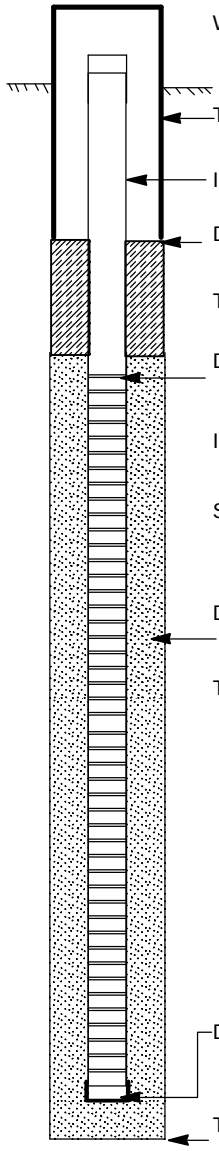
Project: Severstal-Sparrows Point **Project Location: Sparrows Point, MD** **Project Number: 15302058**	**Cell 6 NAPL Area Boring RW03** Sheet 1 of 1

Date(s) Drilled	**09/07/10**	Logged By	**J. McGraw**	Client	**Severstal Sparrows Point**
Location	**Cell 6 NAPL Area**	Sampler Type	**N/A**	Drilling Contractor	**Summit Site Services**

SAMPLES

Depth (ft)	Sample ID	PID (ppm)	Blow Count	Graphic Log	MATERIAL DESCRIPTION
0					SLAG. Dense black fine to coarse slag with occasional glass, metal, and rock fragments. Strong contamination odor throughout.
		9.5			
5					
		2.0			
10					
		5.0			
15					

WELL CONSTRUCTION



Well Diameter
4"

Type of Surface Casing:
Stainless Steel

ID/Type of Riser Pipe:
PVC

Depth of Seal:
2.0 ft bgs

Type of Seal:
Bentonite

Depth of Top of Screen:
5.0 ft bgs

ID/Type of Screen:
PVC

Screen Slot Size:
0.010 Inch

Depth of Top of Filter Pack:
3.0 ft bgs

Type of Filter Pack:
Millersville #2 sand

Depth of Bottom of Screen:
15.0 ft bgs

Total Depth of Boring:
15.0 ft ft bgs

URS

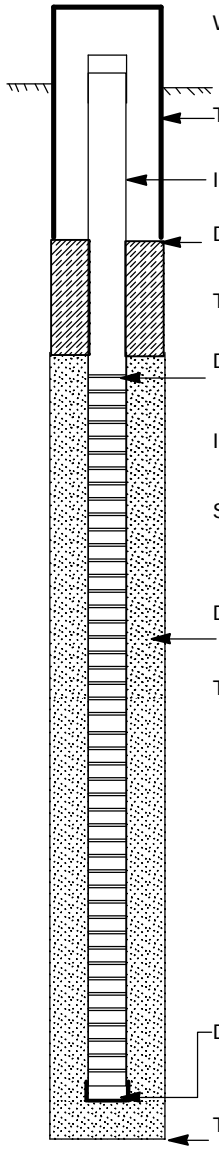
Project: Severstal-Sparrows Point **Project Location: Sparrows Point, MD** **Project Number: 15302058**	**Cell 6 NAPL Area Boring RW04** Sheet 1 of 1

Date(s) Drilled	**09/08/10**	Logged By	**J. McGraw**	Client	**Severstal Sparrows Point**
Location	**Cell 6 NAPL Area**	Sampler Type	**N/A**	Drilling Contractor	**Summit Site Services**

SAMPLES

Depth (ft)	Sample ID	PID (ppm)	Blow Count	Graphic Log	MATERIAL DESCRIPTION
0					SLAG. Dense black fine to coarse slag with occasional glass, metal, and rock fragments. Strong contamination odor throughout.
		0.0			
5					
		90.2			
10					
		116			
15					

WELL CONSTRUCTION



Well Diameter
4"

Type of Surface Casing:
Stainless Steel

ID/Type of Riser Pipe:
PVC

Depth of Seal:
2.0 ft bgs

Type of Seal:
Bentonite

Depth of Top of Screen:
5.0 ft bgs

ID/Type of Screen:
PVC

Screen Slot Size:
0.010 Inch

Depth of Top of Filter Pack:
3.0 ft bgs

Type of Filter Pack:
Millersville #2 sand

Depth of Bottom of Screen:
15.0 ft bgs

Total Depth of Boring:
15.0 ft ft bgs

URS

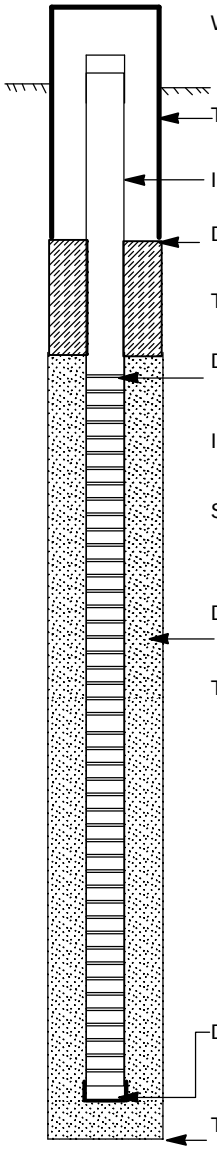
Project: Severstal-Sparrows Point **Project Location: Sparrows Point, MD** **Project Number: 15302058**	**Cell 6 NAPL Area Boring RW05** Sheet 1 of 1

Date(s) Drilled	**09/07/10**	Logged By	**J. McGraw**	Client	**Severstal Sparrows Point**
Location	**Cell 6 NAPL Area**	Sampler Type	**N/A**	Drilling Contractor	**Summit Site Services**

SAMPLES

Depth (ft)	Sample ID	PID (ppm)	Blow Count	Graphic Log	MATERIAL DESCRIPTION
0					SLAG. Dense black fine to coarse slag with occasional glass, metal, and rock fragments. Strong contamination odor throughout.
		0			
5					
		0			
		30.4			
10					
		19.0			
15					

WELL CONSTRUCTION



Well Diameter
4"

Type of Surface Casing:
Stainless Steel

ID/Type of Riser Pipe:
PVC

Depth of Seal:
2.0 ft bgs

Type of Seal:
Bentonite

Depth of Top of Screen:
5.0 ft bgs

ID/Type of Screen:
PVC

Screen Slot Size:
0.010 Inch

Depth of Top of Filter Pack:
3.0 ft bgs

Type of Filter Pack:
Millersville #2 sand

Depth of Bottom of Screen:
15.0 ft bgs

Total Depth of Boring:
15.0 ft ft bgs

URS