



April 2, 2010

Mr. Andrew Fan  
US EPA Region III, 3WC23  
1650 Arch Street  
Philadelphia, PA 19103-2029

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

**Re: Consent Decree, Civil Action Nos. JFM-97-558, JFM-97-559  
Coke Oven Area Interim Measures Pilot Test Results and Prototype Systems Plan  
Response to EPA Comment and Approval letter dated March 2, 2010**

Dear Mr. Fan and Ms. Brown:

Severstal Sparrows Point, LLC ("Severstal Sparrows") hereby responds in accordance with the specified 30 day response timeline to the March 2, 2010 letter received from the US EPA requesting modifications and additions to the referenced Coke Oven Area Interim Measures Prototype Systems Plan.

This letter provides Severstal's responses to US EPA's comments. For mutual ease of understanding, each US EPA comment is presented followed by Severstal's response. We have outlined significant modifications to the prototype systems proposed for the Coke Oven Area and suggest that the responses adequately address your comments and concerns. We look forward to receiving US EPA Region III's final approval of the proposed Interim Measures for the Coke Oven Area. Upon receiving approval, we will modify and incorporate the revisions in a final plan for implementation. In the meantime, we are moving ahead with approved portions of the Plan.

Sincerely yours,

A handwritten signature in blue ink, appearing to read "Russell Becker".

Russell Becker  
Division Manager  
Environmental Engineering and Affairs

Enclosure

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**RESPONSE TO EPA COMMENTS**  
**COKE OVEN AREA INTERIM MEASURES PILOT TEST RESULTS AND PROTOTYPE**  
**SYSTEMS PLAN**

**Consent Decree, Civil Action Number JFM-97-558 and JFM-97-559**

For mutual ease of understanding, each US EPA comment outlined in the corresponding letter dated March 2, 2010 is presented below, followed by Severstal's response.

**US EPA Region III Modification of Prototype Cell at the Former Coal Storage Area:**

*Severstal has not established that vapor recovery wells alone in the saturated zone of the Patapsco Sand will be adequate to control the migration of contaminated groundwater to the bay. Without hydraulic control by groundwater pumping, there is no constraint to prevent or reduce contaminated groundwater from leaking through the 60-foot gaps in between the vapor recovery wells. As shown in the Attachment "B", EPA requires Severstal to modify the design by converting all vapor recovery wells in the Patapsco Sand on the downgradient side of the cell into dual phase extraction wells, and to eliminate all redundant, upgradient vapor recovery wells after the conversion. Due to tidal fluctuations of the water level in the Patapsco Sand, a two-pump system is appropriate (see Attachment "E" for dual phase systems description). The extracted groundwater and vapor shall be diverted to temporary or mobile treatment units necessary to meet MDE air and water discharge requirements. The reason the Patapsco Sand zone (but not the slag zone) in this area is targeted for hydraulic control is that both the benzene and naphthalene concentrations have exceeded the one percent solubility limit criterion for capture requirements as specified in EPA's letter to Severstal, dated February 19, 2009. Additionally, as demonstrated in the pilot test results, naphthalene cannot be effectively removed by vapor extraction and therefore groundwater extraction is necessary.*

**Response:** Comment is acknowledged. Severstal is concerned that installation and operation of the EPA-proposed "dual-phase" groundwater-pumping wells, as depicted on Attachment "B" in the March 2, 2010 US EPA letter will adversely impact the long-term Interim Remedial Measures (IRM) program for the Site because withdrawing groundwater from the Patapsco Sand at the EPA-proposed locations, while possibly establishing limited hydraulic control, will encourage contaminants to migrate from the more contaminated upper slag/fill zone by inducing a downward gradient. This downward gradient effect will encourage movement of contamination from the shallower slag/fill zones into the Patapsco Sand, and will ultimately make corrective actions in the former Coal Storage Area more difficult.

In order to avoid this situation, Severstal proposes to modify, install, and operate the Prototype system, as generally shown on **Revised Figure 5-4** (attached hereto) and described in the January 2010 *Coke Oven Area Interim Measures Pilot Test Results and Prototype Systems Plan*, as follows:

1. Concurrently, while the AS/SVE prototype system concept is being developed and evaluated through operation of the proposed Former Benzol Processing Area system, groundwater from Well CO27-PZM046 (screened in the Patapsco Sand Zone) will be collected and treatability testing will be performed (e.g., pulsed air and/or oxygen) to evaluate the effectiveness of aerobic benzene/naphthalene biodegradation in the formation-specific (i.e., Patapsco Sand) groundwater. Such treatability studies typically take 6 to 8 weeks to complete after the testing is initiated. Aerobic in-situ bioremediation of benzene and naphthalene in groundwater is well documented in the literature.

2. Based on results of the aerobic bioremediation treatability study, Patapsco Sand air/oxygen injection and observation wells will be designed and installed as generally depicted on **Revised Figure 5-4**. The design intent of the pulsed air/oxygen injection system is to deliver sufficient oxygen (as either compressed air or oxygen) to the saturated zone such that a limited reservoir (e.g., “bubble”) of the gas remains trapped within the formation and dissolves into the groundwater to provide the necessary electron acceptor for enhanced microbial activity. URS has found that pulses of 20 to 40 cubic feet of gas (air or oxygen) delivered into the formation several times daily provides sufficient oxygen to enhance microbial activity.

Based on available groundwater data for the Patapsco Sand in Well CO27-PZM046, the low iron concentration of <1 mg/L (i.e., reduced or ferrous iron) is beneficial for inducing aerobic conditions (e.g., elevated dissolved oxygen [DO] and positive oxidation-reduction potential [ORP]) because dissolved iron reacts with oxygen, thereby reducing the availability of the oxygen for microbes.

Effective oxygen distribution in the target groundwater zone is important for establishing effective bioremediation of the benzene and naphthalene. Based on pulsed air/oxygen systems operating in formations similar to the Patapsco Sand in the Graving Dock area (fine sands to sands under confined/semi-confined conditions), injecting three pulses each of 20 to 30 cubic feet of air/oxygen per well per day (total of 60 to 90 cubic feet per well), indicates a 50-foot radius of oxygen enhancement, as defined by DO & ORP increases in adjacent monitoring wells. **Revised Figure 5-4** shows the proposed injection wells at approximately a 100-foot spacing, which should be satisfactory for consistent oxygen enhancement, pending demonstration of a 50-foot effective radius during startup. The Patapsco Sand monitoring wells shown on **Revised Figure 5-4** will provide adequate coverage for monitoring performance of the prototype pulsed air/oxygen system. Air/oxygen pulse volume can be increased to get the desired effect (increasing DO/ORP).

In order to facilitate installation and operation of the prototype pulsed air/oxygen system, the wells could be installed and the pulsed air/oxygen injection process initiated before the AS/SVE system proposed for the Former Coal Storage Area saturated/unsaturated slag zone is installed; thereby initiating treatment of the Patapsco Sand Zone as early as practicable. As indicated above, the proposed treatability tests only take about 6 to 8 weeks and can be completed before the system is fully designed and installed. If necessary (i.e., electric power is not available), the prototype pulsed air/oxygen dosing control system could be solar-powered.

The downgradient wells shown on **Revised Figure 5-4** would be tested (downhole profiling) for DO, ORP, temperature, specific conductivity, and pH, typically on a weekly basis. Once the DO reaches the ~5 mg/L range and the ORP readings indicate oxidative conditions (i.e., positive millivolt readings), conditions should be favorable for biodegradation of benzene/naphthalene. **Table 5-1** (attached hereto) outlines a proposed sampling and analysis protocol for the pulsed air/oxygen system at the Graving Dock Area (and for the other prototype systems as well). Initial monthly BTEX/naphthalene analyses would be appropriate, decreasing to quarterly once the system becomes acclimated to the aerobic conditions and benzene/naphthalene concentration decreases are observed.

3. Pending satisfactory performance of the prototype AS/SVE system at the Former Benzol Processing Area system (possibly modified based on operational conditions), an AS/SVE prototype system would then be installed as generally configured on **Revised Figure 5-4** and operated to evaluate its performance in this area.

**US EPA Region III Addition of Groundwater Extraction Wells to the Turning Basin Area:**  
***EPA supports the proposed in-situ anaerobic bio-treatment testing at the former Coal Tar Storage Area, but the results will not be available for almost a year and the viability of the technology is uncertain. At the present time, there is no control to prevent or reduce the naphthalene plume migration to the Turning Basin.***

*As shown in Attachment “C”, EPA requires Severstal to install a line of groundwater wells new Monitoring Well CO26 to intercept the naphthalene plume in the slag zone. These locations are chosen to optimize interception of the naphthalene plume before the clay layer dividing the slag zone and the Patapsco Sand begins to taper off (see Figure 3-8 in the 2005 Site Wide Investigation Report). The groundwater extraction wells shall be placed at about 60-foot spacing allowing a 500-foot line perpendicular to the groundwater flow direction and each well shall be screened across the water table covering the full thickness of the slag zone. The extracted groundwater shall be diverted to temporary or mobile treatment units necessary to meet MDE water and air discharge requirements. The reason the slag zone (but not the Patapsco Sand zone) in this area is targeted for hydraulic control is that the naphthalene concentrations have exceeded the one percent solubility limit criterion for capture requirements as specified in EPA’s letter to Severstal, dated February 19, 2009.*

**Response:** Comment is acknowledged. Severstal is concerned that installation and operation of the EPA-proposed groundwater-pumping wells, as depicted on Attachment “C” in the March 2, 2010 US EPA letter will adversely impact the long-term IRM program for the Site because withdrawing groundwater from the EPA-proposed location will encourage contaminants to migrate from the higher contaminant concentration (i.e., “source”) area near Well CO13-PZM008 toward the turning basin. This effect will ultimately make control of contaminant discharge to the turning basin more difficult.

In order to avoid this situation, Severstal proposes to implement groundwater pumping, combined with appropriate treatment processes to remove contaminant mass, as part of the proposed enhanced in-situ anaerobic bioremediation program for the Turning Basin Area. Groundwater pumping and treatment is proposed from the upper slag/fill zone only and is further described as follows:

1. Install one or more “Bio-Trap” sampler units in selected existing wells at the Former Coal Tar Storage Area to establish baseline microbiological conditions. These “Bio-Traps” are tentatively scheduled for installation in April 2010.
2. Concurrently, while the baseline “Bio-Traps” are collecting the necessary baseline microbiological data, one or more wells will be installed into the saturated slag zone in the area proposed for the circulation cell prototype location (see attached **Revised Figure 5-6**) to collect groundwater samples for bench- or pilot-scale treatability evaluations. These wells will ultimately be utilized for the circulation cell prototype. These treatability evaluations will be performed concurrently with installation of the system well network.
3. Install a network of pumping wells in the saturated slag zone downgradient of the identified higher contaminant concentration (i.e., “source”) area near Well CO13-PZM008 (**Revised Figure 5-6**) to collect and contain contaminants migrating from the source area via the shallow groundwater toward the turning basin.
4. Based on results of the bench- or pilot-scale treatability evaluations, a portable or trailer-mounted groundwater treatment system will be designed and installed. Based on preliminary considerations of existing groundwater chemistry, the treatment system may consist of appropriately sized organoclay process units (or similar treatment media) designed to remove most naphthalene and BTEX contaminants while not drastically changing the groundwater chemistry (e.g., maintaining anaerobic conditions throughout the treatment train). **Revised Figure 5-7** presents a schematic diagram of the proposed treatment system concept.
5. Re-inject the appropriately treated groundwater upgradient of the pumping wells (but downgradient of the baseline “Bio-Trap” well locations) in order to establish an in-situ re-circulation system for the planned

enhanced anaerobic bioremediation system. Because the re-injected water is partially treated, it should not drastically affect (possibly adversely) the microbial equilibrium believed to be presently reducing some of the naphthalene and BTEX in the groundwater regime.

6. Re-locate appropriate “Bio-Trap” sampler units to one or more of the proposed monitoring wells located between the extraction and reinjection wells and operate the groundwater pumping-treatment-reinjection system. This will allow evaluation of the groundwater biogeochemical conditions that will ultimately be established during the subsequent prototype groundwater re-circulation and amendment program.

**Revised Figure 5-6** shows the proposed groundwater treatment system layout on the Site and **Revised Figure 5-7** schematically depicts its operation.

**US EPA Region III Addition of Dual Phase Extraction Wells to former Benzol Processing LNALP Area:** *The existing skimmer operation and Severstal’s proposal for further skimmer evaluation will not be aggressive enough to recover the LNAPL. A slight groundwater depression is necessary to increase product migration to the extraction wells. As shown in Attachment “D”, EPA requires Severstal to convert all monitoring wells within the LNAPL zone delineated by the Maryland Port Administration into dual phase extraction wells. Due to the small diameter of existing monitoring wells and the presence of free product, a total fluid, single-pump system may be appropriate (see Attachment “E”). The extracted groundwater and vapor shall be diverted to temporary or mobile treatment units necessary to meet MDE air and water discharge requirements.*

**Response:** Comment Acknowledged. Severstal does not agree that groundwater depression is necessary at the present time because product thickness is sufficient to efficiently collect the LNAPL. In order to enhance recovery of floating product, Severstal will install two (2) additional 4-inch diameter LNAPL recovery wells in the affected area. These wells will be fitted with solar-powered skimmer pumps, as are the existing converted monitoring wells. Locations for the additional LNAPL recovery wells will be determined based on the current well configuration and observed LNAPL thickness data. The results from the current effort show that effective removal of floating product can be achieved with these systems. An existing small-diameter (2-inch) monitoring well (BP-MW-05) contains about 4 feet of LNAPL. In January 2010 an automatic oil recovery system was installed on BP-MW-05 and weekly inspections were conducted to assess the LNAPL recovery rate. Most recently this small system was recovering LNAPL at a rate of about 10 gallons per day with no indication of LNAPL depletion such that water rather than LNAPL would be removed. These findings indicate that LNAPL is easily recovered and that no enhancements such as groundwater pumping are necessary to maintain LNAPL recoverability. Accordingly, it is appropriate to expand the recovery system to include two additional LNAPL recovery wells and a dedicated oil recovery system for each well.

Once the product thickness reduces to that which hinders the recovery efficiency, Severstal will consider groundwater depression pumping.

**US EPA Region III Comment 1:** *Section 3.1.1, “No vacuum pressure responses were measured during SVE in any of the observation wells surrounding EXT-1.....This suggests the unsaturated slag zone material surround well EXT-1 is relatively “tight” and not permeable to soil gas flow.” The statement that the unsaturated slag zone is tight based on lack of vacuum pressure responses is not substantiated and*

*contradicts the high permeability ( $3.5 \times 10^2$  cm/sec) estimated for this zone. An opposite conclusion can be drawn that the zone is too pervious to maintain vacuum build up surrounding the vacuum extraction well.*

**Response:** Comment acknowledged. The unsaturated slag zone permeability estimate is just that; an estimate calculated using the methodology described in the Plan. The statement that “No vacuum pressure responses were measured during SVE in any of the observation wells surrounding EXT-1...” is accurate and based on measurements made during the pilot test. Severstal agrees that the statement suggesting the slag material is “tight” (based on the calculated  $3.5 \times 10^2$  cm/sec permeability) may be misleading. However, the field observations indicate there were no vacuum pressure responses observed in the pilot test monitoring wells.

**US EPA Region III Comment 2:** *Section 3.3, “The pumping test results, while short-term in nature, reveal that the saturated slag zone is very productive and that potential groundwater treatment systems that involve groundwater pumping may be impractical at the COA.” The statement that it is impractical to remediate groundwater by pump-and-treat is not substantiated and contradicts the high productivity observed in the saturated slag zone. An opposite conclusion can be drawn that a high productivity zone allows greater mobility and more efficient extraction of contaminated groundwater than a less productive zone.*

**Response:** Comment acknowledged.

**US EPA Region III Comment 3:** *Appendix D, third paragraph, “Water levels were very difficult to measure in the pumping well EXT-2 at the Naphthalene Area because of DNAPL which repeatedly coated the interface probe rendering it ineffective.” This observation demonstrates that mobile phase DNAPL is present and is likely recoverable by groundwater pumping.*

**Response:** Comment acknowledged. However, Severstal does not believe mobile-phase DNAPL is recoverable by groundwater pumping alone.

**US EPA Region III Comment 4:** *Section 4.0 and Table 4-1 Thirteen technologies were screened and only three technologies (product skimming, soil vapor/sparging extraction, and bioremediation) were retained, with unclear, unsupported and/or inconsistent justifications to reject all other technologies. For example, multiphase extraction was rejected, with the disadvantage listed as it “requires energy and separation/treatment of extracted waste streams.” Yet Soil Vapor Extraction/Air Sparging was retained, notwithstanding the fact that it was the same attributes. Anaerobic Bioremediation is retained, but lists as a disadvantage listed as “construction detects and post construction property changes lead to greater probability for system failure;” however, there is no apparent basis for this assertion.*

**Response:** Comment Acknowledged. While there may be some minor misunderstanding with the technology descriptions and screening terminology presented in Section 4.0 and Table 4.1, Severstal stands behind the technologies proposed and selected for prototype testing.

**US EPA Region III Comment 5:** *Section 4.2.2 references Appendix I. The correct reference should be*

**Appendix H.**

**Response:** Comment acknowledged. The correct reference should be “Appendix H”.

**US EPA Region III Comment 6:** *Section 5.1.2.2 references Appendix J. The correct reference should be Appendix I.*

**Response:** Comment acknowledged. The correct reference should be “Appendix I”.

**US EPA Region III Comment 7:** *Figure 5-7 is a duplication of Figure 5-6. The correct figure 5-7 was provided at the meeting with MDE, EPA and Severstal on January 26, 2010.*

**Response:** Comment acknowledged. **Revised Figure 5-6** and **Revised Figure 5-7** are attached hereto that reflect the changes to the Former Coal Tar Storage Area/Turning Basin in-situ anaerobic bioremediation prototype system proposed above.

**US EPA Region III Comment 8:** *The EPA-approved pilot testing plan, dated July 2009, indicated in Section 2.2.2 that split spoon samples collected during installation of test wells AS-1 would be analyzed for benzene and free product. Likewise, Section 2.3.1 indicated that split spoon samples collected during installation of test wells AS-2 would be analyzed for semi volatiles and coal tar residue as well as qualitatively evaluated for odor, sheen and visible product. It is unclear whether the split spoon samples were analyzed as per the approved work plan based on the limited laboratory results provided in the report. Please verify that the sampling was conducted and provide any additional laboratory results not included in the report.*

**Response:** On October 13, 2009, eleven (11) soil boring depth intervals were sampled using split-spoon methods during the installation of Well AS-1 in the Former Benzol Processing Area. All intervals were qualitatively analyzed for dense non-aqueous phase liquid (DNAPL) properties using Method ASTM D 3987. Odor was apparent below 6 feet below ground surface (ft bgs) while sheen and visible product were noted below 8 ft bgs. In addition, select intervals 4 to 6 ft bgs, 14 to 16 ft bgs and 22 to 24 ft bgs were analyzed for benzene using USEPA Method 8260B. Benzene was detected in all three selected intervals at concentrations of 7.7 mg/kg, 23,000 mg/kg and 3,200 mg/kg, respectively.

Six (6) intervals were sampled using split spoon methods during the installation of AS-2 in the Former Coal Tar Storage Area on October 30, 2009. All intervals were qualitatively analyzed for DNAPL properties using Method ASTM D 3987. Odor was detected below 8 ft bgs while sheen was observed in the interval 12 to 14 ft bgs and below 16 ft bgs. Visible product was noted in the 12 to 14 ft bgs and 18 to 19.5 ft bgs intervals. In addition, select intervals 6 to 8 feet, 12 to 14 feet and 18 to 19.5 feet were analyzed for naphthalene using USEPA Method 8270C. Naphthalene was detected in all three selected intervals at concentrations of 4.6 mg/kg, 28 mg/kg and 770 mg/kg, respectively.

Analytical packages for both AS-1 and AS-2 are included herewith as **Appendix J**.

**US EPA Region III Comment 9:** *Page 5-1 of the report states “Pending satisfactory performance of the*

*system (as defined by benzene recovery/destruction efficiencies and groundwater benzene concentration decreases) additional AS/SVE systems will be constructed and operated at the Former Coal Storage Area and Cover Area as IM Phase 2.” The Plan lacks information on how these parameters will be measured and the standards by which the system performance will be evaluated.*

**Response:** **Table 5-1** (attached hereto) describes the planned sampling and analytical protocol that will be used to evaluate performance of the prototype systems. It must be emphasized that this protocol will likely be adjusted and modified as the systems are brought on line and operational experience is acquired with each system. Accordingly, this represents the initial plan for performance evaluation.

The standards by which performance of the prototype systems will be evaluated are in keeping with the overall IM objective; that is to evaluate the effectiveness of the IM technology’s ability to reduce off-Site migration of contaminants in the groundwater plume. Severstal expects that contaminant mass removal in or near identified source areas will be documented through observed reductions (from current levels) in target contaminant (specifically benzene and naphthalene) concentrations in groundwater at the locations indicated in **Table 5-1**.

**US EPA Region III Comment 10:** *The Plan does not explain the rationale for selecting the location and orientation of the prototype cells.*

**Response:** Locations for the prototype cells were selected based on historical site investigation data (groundwater and soil sample analyses) that suggested implementation of IM technologies at or near these locations could either reduce the source mass of contaminants and/or reduce the migration of contaminants off-Site via the groundwater. For example, the Former Benzol Processing Area and Former Coal Tar Storage areas were selected for pilot testing based on elevated benzene and naphthalene concentrations, respectively, in groundwater at existing monitoring wells. These areas are viewed as “source” areas where contaminant reduction would provide a significant benefit to the reduction in long-term contaminant migration off-Site. The former Coal Storage and Cove Area locations were selected for prototype-scale technology evaluation for enhancing possible off-Site contaminant migration control based on historic off-Site surface water quality data.

**US EPA Region III Comment 11:** *The Plan should identify all groundwater wells and vapor monitoring locations in a map that will be monitored to evaluate system performance, including the testing methods, parameters and frequency of sampling during the initial evaluation period. The Plan should state that installation of addition groundwater wells and vapor monitoring locations may be required if EPA determines, during the initial evaluation period, that the existing configuration of monitoring is insufficient.*

**Response:** Comment Acknowledged. **Table 5-1** describes the planned sampling and monitoring locations and analyses. The wells and locations referenced in **Table 5-1** area shown on **Revised Figure 5-1** (both attached hereto). Should the existing configuration of monitoring locations prove to be insufficient, Severstal acknowledges that the EPA may request the installation of additional groundwater wells and vapor monitoring locations.

**US EPA Region III Comment 12:** *The Plan does not indicate if underground utilities may be present in the test areas that may impact the system performance and monitoring or present a safety hazard due to*

*vapor mitigation.*

**Response:** Comment acknowledged. The prototype system footprints will be determined based on existing underground utility information and will be adjusted accordingly.

***US EPA Region III Comment 13:*** *The Plan does not address if measures will be taken to prevent cross contamination from the use of the diesel or gasoline driven air compressors.*

**Response:** No diesel or gasoline driven air compressors are planned for use as part of the proposed IRMs. The internal combustion engine(s) used for the AS/SVE prototype systems will use propane and/or natural gas as supplemental fuel.

***US EPA Region III Comment 14:*** *The Plan proposal of six months to a year frame to evaluate the performance of the initial prototype cell, designated as Cell 1, prior to installation of Cell 2 and Cell 3 is excessive. The performance of Cell 1 based on the measurement of benzene recovery/destruction efficiencies and groundwater benzene concentrations decreases must be evaluated after three months of operation, and based on that evaluation, EPA shall determine if the initial cell design must be modified, and if construction of Cell 2 and Cell 3 with or without modification may proceed.*

**Response:** Comment acknowledged. Severstal does not believe 3 months of operation provides sufficient time to collect data necessary to fully evaluate the AS/SVE concept performance. Accordingly, Severstal plans on operating the Cell 1 AS/SVE system for 6 months before proceeding with design/construction of Prototype Cells 2 and/or 3. Severstal will submit monthly progress reports to US EPA, as requested in Comment # 16 below.

***US EPA Region III Comment 15:*** *The Plan should provide an updated map for the entire Coke Oven Area that shows all existing wells, new wells installed by the Maryland Port Administration, and new wells installed for the pilot test study.*

**Response:** Comment Acknowledged. Attached **Revised Figure 5-1** shows the requested information.

***US EPA Region III Comment 16:*** *Beginning one month after each cell is in operation, Severstal shall submit to EPA monthly progress reports on the performance of each cell by the last day of the following month by electronic and/or regular mail until such time EPA notifies Severstal to modify the reporting frequency. The monthly progress reports shall contain, at the minimum, the following information for the previous month: days of operation, air and water extraction rates, quantities of product recovered by groundwater and vapor extraction, estimated removal efficiency, vacuum pressure, water level and product thickness gauging in monitoring wells throughout the Coke Oven Study Area.*

**Response:** Comment acknowledged. Severstal will submit the requested monthly reports as indicated.

***US EPA Region III Comment 17:*** *After Cell 6 is in operation for 3 months, Severstal is required to submit a plan to further define the LNAPL plume previously delineated by the Maryland Port Authority in Attachment "D" and in the vicinity of CO04-PZM004. Such plan shall include installation of*

*additional monitoring wells in areas not adequately covered by existing wells as well as based on operation experience of the LNAPL recovery system.*

**Response:** Comment acknowledged.

**Table 5-1  
Performance Monitoring Plan  
IRM Prototype Systems  
Former Coke Oven Area  
Severstal Sparrows Point, LLC.**

Media/Parameter Sampled	Sample Description	Estimated Quantity	Parameter/Analyte	Analysis Method	Planned Analysis Frequency	Notes
<b>Former Benzol Processing Area (near well CO18-PZM006)</b>						
<b>Soil Gas</b>	ICE Influent	48	BTEX	PID/FID	Semi-Weekly or as required to optimize ICE performance and benzene removal.	Assumed initial evaluation for 6 months.*
	ICE Influent	6	BTEX/Methane	EPA Method TO-15	Monthly	Assumed initial evaluation for 6 months.* Methane analysis performed to assess total fuel gas composition to ICE.
	ICE Effluent	6	BTEX/Methane	EPA Method TO-15	Monthly	Assumed initial evaluation period for 6 months.
<b>Former Coal Tar Storage Area (near well CO13-PZM008)</b>						
<b>Groundwater</b>	CO02-PZM006	6	BTEX	EPA Method 8260B	Monthly	Assumed initial evaluation for 6 months.*
	CO18-PZM006	6	BTEX	EPA Method 8260B	Monthly	Assumed initial evaluation for 6 months.*
	CO17-PSM005	6	BTEX	EPA Method 8260B	Monthly	Assumed initial evaluation for 6 months.*
	CO13-PZM008	6	BTEX/Naphthalene	EPA Methods 8260B/8270C	Monthly	Assumed initial evaluation for 6 months.*
	CT-MW-01	6	BTEX/Naphthalene	EPA Methods 8260B/8270C	Monthly	Assumed initial evaluation for 6 months.*
<b>Groundwater</b>	CO26-PZM007	6	BTEX/Naphthalene	EPA Methods 8260B/8270C	Monthly	Assumed initial evaluation for 6 months.*
	Treatment System Influent	6	BTEX/Naphthalene	EPA Methods 8260B/8270C	Monthly	Assumed initial evaluation for 6 months.*
	Treatment System Effluent	6	BTEX/Naphthalene	EPA Methods 8260B/8270C	Monthly	Assumed initial evaluation for 6 months.* This analysis is performed on the treated groundwater prior to re-injection.
<b>Cove Area (near well CO30-PZM015)**</b>						
<b>Soil Gas</b>	ICE Influent	48	BTEX	PID/FID	Semi-Weekly or as required to optimize ICE performance and benzene removal.	Assumed initial evaluation for 6 months.*
	ICE Influent	6	BTEX/Methane	EPA Method TO-15	Monthly	Assumed initial evaluation for 6 months.* Methane analysis performed to assess total fuel gas composition to ICE.
	ICE Effluent	6	BTEX/Methane	EPA Method TO-15	Monthly	Assumed initial evaluation period for 6 months.
<b>Groundwater</b>	CO30-PZM015	6	BTEX	EPA Method 8260B	Monthly	Assumed initial evaluation for 6 months.*
<b>Graving Dock Area (near well CO27-PZM012)</b>						
<b>Soil Gas**</b>	ICE Influent	48	BTEX	PID/FID	Semi-Weekly or as required to optimize ICE performance and benzene removal.	Assumed initial evaluation for 6 months.*
	ICE Influent	6	BTEX/Methane	EPA Method TO-15	Monthly	Assumed initial evaluation for 6 months.* Methane analysis performed to assess total fuel gas composition to ICE.
	ICE Effluent	6	BTEX/Methane	EPA Method TO-15	Monthly	Assumed initial evaluation period for 6 months.
<b>Groundwater***</b>	CO27-PZM012**	6	BTEX/Naphthalene	EPA Methods 8260B/8270C	Monthly	Assumed initial evaluation for 6 months.*
	CO27-PZM046	6	BTEX/Naphthalene	EPA Methods 8260B/8270C	Monthly	Assumed initial evaluation for 6 months.*
	5 downgradient and 3 upgradient wells within prototype treatment cell	192	Dissolved Oxygen/Oxidation-Reduction Potential, pH, Conductivity	Field Water Quality Instrument - Downhole Measurement	Weekly	Assumed initial evaluation for 6 months.*
	5 downgradient and 3 upgradient wells within prototype treatment cell	48	BTEX/Naphthalene	EPA Methods 8260B/8270C	Monthly	Assumed initial evaluation for 6 months.*

**Notes:**

\* Number of samples to vary, depending on overall system adjustments and operational performance

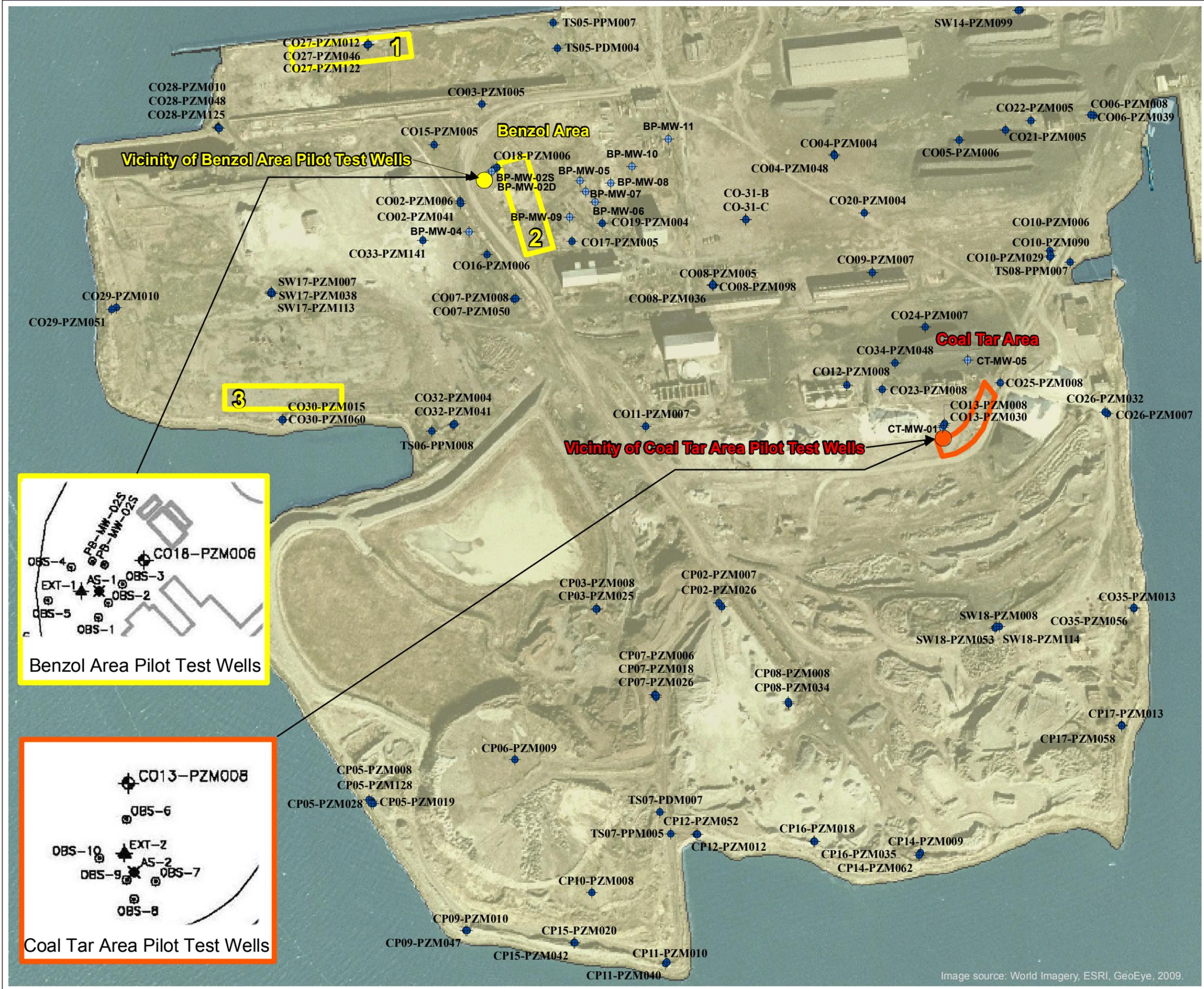
\*\* Contingent on the performance of the Former Benzol Processing Area prototype

\*\*\* Evaluation as part of pulsed air/oxygen injection treatment system

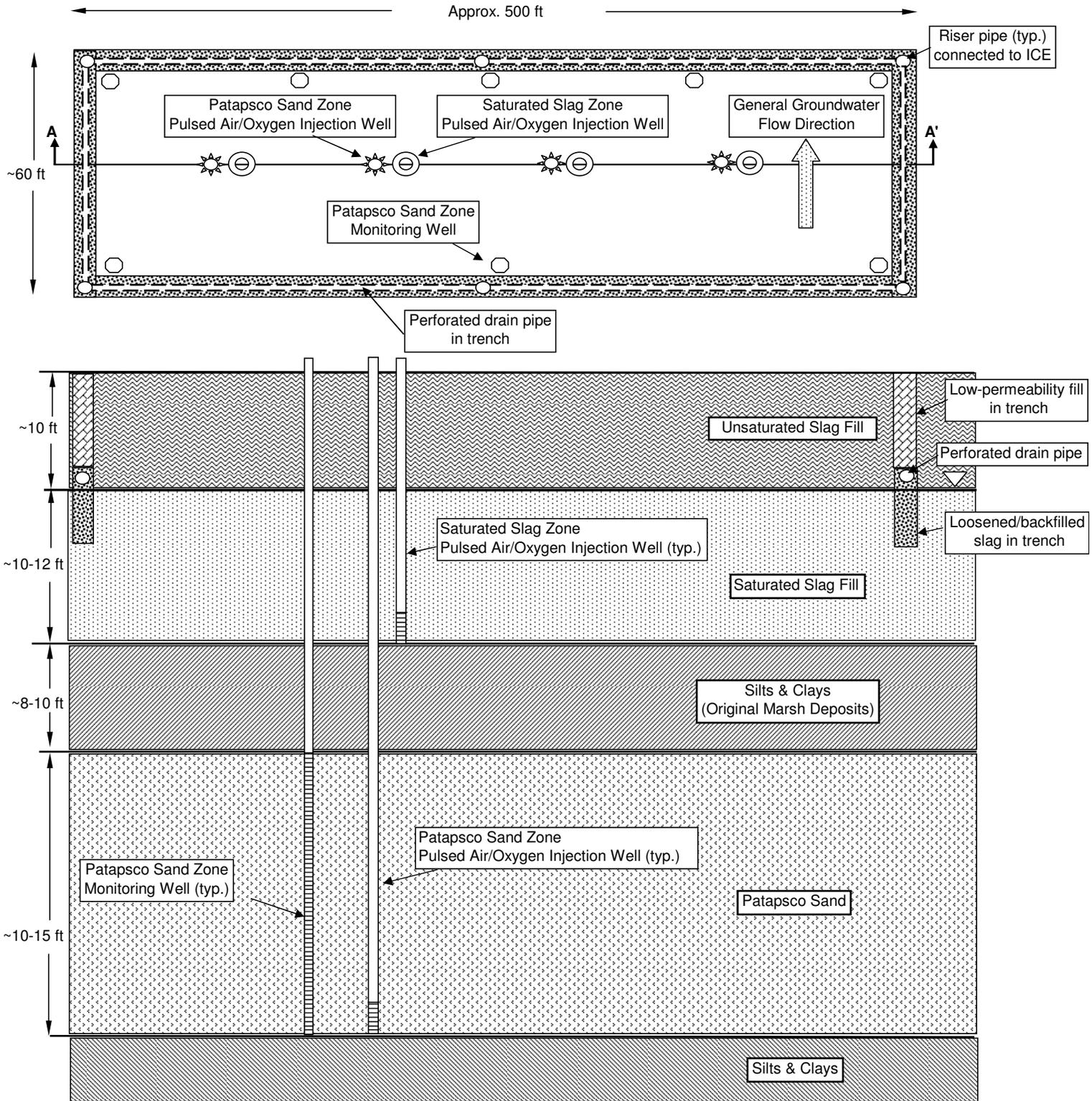
The installation of additional monitoring wells and vapor monitoring points may be required if EPA determines, during the initial evaluation period, that the existing configuration of monitoring is insufficient

BTEX = Benzene, Toluene, Ethylbenzene and Total Xylenes

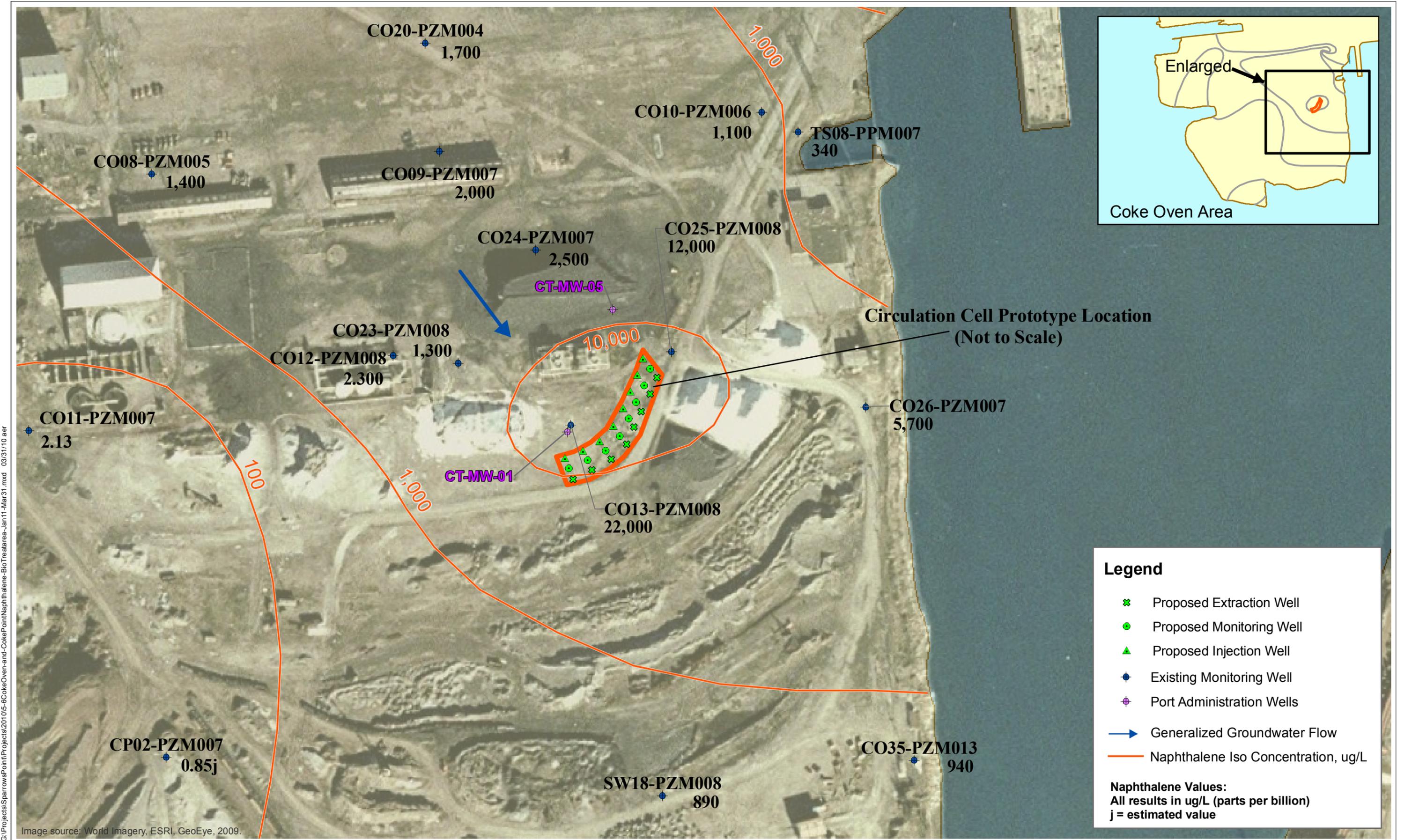
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**Revised Figure 5-4**  
**Schematic Diagram - Prototype AS/SVE and Air/Oxygen Injection System**  
**Former Coal Storage Area**  
**Severstal Sparrows Point, LLC.**



**Section A-A'**  
(not to scale)



G:\Projects\SparrowsPoint\Projects\2010\5-6CokeOven-and-CokePoint\Naphthalene-Bio-Treatarea-Jan11-Mar31.mxd 03/31/10 aer

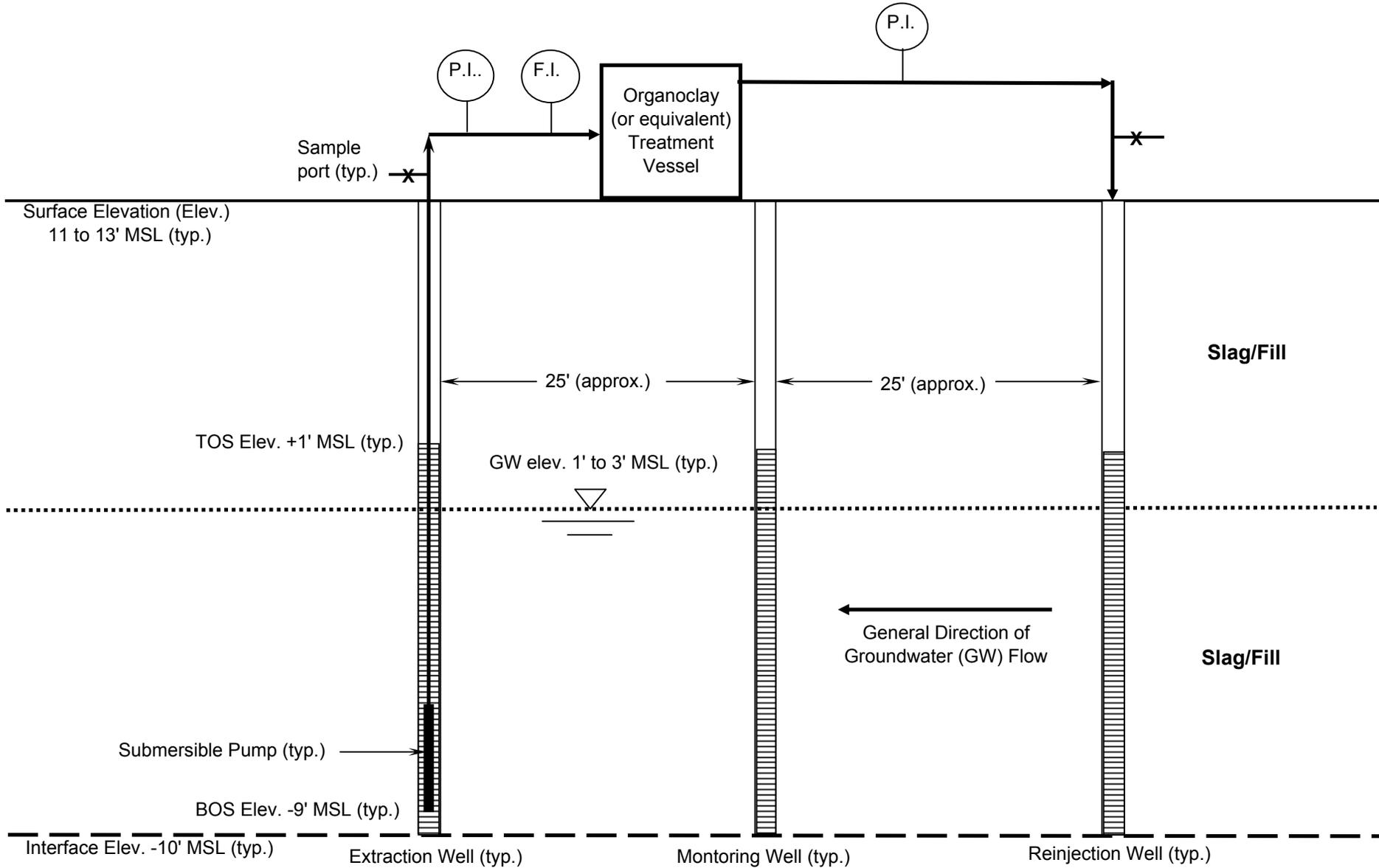
Image source: World Imagery, ESRI, GeoEye, 2009.



**Revised Figure 5-6**  
**Coal Tar Area**  
**In-situ Anaerobic Bio-Treatment Area<sup>(a)</sup>**

<sup>(a)</sup>Injection and monitoring well locations may be adjusted based on surface features and subsurface conditions encountered during drilling.

**Revised Figure 5-7**  
**Schematic Diagram of Proposed Enhanced Anaerobic Bio-Treatment Re-Circulation System**  
**Former Coal Tar Storage Area**  
**Severstal Sparrows Point, LLC**



BOS = Bottom of well screen  
TOS = Top of well screen  
F.I. = Flow Indicator  
P.I. = Pressure Indicator  
MSL = Mean Sea Level

**Silts and Clays**

APPENDIX J

Analytical Packages  
(AS-1 And AS-2)



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### COVER LETTER

Bill Eaton  
URS-Gaithersburg  
200 Orchard Ridge Dr.  
Gaithersburg, MD 20878  
RE: Sparrows Point

November 11, 2009  
Report No.: 09J0673

The report of analyses contains test results for samples received at Microbac Laboratories, Inc., Baltimore Division on 10/14/2009 13:10.

The enclosed results were obtained from and applicable to the sample(s) as received at the laboratory. All sample results are reported on an "as received" basis unless otherwise noted.

All data included in this report has been reviewed and meet the applicable project and certification specific requirements, unless otherwise noted.

This report has been paginated in its entirety and shall not be reproduced except in full, without the written approval of Microbac Laboratories, Inc.

We appreciate the opportunity to service your analytical needs. If you have any questions, please feel free to contact us.

This Data Package contains the following:

- This Cover Page
- Sample Summary
- Test Results
- Notes and Definitions
- Cooler Receipt Log
- Chain of Custody

A handwritten signature in black ink, appearing to read "Melanie C. Duszynski".

11/11/2009

Final report reviewed by:

Melanie C. Duszynski/Project Manager

Report issue date

*All samples received in proper condition and results conform to ISO 17025 standards unless otherwise noted.*

*If we have not met or exceeded your expectations, please contact the Director or Trevor Boyce, President at tboyce@microbac.com or Robert Morgan, Chief Operation Officer, at rmorgan@microbac.com.*



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**CERTIFICATE OF ANALYSIS**

URS-Gaithersburg 200 Orchard Ridge Dr. Gaithersburg, MD 20878	Project: Sparrows Point Project Number: Sparrows Point Project Manager: Bill Eaton	Report: 09J0673 Reported: 11/11/2009 11:31
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**SAMPLE SUMMARY**

Sample ID	Laboratory ID	Matrix	Type	Date Sampled	Date Received
AS-1 (0-2)	09J0673-01	Solid	Grab	10/13/2009 11:50	10/14/2009 13:10
AS-1 (2-4)	09J0673-02	Solid	Grab	10/13/2009 11:55	10/14/2009 13:10
AS-1 (4-6)	09J0673-03	Solid	Grab	10/13/2009 12:10	10/14/2009 13:10
AS-1 (6-8)	09J0673-04	Solid	Grab	10/13/2009 12:30	10/14/2009 13:10
AS-1 (8-10)	09J0673-05	Solid	Grab	10/13/2009 12:38	10/14/2009 13:10
AS-1 (10-12)	09J0673-06	Solid	Grab	10/13/2009 12:45	10/14/2009 13:10
AS-1 (12-14)	09J0673-07	Solid	Grab	10/13/2009 13:00	10/14/2009 13:10
AS-1 (14-16)	09J0673-08	Solid	Grab	10/13/2009 13:05	10/14/2009 13:10
AS-1 (18-20)	09J0673-09	Solid	Grab	10/13/2009 14:45	10/14/2009 13:10
AS-1 (20-22)	09J0673-10	Solid	Grab	10/13/2009 14:50	10/14/2009 13:10
AS-1 (22-24)	09J0673-11	Solid	Grab	10/13/2009 15:05	10/14/2009 13:10

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Melanie C. Duszynski, Project Manager

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**AS-1 (0-2)**

**09J0673-01 (Solid) Sampled: 10/13/2009 11:50; Type: Grab**

Analyte	Result	Reporting Limit	Units	Prepared	Analyzed	Analyst	Method	Notes
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**Microbac Laboratories, Inc., Baltimore Division**

**Wet Chemistry**

<b>% Solids</b>	<b>90.16</b>	<b>0.05</b>	<b>% by Weight</b>	<b>102109 1507</b>	<b>102209 1301</b>	<b>LCR</b>	<b>SM (20) 2540G</b>	
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**DNAPL Qualitative Determination**

<b>Odor</b>	<b>No</b>		<b>N/A</b>	<b>102109 1600</b>	<b>102709 1137</b>	<b>EMG</b>	<b>ASTM D 3987 Modified</b>	
<b>Sheen</b>	<b>No</b>		<b>N/A</b>	<b>102109 1600</b>	<b>102709 1137</b>	<b>EMG</b>	<b>ASTM D 3987 Modified</b>	
<b>Visible Product</b>	<b>No</b>		<b>N/A</b>	<b>102109 1600</b>	<b>102709 1137</b>	<b>EMG</b>	<b>ASTM D 3987 Modified</b>	

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Melanie C. Duszynski, Project Manager

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---	--	---

**AS-1 (2-4)**

**09J0673-02 (Solid) Sampled: 10/13/2009 11:55; Type: Grab**

Analyte	Result	Reporting Limit	Units	Prepared	Analyzed	Analyst	Method	Notes
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**Microbac Laboratories, Inc., Baltimore Division**

**Wet Chemistry**

<b>% Solids</b>	<b>90.80</b>	0.05	% by Weight	102109 1507	102209 1301	LCR	SM (20) 2540G	
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**DNAPL Qualitative Determination**

<b>Odor</b>	No		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
<b>Sheen</b>	No		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
<b>Visible Product</b>	No		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	

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**AS-1 (4-6)**

**09J0673-03 (Solid) Sampled: 10/13/2009 12:10; Type: Grab**

Analyte	Result	Reporting Limit	Units	Prepared	Analyzed	Analyst	Method	Notes
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**Microbac Laboratories, Inc., Baltimore Division**

**Wet Chemistry**

<b>% Solids</b>	<b>83.38</b>	<b>0.05</b>	<b>% by Weight</b>	<b>102109 1507</b>	<b>102209 1302</b>	<b>LCR</b>	<b>SM (20) 2540G</b>	
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**DNAPL Qualitative Determination**

<b>Odor</b>	<b>No</b>		<b>N/A</b>	<b>102109 1600</b>	<b>102709 1137</b>	<b>EMG</b>	<b>ASTM D 3987 Modified</b>	
<b>Sheen</b>	<b>No</b>		<b>N/A</b>	<b>102109 1600</b>	<b>102709 1137</b>	<b>EMG</b>	<b>ASTM D 3987 Modified</b>	
<b>Visible Product</b>	<b>No</b>		<b>N/A</b>	<b>102109 1600</b>	<b>102709 1137</b>	<b>EMG</b>	<b>ASTM D 3987 Modified</b>	

**Volatile Organic Compounds by EPA Method 8260B**

<b>Benzene</b>	<b>7700</b>	<b>300</b>	<b>ug/kg dry</b>	<b>102009 1600</b>	<b>102109 1937</b>	<b>EMG</b>	<b>EPA 8260B</b>	<b>D</b>
<i>Surrogate: Dibromofluoromethane</i>		<i>95.4%</i>	<i>80-120</i>	<i>102009 1600</i>	<i>102109 1937</i>		<i>EPA 8260B</i>	
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>98.0%</i>	<i>80-120</i>	<i>102009 1600</i>	<i>102109 1937</i>		<i>EPA 8260B</i>	
<i>Surrogate: Toluene-d8</i>		<i>105%</i>	<i>75-120</i>	<i>102009 1600</i>	<i>102109 1937</i>		<i>EPA 8260B</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>100%</i>	<i>60-149</i>	<i>102009 1600</i>	<i>102109 1937</i>		<i>EPA 8260B</i>	

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**AS-1 (6-8)**

**09J0673-04 (Solid) Sampled: 10/13/2009 12:30; Type: Grab**

Analyte	Result	Reporting Limit	Units	Prepared	Analyzed	Analyst	Method	Notes
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**Wet Chemistry**

% Solids	78.98	0.05	% by Weight	102109 1507	102209 1302	LCR	SM (20) 2540G	
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**DNAPL Qualitative Determination**

Odor	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
Sheen	No		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
Visible Product	No		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	

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**AS-1 (8-10)**

**09J0673-05 (Solid) Sampled: 10/13/2009 12:38; Type: Grab**

Analyte	Result	Reporting Limit	Units	Prepared	Analyzed	Analyst	Method	Notes
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**Microbac Laboratories, Inc., Baltimore Division**

**Wet Chemistry**

% Solids	84.62	0.05	% by Weight	102109 1507	102209 1302	LCR	SM (20) 2540G	
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**DNAPL Qualitative Determination**

Odor	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
Sheen	No		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
Visible Product	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	

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**AS-1 (10-12)**

**09J0673-06 (Solid) Sampled: 10/13/2009 12:45; Type: Grab**

Analyte	Result	Reporting Limit	Units	Prepared	Analyzed	Analyst	Method	Notes
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**Microbac Laboratories, Inc., Baltimore Division**

**Wet Chemistry**

% Solids	86.40	0.05	% by Weight	102109 1507	102209 1302	LCR	SM (20) 2540G	
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**DNAPL Qualitative Determination**

Odor	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
Sheen	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
Visible Product	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	

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**AS-1 (12-14)**

**09J0673-07 (Solid) Sampled: 10/13/2009 13:00; Type: Grab**

Analyte	Result	Reporting Limit	Units	Prepared	Analyzed	Analyst	Method	Notes
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**Microbac Laboratories, Inc., Baltimore Division**

**Wet Chemistry**

% Solids	61.87	0.05	% by Weight	102109 1507	102209 1303	LCR	SM (20) 2540G	
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**DNAPL Qualitative Determination**

Odor	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
Sheen	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
Visible Product	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	

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**AS-1 (14-16)**

09J0673-08 (Solid) Sampled: 10/13/2009 13:05; Type: Grab

Analyte	Result	Reporting Limit	Units	Prepared	Analyzed	Analyst	Method	Notes
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**Wet Chemistry**

% Solids	56.40	0.05	% by Weight	102109 1507	102209 1303	LCR	SM (20) 2540G	
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**DNAPL Qualitative Determination**

Odor	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
Sheen	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
Visible Product	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	

**Volatile Organic Compounds by EPA Method 8260B**

<b>Benzene</b>	<b>23000000</b>	<b>850000</b>	<b>ug/kg dry</b>	<b>102009 1600</b>	<b>102109 2051</b>	<b>EMG</b>	<b>EPA 8260B</b>	<b>D, Z10</b>
Surrogate: Dibromofluoromethane		96.6%	80-120	102009 1600	102109 2051		EPA 8260B	Z10
Surrogate: 1,2-Dichloroethane-d4		103%	80-120	102009 1600	102109 2051		EPA 8260B	Z10
Surrogate: Toluene-d8		110%	75-120	102009 1600	102109 2051		EPA 8260B	Z10
Surrogate: 4-Bromofluorobenzene		104%	60-149	102009 1600	102109 2051		EPA.8260B	Z10

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**AS-1 (18-20)**

**09J0673-09 (Solid) Sampled: 10/13/2009 14:45; Type: Grab**

Analyte	Result	Reporting Limit	Units	Prepared	Analyzed	Analyst	Method	Notes
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**Microbac Laboratories, Inc., Baltimore Division**

**Wet Chemistry**

% Solids	69.25	0.05	% by Weight	102109 1507	102209 1303	LCR	SM (20) 2540G	
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**DNAPL Qualitative Determination**

Odor	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
Sheen	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
Visible Product	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	

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**AS-1 (20-22)**

**09J0673-10 (Solid) Sampled: 10/13/2009 14:50; Type: Grab**

Analyte	Result	Reporting Limit	Units	Prepared	Analyzed	Analyst	Method	Notes
---------	--------	-----------------	-------	----------	----------	---------	--------	-------

**Microbac Laboratories, Inc., Baltimore Division**

**Wet Chemistry**

% Solids	55.38	0.05	% by Weight	102109 1507	102209 1303	LCR	SM (20) 2540G	
----------	-------	------	-------------	-------------	-------------	-----	---------------	--

**DNAPL Qualitative Determination**

Odor	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
Sheen	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
Visible Product	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	

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**AS-1 (22-24)**

**09J0673-11 (Solid) Sampled: 10/13/2009 15:05; Type: Grab**

Analyte	Result	Reporting Limit	Units	Prepared	Analyzed	Analyst	Method	Notes
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**Microbac Laboratories, Inc., Baltimore Division**

**Wet Chemistry**

% Solids	71.11	0.05	% by Weight	102109 1507	102209 1304	LCR	SM (20) 2540G	
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**DNAPL Qualitative Determination**

Odor	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
Sheen	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	
Visible Product	Yes		N/A	102109 1600	102709 1137	EMG	ASTM D 3987 Modified	

**Volatile Organic Compounds by EPA Method 8260B**

<b>Benzene</b>	<b>3200000</b>	<b>330000</b>	<b>ug/kg dry</b>	<b>102009 1600</b>	<b>102109 2014</b>	<b>EMG</b>	<b>EPA 8260B</b>	<b>D, Z10</b>
Surrogate: Dibromofluoromethane		96.6%	80-120	102009 1600	102109 2014		EPA 8260B	Z10
Surrogate: 1,2-Dichloroethane-d4		103%	80-120	102009 1600	102109 2014		EPA 8260B	Z10
Surrogate: Toluene-d8		112%	75-120	102009 1600	102109 2014		EPA 8260B	Z10
Surrogate: 4-Bromofluorobenzene		103%	60-149	102009 1600	102109 2014		EPA 8260B	Z10

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**Notes and Definitions**

- Z5a Yes
- Z5 No
- Z10 Sample analyzed outside 12 hour tune window. Data estimated.
- D Sample Diluted
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

**Certifications**

*Below is a list of certifications maintained by Microbac Laboratories, Inc. All data included in this report has been reviewed for and meets all project specific and quality control requirements of the applicable accreditation, unless otherwise noted. A complete list of individual analytes pursuant to each certification below is available upon request.*

- A2LA (Microbiology): 410.02
- A2LA (Environmental): 410.01
- A2LA (ELLAP): 410.01
- CPSC: 1115
- Maryland: 109
- Pennsylvania (NELAC): 68-00339
- USDA: S-53726
- Virginia: 00152

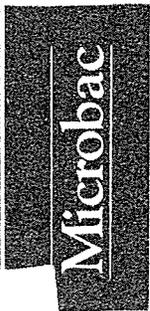
**Cooler Receipt Log**

**Cooler ID:** Default Cooler

**Cooler Temp:** 2.60 °C

Custody Seals Intact:	Yes	COC/Containers Agree:	Yes
Containers Intact:	Yes	Correct Preservation:	Yes
Received On Ice:	Yes	Correct Number of Containers Received:	Yes
Radiation Scan Acceptable:	Yes	Sufficient Sample Volume for Testing:	Yes
COC Present:	Yes	Samples Received in Proper Condition:	Yes

**Comments:**



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 Baltimore, MD 21224  
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 Fax: 410-633-6553  
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**Sample Submittal**  
 Chain of Custody Record

Work Order Number: 09J00073

Page 1 of 2

Client Name URS Corporation Project Severstal Steel NPDES YES/NO Turnaround Time (Required) \_\_\_\_\_ QC and EDD Type (Required) \_\_\_\_\_  
 Address 200 Orchard Ridge Dr. # Location Sparrows Point, MD  Standard  Level I (NAC)  EDD  
 City, State, Zip Gaithersburg MD 20878 PO # \_\_\_\_\_  RUSH\* (notify lab) \_\_\_\_\_ Format: \_\_\_\_\_  
 Contact Bill Eaton MDE Drinking Water Certified Sampler? YES / NO \_\_\_\_\_ (needed by) \_\_\_\_\_ Comments: \_\_\_\_\_  
 Telephone # 301-258-5804 Certification # \_\_\_\_\_

Sampled by (PRINT) Christine Matherly Sampler Signature Christine Matherly Sampler Phone # 301-305-8827  
 Send Report via  e-mail (address) bill\_eaton@urscorp.com  Mail  Telephone  Fax (fax #) \_\_\_\_\_ Hard Copy  YES  NO

\* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

Client Sample ID	Matrix*	Grab	Composite	Filtered	Date Collected	Time Collected	No. of Containers	Requested Analysis	Comments
AS-1(0-2)	S	✓			10/13/09	1150	2	Benzene 8260	* by Appropriate ASTM Method
AS-1(2-4)	S	✓			10/13/09	1155	1		
AS-1(4-6)	S	✓			10/13/09	1210	1		
AS-1(6-8)	S	✓			10/13/09	1230	1		
AS-1(8-10)	S	✓			10/13/09	1238	1		
AS-1(10-12)	S	✓			10/13/09	1245	1		
AS-1(12-14)	S	✓			10/13/09	1300	1		
AS-1(14-16)	S	✓			10/13/09	1305	1		
AS-1(18-20)	S	✓			10/13/09	1445	1		

Possible Hazard Identification  Hazardous  Non-Hazardous  Radioactive  Disposed as appropriate  Return  Archive  
 Number of Containers: \_\_\_\_\_  
 Relinquished By (signature) Christine Matherly Date/Time 10/14/09/1310 Received By (signature) [Signature] Printed Name/Affiliation \_\_\_\_\_  
 Relinquished By (signature) \_\_\_\_\_ Date/Time \_\_\_\_\_ Received By (signature) \_\_\_\_\_ Printed Name/Affiliation \_\_\_\_\_  
 Relinquished By (signature) \_\_\_\_\_ Date/Time \_\_\_\_\_ Received for Lab By (signature) \_\_\_\_\_ Printed Name/Affiliation \_\_\_\_\_



Number of Coolers Received: 1  
Client: URS CORP  
Form Completed By: VG

Receipt Date / Time: 10/14/09 1310  
Work Order # \_\_\_\_\_

Shipper:  
Custody Tape Intact:  
Containers Intact:  
Sample Received on Ice or refrigerated:

Microbac  Client  UPS  FedEx  
YES / NO / NA

YES / NO

YES / NO

Temperature: \_\_\_\_\_ °C or  
Infrared (IR) Temperature: 2.6 °C

Negative or \_\_\_\_\_ mR/hr

YES / NO

YES / NO

YES / NO / Not Checked

YES / No (If No. contact client immediately)

YES / NO / NA

Water Soil Wipes Oil Filter Solid  
Sludge Food Other

Radiation Scan:  
Chain of Custody Present with shipment:  
Sample Bottle IDs agree with COC:  
Preservation requirements met:  
Correct Number of Containers / Sample Volume:  
Headspace in container:  
Type of Sample:

Container Type / Quantity:															
A -	___	Unpreserved	___	H2SO4	___	HNO3	___	HCl	___	NaOH	___	NaOH/Ascorbic Acid	___	Other(	_____)
B -	___	Unpreserved	___	H2SO4	___	HNO3	___	HCl	___	NaOH	___	NaOH/Ascorbic Acid	___	Other(	_____)
C -	___	Unpreserved	___	H2SO4	___	HNO3	___	HCl	___	NaOH	___	NaOH/Ascorbic Acid	___	Other(	_____)
D -	___	Unpreserved	___	H2SO4	___	HNO3	___	HCl	___	NaOH	___	NaOH/Ascorbic Acid	___	Other(	_____)
E -	___	Unpreserved	___	H2SO4	___	HNO3	___	HCl	___	NaOH	___	NaOH/Ascorbic Acid	___	Other(	_____)
H -	___	Unpreserved	___	H2SO4	___	HNO3	___	HCl	___	NaOH	___	NaOH/Ascorbic Acid	___	Other(	_____)
K -	<u>12</u>	Unpreserved	___	H2SO4	___	HNO3	___	HCl	___	NaOH	___	NaOH/Ascorbic Acid	___	Other(	_____)
L -	___	Unpreserved	___	H2SO4	___	HNO3	___	HCl	___	NaOH	___	NaOH/Ascorbic Acid	___	Other(	_____)
M -	___	Unpreserved	___	H2SO4	___	HNO3	___	HCl	___	NaOH	___	NaOH/Ascorbic Acid	___	Other(	_____)
W -	___	Unpreserved	___	H2SO4	___	HNO3	___	HCl	___	NaOH	___	NaOH/Ascorbic Acid	___	Other(	_____)
V -	___	Unpreserved	___	HCl	___	HCl / Ascorbic Acid	___	HCl / NaTHIO	(Checked at time of Analysis)						
F -	___	Unpreserved	___	NaTHIO	(Checked at time of Analysis)										
S -	___	Unpreserved	___	NaTHIO	(Checked at time of Analysis)										
SN -	___	Unpreserved	___	NaTHIO	___	NaTHIO/EDTA	(Checked at time of Analysis)								
J -	___	Unpreserved	___	H2SO4	___	HNO3	___	HCl	___	NaOH	___	NaOH/Ascorbic Acid	___	Other(	_____)
___	___	Unpreserved	___	H2SO4	___	HNO3	___	HCl	___	NaOH	___	NaOH/Ascorbic Acid	___	Other(	_____)
___	___	Unpreserved	___	H2SO4	___	HNO3	___	HCl	___	NaOH	___	NaOH/Ascorbic Acid	___	Other(	_____)

**Describe preservation requirements not met:**

All Acid preserved <2 pH      NaOH preserved >12 pH      All others >2 and <10 (usually 4-8)

Sample ID: \_\_\_\_\_ H<sub>2</sub>SO<sub>4</sub> HNO<sub>3</sub> NaOH \_\_\_\_\_ mls added

Sample ID: \_\_\_\_\_ H<sub>2</sub>SO<sub>4</sub> HNO<sub>3</sub> NaOH \_\_\_\_\_ mls added

Sample ID: \_\_\_\_\_ H<sub>2</sub>SO<sub>4</sub> HNO<sub>3</sub> NaOH \_\_\_\_\_ mls added

Sample ID: \_\_\_\_\_ H<sub>2</sub>SO<sub>4</sub> HNO<sub>3</sub> NaOH \_\_\_\_\_ mls added

H<sub>2</sub>SO<sub>4</sub> - Sulfuric Acid, HNO<sub>3</sub> - Nitric Acid, NaOH - Sodium Hydroxide, ASC - Ascorbic Acid, NaTHIO - Sodium Thiosulfate

Describe Anomalies: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Contact information / Summary of Actions:**

Date / Time: \_\_\_\_\_ Contact: \_\_\_\_\_ Contact By: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**Microbac Laboratories, Inc.**  
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Phone: 410-633-1800  
Fax: 410-633-6553  
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### COVER LETTER

Bill Eaton  
URS-Gaithersburg  
200 Orchard Ridge Dr.  
Gaithersburg, MD 20878  
RE: Sparrows Point

November 25, 2009  
Report No.: 09K0039

The report of analyses contains test results for samples received at Microbac Laboratories, Inc., Baltimore Division on 10/30/2009 15:20.

The enclosed results were obtained from and applicable to the sample(s) as received at the laboratory. All sample results are reported on an "as received" basis unless otherwise noted.

All data included in this report has been reviewed and meet the applicable project and certification specific requirements, unless otherwise noted.

This report has been paginated in its entirety and shall not be reproduced except in full, without the written approval of Microbac Laboratories, Inc.

We appreciate the opportunity to service your analytical needs. If you have any questions, please feel free to contact us.

This Data Package contains the following:

- This Cover Page
- Sample Summary
- Test Results
- Notes and Definitions
- Cooler Receipt Log
- Chain of Custody

A handwritten signature in cursive script that reads "Melanie C. Duszynski".

11/25/2009

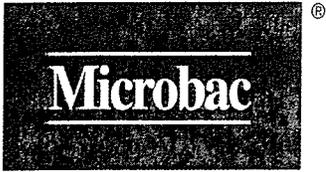
Final report reviewed by:

Melanie C. Duszynski/Project Manager

Report issue date

*All samples received in proper condition and results conform to ISO 17025 standards unless otherwise noted.*

*If we have not met or exceeded your expectations, please contact the Director or Trevor Boyce, President at tboyce@microbac.com or Robert Morgan, Chief Operation Officer, at rmorgan@microbac.com.*



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Baltimore Division  
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**CERTIFICATE OF ANALYSIS**

URS-Gaithersburg 200 Orchard Ridge Dr. Gaithersburg, MD 20878	Project: Sparrows Point Project Number: Sparrows Point Project Manager: Bill Eaton	Report: 09K0039 Reported: 11/25/2009 09:19
---	--	---

**SAMPLE SUMMARY**

Sample ID	Laboratory ID	Matrix	Type	Date Sampled	Date Received
AS-2 (4-6)	09K0039-01	Solid	Grab	10/29/2009 14:43	10/30/2009 15:20
AS-2 (6-8)	09K0039-02	Solid	Grab	10/29/2009 15:05	10/30/2009 15:20
AS-2 (12-14)	09K0039-03	Solid	Grab	10/30/2009 09:15	10/30/2009 15:20
AS-2 (14-16)	09K0039-04	Solid	Grab	10/30/2009 09:22	10/30/2009 15:20
AS-2 (16-18)	09K0039-05	Solid	Grab	10/30/2009 09:35	10/30/2009 15:20
AS-2 (18-19.5)	09K0039-06	Solid	Grab	10/30/2009 09:55	10/30/2009 15:20

Microbac Laboratories, Inc., Baltimore Division

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Melanie C. Duszynski, Project Manager



# Microbac Laboratories, Inc.

Baltimore Division

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## CERTIFICATE OF ANALYSIS

URS-Gaithersburg  
200 Orchard Ridge Dr.  
Gaithersburg, MD 20878

Project: Sparrows Point  
Project Number: Sparrows Point  
Project Manager: Bill Eaton

Report: 09K0039  
Reported: 11/25/2009 09:19

AS-2 (4-6)

09K0039-01 (Solid) Sampled: 10/29/2009 14:43; Type: Grab

Analyte	Result	Reporting Limit	Units	Prepared	Analyzed	Analyst	Method	Notes
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### Microbac Laboratories, Inc., Baltimore Division

#### Wet Chemistry

% Solids	83.98	0.05	% by Weight	110509 1045	110609 0905	LCR	SM (20) 2540G	
----------	-------	------	-------------	-------------	-------------	-----	---------------	--

#### DNAPL Qualitative Determination

Odor	No		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	
Sheen	No		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	
Visible Product	No		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	

Microbac Laboratories, Inc., Baltimore Division

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Melanie C. Duszynski, Project Manager



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**CERTIFICATE OF ANALYSIS**

URS-Gaithersburg  
200 Orchard Ridge Dr.  
Gaithersburg, MD 20878

Project: Sparrows Point  
Project Number: Sparrows Point  
Project Manager: Bill Eaton

Report: 09K0039  
Reported: 11/25/2009 09:19

AS-2 (6-8)

09K0039-02 (Solid) Sampled: 10/29/2009 15:05; Type: Grab

Analyte	Result	Reporting Limit	Units	Prepared	Analyzed	Analyst	Method	Notes
---------	--------	-----------------	-------	----------	----------	---------	--------	-------

**Microbac Laboratories, Inc., Baltimore Division**

**Wet Chemistry**

% Solids	90.76	0.05	% by Weight	110509 1045	110609 0905	LCR	SM (20) 2540G	
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**DNAPL Qualitative Determination**

Odor	No		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	
Sheen	No		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	
Visible Product	No		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	

**Acid and Base/Neutral Extractables by EPA Method 8270C**

Naphthalene	4600	940	ug/kg dry	110909 1300	111309 0322	RIS	EPA 8270C	D, B
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Microbac Laboratories, Inc., Baltimore Division

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Melanie C. Duszynski, Project Manager



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Baltimore Division

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## CERTIFICATE OF ANALYSIS

URS-Gaithersburg  
200 Orchard Ridge Dr.  
Gaithersburg, MD 20878

Project: Sparrows Point  
Project Number: Sparrows Point  
Project Manager: Bill Eaton

Report: 09K0039  
Reported: 11/25/2009 09:19

### AS-2 (12-14)

09K0039-03 (Solid) Sampled: 10/30/2009 09:15; Type: Grab

Analyte	Result	Reporting Limit	Units	Prepared	Analyzed	Analyst	Method	Notes
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### Microbac Laboratories, Inc., Baltimore Division

#### Wet Chemistry

% Solids	83.24	0.05	% by Weight	110509 1045	110609 0906	LCR	SM (20) 2540G	
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#### DNAPL Qualitative Determination

Odor	Yes		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	
Sheen	Yes		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	
Visible Product	Yes		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	

#### Acid and Base/Neutral Extractables by EPA Method 8270C

Naphthalene	28000	4100	ug/kg dry	110909 1300	111309 2024	RIS	EPA 8270C	D, B
-------------	-------	------	-----------	-------------	-------------	-----	-----------	------

Microbac Laboratories, Inc., Baltimore Division

Melanie C. Duszynski, Project Manager

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## CERTIFICATE OF ANALYSIS

URS-Gaithersburg  
200 Orchard Ridge Dr.  
Gaithersburg, MD 20878

Project: Sparrows Point  
Project Number: Sparrows Point  
Project Manager: Bill Eaton

Report: 09K0039  
Reported: 11/25/2009 09:19

AS-2 (14-16)

09K0039-04 (Solid) Sampled: 10/30/2009 09:22; Type: Grab

Analyte	Result	Reporting Limit	Units	Prepared	Analyzed	Analyst	Method	Notes
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### Microbac Laboratories, Inc., Baltimore Division

#### Wet Chemistry

% Solids	85.58	0.05	% by Weight	110509 1045	110609 0906	LCR	SM (20) 2540G	
----------	-------	------	-------------	-------------	-------------	-----	---------------	--

#### DNAPL Qualitative Determination

Odor	Yes		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	
Sheen	No		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	
Visible Product	No		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	

Microbac Laboratories, Inc., Baltimore Division

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Melanie C. Duszynski, Project Manager



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Baltimore Division

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## CERTIFICATE OF ANALYSIS

URS-Gaithersburg  
200 Orchard Ridge Dr.  
Gaithersburg, MD 20878

Project: Sparrows Point  
Project Number: Sparrows Point  
Project Manager: Bill Eaton

Report: 09K0039  
Reported: 11/25/2009 09:19

AS-2 (16-18)

09K0039-05 (Solid) Sampled: 10/30/2009 09:35; Type: Grab

Analyte	Result	Reporting Limit	Units	Prepared	Analyzed	Analyst	Method	Notes
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### Microbac Laboratories, Inc., Baltimore Division

#### Wet Chemistry

% Solids	75.40	0.05	% by Weight	110509 1045	110609 0906	LCR	SM (20) 2540G	
----------	-------	------	-------------	-------------	-------------	-----	---------------	--

#### DNAPL Qualitative Determination

Odor	Yes		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	
Sheen	Yes		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	
Visible Product	No		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	

Microbac Laboratories, Inc., Baltimore Division

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Melanie C. Duszyński, Project Manager



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## CERTIFICATE OF ANALYSIS

URS-Gaithersburg  
200 Orchard Ridge Dr.  
Gaithersburg, MD 20878

Project: Sparrows Point  
Project Number: Sparrows Point  
Project Manager: Bill Eaton

Report: 09K0039  
Reported: 11/25/2009 09:19

AS-2 (18-19.5)

09K0039-06 (Solid) Sampled: 10/30/2009 09:55; Type: Grab

Analyte	Result	Reporting Limit	Units	Prepared	Analyzed	Analyst	Method	Notes
---------	--------	-----------------	-------	----------	----------	---------	--------	-------

### Microbac Laboratories, Inc., Baltimore Division

#### Wet Chemistry

% Solids	86.65	0.05	% by Weight	110509 1045	110609 0906	LCR	SM (20) 2540G	
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#### DNAPL Qualitative Determination

Odor	Yes		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	
Sheen	Yes		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	
Visible Product	Yes		N/A	111709 1600	111709 1726	RIS	ASTM D 3987 Modified	

#### Acid and Base/Neutral Extractables by EPA Method 8270C

Naphthalene	770000	98000	ug/kg dry	110909 1300	111309 2102	RIS	EPA 8270C	D, B
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Microbac Laboratories, Inc., Baltimore Division

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Melanie C. Duszyński, Project Manager



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## CERTIFICATE OF ANALYSIS

URS-Gaithersburg  
200 Orchard Ridge Dr.  
Gaithersburg, MD 20878

Project: Sparrows Point  
Project Number: Sparrows Point  
Project Manager: Bill Eaton

Report: 09K0039  
Reported: 11/25/2009 09:19

### Notes and Definitions

Z5a	Yes
Z5	No
D	Sample Diluted
B	Analyte is found in method blank.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

### Certifications

*Below is a list of certifications maintained by Microbac Laboratories, Inc. All data included in this report has been reviewed for and meets all project specific and quality control requirements of the applicable accreditation, unless otherwise noted. A complete list of individual analytes pursuant to each certification below is available upon request.*

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- A2LA (Environmental): 410.01
- A2LA (ELLAP): 410.01
- CPSC: 1115
- Maryland: 109
- Pennsylvania (NELAC): 68-00339
- USDA: S-53726
- Virginia: 00152

## Cooler Receipt Log

**Cooler ID:** Default Cooler

**Cooler Temp:** 5.10 °C

Custody Seals Intact:	Yes	COC/Containers Agree:	Yes
Containers Intact:	Yes	Correct Preservation:	Yes
Received On Ice:	Yes	Correct Number of Containers Received:	Yes
Radiation Scan Acceptable:	Yes	Sufficient Sample Volume for Testing:	Yes
COC Present:	Yes	Samples Received in Proper Condition:	Yes

**Comments:**