



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

MAR 2 2010

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Russell Becker
Program Manager
Environmental Engineering & Affairs
Severstal Sparrows Point
1430 Sparrows Point Blvd
Sparrows Point, MD 21219

Subject: Consent Decree, Civil Action Numbers JFM-97-558 and JFM-97-559
Coke Oven Area Interim Measures Pilot Test Results and Prototype Systems Plan

Dear Mr. Becker:

Pursuant to Section XIII, SUBMISSION REQUIRING EPA AND/OR MDE APPROVAL, of the Consent Decree referenced above, the United States Environmental Protection Agency ("EPA") hereby approves the proposed work and schedule contained in the Coke Oven Area Interim Measures Pilot Test Results and Prototype Systems Plan ("Plan"), dated January 2010, with the condition that Severstal must make one modification of and two additions to the prototype system design as described below (See paragraph XIII.1(b) of the Consent Decree):

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 fluctuation 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 requirement 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.

Addition of Groundwater Extraction Wells to the Turning Basin Area

EPA supports the proposed in-situ anaerobic biotreatment 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 extraction wells near 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 along 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 requirement as specified in EPA's letter to Severstal, dated February 19, 2009.

Addition of Dual Phase Extraction Wells to former Benzol Processing LNAPL 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.

Attachment "A" provides additional and specific comments Severstal must address in revising the submission. Severstal is required to incorporate the aforementioned modification and additions into the Plan and submit a revised Plan to EPA for approval within 30 calendar days of receipt of this letter.

All other work** described in the Plan not affected by the modification or additions shall proceed with no delay according to the schedule contained in the Plan. Note that the EPA-required modification and additions are subject to performance evaluation and adjustment in the future based on operational experience.

If you have technical questions regarding this matter, please call Andrew Fan at (215) 814-3426. For legal questions, please have your attorney contact Susan Hodges, Senior Assistant Regional Counsel, at (215) 814-2643.

Sincerely,


Abraham Ferdas, Director
Land and Chemicals Division

cc (w/encl.): Barbara Brown, MDE

Attachments A to E

** Prototype Cells proposed by Severstal: Cell 1 - AS/SVE system in Benzol Area; Cell 2 - AS/SVE System in former coal Storage / Graving Dock Basin Area; Cell 3 - AS/SVE System in "Cove" Area (CO30-PZM015 Area); Cell 4 - In-situ Anaerobic Bio-treatment Area in Coal Tar Area.

ATTACHMENT "A"
ADDITIONAL AND SPECIFIC COMMENTS

- (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 surrounding 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 (3.5×10^{-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.
- (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.
- (3) Appendix D, third paragraph, "*Water levels were very difficult to measure in 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.
- (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 has the same attributes. Anaerobic Bioremediation is retained, but lists as a disadvantage because it "*may not be effective where free-phase product is present.*" This would be a significant concern, but it is not further explained in the report. Slurry wall was rejected with the 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.
- (5) Section 4.2.2 references Appendix I. The correct reference should be Appendix H.
- (6) Section 5.1.2.2 references Appendix J. The correct reference should be Appendix I.
- (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.
- (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 semivolatiles 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.

(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 Cove 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.

(10) The Plan does not explain the rationale for selecting the location and orientation of the prototype cells.

(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 additional 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.

(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 migration.

(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.

(14) The Plan proposal of six months to a year time 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 the benzene recovery/destruction efficiencies and groundwater benzene concentration 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.

(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.

(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

^{††} Prototype Cells Designation: Cell 1 - AS/SVE system in Benzol Area; Cell 2 - AS/SVE System in former coal Storage / Graving Dock Basin Area; Cell 3 - AS/SVE System in "Cove" Area (CO30-PZM015 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 - Dual Phase extraction at the former Benzol Processing LNAPL area.

pressure, water level and product thickness gauging in monitoring wells throughout the Coke Oven Study Area.

(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 Administration 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.