STATEMENT OF BASIS

KOPPERS INDUSTRIES, INC

FOLLANSBEE, WEST VIRGINIA

September 2010

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GLOSSARY

AOC – Area of Concern
BBL – Blasland, Bouck & Lee, Inc.
BTEX – benzene, toluene, ethlybenzene, and xylene
cm/sec – centimeters per second
COC – contaminant of concern
cy – cubic yards
DNAPL – dense non-aqueous phase liquid
DOT – Department of Transportation
FDRTC – Final Decision Document and Response to Comments
gpm – gallons per minute
HDS – Hydrodesulfurization
HHRA – human health risk assessment
IM – Interim Measures
Koppers – Koppers Industries Inc.
MCL – maximum concentration level
mg/kg – milligrams per kilogram
MNA – monitored natural attenuation
OMM – operations and maintenance management
OSHA – Occupational Safety and Health Administration
PAH – polycyclic aromatic hydrocarbons
RBC – risk-based concentration
RCRA – Resource Conservation and Recovery Act
RFI – RCRA Facility Investigation
SB – Statement of Basis
SVOC – semivolatile organic compound
SWMU – solid waste management unit
USACE – United States Army Crops of Engineers
U.S.C. – United States Code
EPA – United States Environmental Protection Agency
VOC – volatile organic compound
WPSC – Wheeling-Pittsburgh Steel Corporation
WVDEP – West Virginia Department of Environmental Protection
WVDNR – West Virginia Division of Natural Resources

I. INTRODUCTION

This Statement of Basis (SB) describes the United States Environmental Protection Agency's (EPA's) proposed remedy for contaminated soil, sediments, and groundwater originating from the Koppers Industries Inc. (Koppers) Coal Tar Plant located to the northwest of Follansbee, Brooke County, West Virginia (Facility or Site). For soils, EPA proposes to determine that the corrective action is complete following the implementation of institutional (ICs) since no further engineering controls are necessary at this time. EPA's proposed remedy for groundwater is continued operation of the perched groundwater collection system and the expansion of the interim dense non-aqueous phase liquid (DNAPL) recovery system, as well as continued monitoring and implementation of institutional controls. Institutional controls are non-engineered instruments such as administrative or legal controls that minimize the potential for human exposure to contamination and protect the integrity of a remedy. The ICs will be implemented by an enforceable document such as an order and/or an Environmental Covenant recorded in a manner consistent with the West Virginia Uniform Environmental Covenants Acts (UECA), W.Va.Code, § 22-22B-1, *et seq.* For contaminated sediments, EPA is proposing to dredge and remove the areas of shallow sediment containing the highest concentrations of polycyclic aromatic hydrocarbons (PAHs) and cap the remaining sediments that exhibit PAH concentrations in excess of 100 milligrams per kilogram (mg/kg).

EPA is issuing this SB under the Resource Conservation and Recovery Act (RCRA), as amended, 42 United States Code (U.S.C.) Sections 6901, et seq. The purpose of this SB is to solicit public comment on EPA's proposed remedy prior to EPA making its final remedy selection for the Facility. The public may participate in the remedy selection process by reviewing this SB and documents contained in the Administrative Record and submitting written comments to EPA during the public comment period. The information presented in this SB can be found in greater detail in the work plans and reports submitted by the Facility to EPA and the West Virginia Department of Environmental Protection (WVDEP). To gain a more comprehensive understanding of RCRA activities that have been conducted at the Facility, EPA encourages the public to review these documents, which are found in the Administrative Record.

The locations of the Administrative Record and details of the public participation process are provided in Section IX of this SB. EPA will address all significant comments submitted in response to the proposed remedy described in this SB. EPA will make a final remedy decision and issue a Final Decision and Response to Comments after considering information submitted during the public comment period. If EPA determines that new information or public comments warrant a modification to the proposed remedy, EPA may modify the proposed remedy or select other alternatives based on such new information and/or public comments.

II. FACILITY BACKGROUND AND HISTORY

The 34-acre Facility is located just north of the city of Follansbee in Brooke County, West Virginia (Figures 1 and 2). The Facility is bounded to the north, south, and east by a coke manufacturing facility, which is owned and operated by the former Wheeling-Pittsburgh Steel Corporation (WPSC), which is now part of Severstal Wheeling, Inc.. The Facility was first constructed in 1914 by the American Tar Products Company to operate as a tar distillation plant, producing creosote, road tar, and pitches. The current owner of the Facility is Koppers Industries, inc., but in the last century of coal tar processing, the Facility has undergone multiple ownership and name changes.

In September 1990, an Administrative Order on Consent ("Order") was issued pursuant to 42 U.S.C. §6928(h) of the Resource Conservation and Recovery Act to Beazer East, Inc., former owner of the Facility. The Order requires Beazer East to perform interim measures, RCRA facility investigation and a corrective measures study. For convenience of reference, Koppers in this document refers to the Site, Facility or Facility owner/operator, and Beazer East refers to the responsible party of the Order to perform the work.

III. SUMMARY OF PREVIOUS INVESTIGATION AND INTERIM MEASURES

The first reported investigations completed at the Facility focused on evaluating the seepage of perched groundwater from the Facility into the WPSC coal pits from along the base of the west wall of the coal pits. These investigations began in the mid-1950s. While the results of these investigations are not well documented, memoranda and other Koppers interoffice correspondence dating from the mid-1950s through the late 1970s indicate that a possible source of the water leaking into the WPSC coal pits was condensate and other process water from the Facility.

More detailed and better documented environmental investigation activities began at the Facility in the late 1970s. The majority of the investigations, completed between the late 1970s and late 1980s, focused on understanding the behavior of groundwater flow and extent of dissolved-phase chemicals of potential concern in groundwater. The scope of the investigations eventually expanded to encompass the entire Facility property, including portions of the Ohio River. The scope of the environmental investigations was expanded to include soil, sediment, and surface-water media beginning in 1993 during implementation of the RCRA Facility Investigation (RFI). Table 1 provides a summary of the previous investigations.

Based on the results of these previous investigations, EPA required implementation of groundwater and DNAPL monitoring and Interim Measure (IM) programs at the Facility pursuant to the IM provision of the Order. They included:

- Site Improvements/Corrective Action/Interim Measures - Starting in the 1970s several improvements were implemented at the Site to help prevent releases of contaminants of concern (COCs) from Site processes, and control or limit the migration of existing COCs in Site soil and groundwater. The following are the most significant of these Site improvements.

    - Paving the ground surface to provide an exposure barrier to soil and to limit infiltration of precipitation into the subsurface.

    - Closure and capping of the former wastewater aeration basins.

    - Installing physical barriers and implementing administrative procedures to restrict access by Site employees to areas of potential exposure to COCs.

    - Initiating a health and safety program designed to educate and protect Site personnel and contractors from exposure to COCs.

    - Improving product handling practices to reduce the potential for spills, and constructing containment systems to both contain potential spills and restrict their movement.

    - Constructing and operating a wastewater treatment system (with periodic system improvements) to manage process water and collected Site surface water runoff.

    - Perched Groundwater Collection System - Perched groundwater beneath the Site is captured by a collection system consisting of extraction wells and trenches installed in accordance with a 1984 Consent Decree, Civil Action No. 83-0127-W(K), issued jointly by EPA and the State of West Virginia to Wheeling Pittsburgh Steel Corporation and Koppers Company, Inc. (former name of Beazer East,Inc.) under the Clean Water Act. The system consists of five groundwater recovery wells installed between 1984 and 1986 at strategic locations to intercept perched groundwater discharging to seeps along the Ohio River embankment and adjacent to the WPSC coal pits. Perched groundwater recovered by this system is routed to the Site wastewater treatment plant. There have been various repairs and upgrades to the groundwater collection system over the years, including the installation of a piezometer network surrounding the recovery wells and trenches to monitor groundwater capture zones.

    - DNAPL Removal - A DNAPL recovery system is currently operating at recovery well R-225D, located adjacent to the unloading station east of the Barge Dock. The current system was installed in April 2000 as an IM pursuant to the IM provision of the 1990 Order to address DNAPL pooled on the bedrock surface beneath this area of the Site. By end of 2009, a cumulative total of 84,000 gallons of DNAPL have been recovered at an average rate of about 577 gallons per month during the year. The recovered DNAPL is routed to a recycling facility on Site.

IV. SITE CHARACTERIZATION

A. Surface-Water Hydrology

Surface-water drainage from the Facility is toward the Ohio River. The Ohio River flows from the north to the south along the west side of the Facility. The 100-year flood plain elevation is 668.5 feet above mean sea level, as recorded by the United States Army Corps of Engineers (USACE), Pittsburgh District, Ohio River Basin Office. Most of the Facility (including all process areas) lies within either a Zone B or Zone C flood area designation (Federal Emergency Management Agency Flood Insurance Rate Map). Zone B areas are at elevations between the limits of 100-year and 500-year frequency flood elevation, while Zone C represents areas that are above the 500-year frequency flood elevation.

Stormwater from the process and storage areas of the Facility is collected and treated prior to discharge to the Ohio River under a National Pollutant Discharge Elimination System Permit, Number WV0004588, issued to the Facility by the State of West Virginia.

B. Groundwater Hydrology

The hydrogeologic system at the Site consists of four distinct hydrogeologic units. The first, described as the perched unit, refers to the groundwater in the fill material. The second consists of an underlying layer of fine-grained silty clay that has a low permeability that serves as a semi-confining base of the perched unit. The third unit consists of relatively pervious coarse alluvial material beneath the silty clay unit and above the bedrock. The fourth unit is bedrock consisting of sandstones and shales that are fractured and weathered near its surface and more competent with depth. The thicknesses of each unit are depicted on Figure 2.

The elevation of the groundwater observed within the perched unit is higher than the levels observed in the alluvial material below the silty clay. Perched groundwater flows radially from a groundwater mound in the north-central portion of the Site. Perched unit groundwater is not present in the vicinity of monitoring well R-123, located near the Site's southern property boundary.

Seepage of perched groundwater from the fill has been reported in the past along the embankment of the Ohio River and into the WPSC coal pits. Perched groundwater flowing toward the WPSC coal pits is intercepted by a groundwater collection trench system. A similar trench system collects perched groundwater flowing toward the river.

Groundwater from the alluvial unit discharges to the Ohio River under low to normal flow conditions; but the flow direction may reverse during periods of high river stage with the Ohio River providing recharge to the alluvial unit (RCRA Facility Investigation Report, ICF Kaiser, 1996).

Groundwater movement in the surficial bedrock is fracture-controlled, including bedding plane fractures. The competent bedrock below has much lower permeability where DNAPL is retarded from further downward migration and tends to pool at depressions.

C. Contaminants of Concern

1. Groundwater

Large numbers of groundwater samples have been collected at the Facility to characterize the nature and extent of the COCs. Initially, all samples were analyzed for a wider range of constituents. EPA reduced the groundwater sampling parameter list to the following list of COCs for the purpose of routine monitoring because these compounds are the only ones that exceeded December 2009 EPA Region 3 Risk-Based Concentrations (RBCs) for hypothetical potable use. EPA understands that the Facility is currently, and will be, for the foreseeable future under industrial land use and groundwater is not and will not be used as potable water supply at the Facility.

List of Groundwater COCs

COCs	Perched Groundwater Zone	Shallow Alluvial Groundwater Zone	Deep Alluvial Groundwater Zone	Bedrock Groundwater Zone
VOCs	Benzene Chloromethane Ethlybenzene Styrene Toluene	Benzene Chloromethane Ethlybenzene Methylene Chloride Styrene Toluene 1,1,1-Trichloroethane Xylenes	Benzene Methylene Chloride Styrene Toluene	Benzene Chloromethane Ethylbenzene Methylene Chloride Styrene Toluene
SVOCs	2,4-Dimethylphenol 2-Methylphenol 4-Methylphenol Phenol	2,4-Dimethylphenol 2-Methylphenol 4-Methylphenol Phenol	2,4-Dimethylphenol 2-Methylphenol 4-Methylphenol Phenol	2,4-Dimethylphenol 2-Methylphenol 4-Methylphenol Phenol
PAHs	Acenaphthene Acenaphthylene Anthracene Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene Dibenzo(a,h)anthracene Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene Naphthalene Phenanthrene Pyrene	Acenaphthene Acenaphthylene Anthracene Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene Dibenzo(a,h)anthracene Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene Naphthalene Phenanthrene Pyrene	Acenaphthene Acenaphthylene Anthracene Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene Dibenzo(a,h)anthracene Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene Naphthalene Phenanthrene Pyrene	Acenaphthene Acenaphthylene Anthracene Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene Dibenzo(a,h)anthracene Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene Naphthalene Phenanthrene Pyrene
Inorganics	Arsenic Beryllium Chromium Lead Zinc	Arsenic Beryllium Chromium Cyanide Lead Mercury Nickel	Arsenic Beryllium Lead Nickel Zinc	Lead

2. Soil

Based on the results of the data screening provided in the Human Health Risk Assessment (HHRA) in the RFI Report, the following hazardous constituents were detected at maximum concentrations greater than EPA industrial RBCs (December 2009) for surface and subsurface soils and, therefore, were identified as COCs.

List of Soil COCs

VOCs	Benzene	
SVOCs	2,4-Dimethylphenol	
PAHs	2-Methylnaphthalene	Acenaphthene
	Acenaphthylene	Benzo(g,h,i)perylene
	Chrysene	Dibenzofuran
	Fluorene	Naphthalene
	Phenanthrene	Benzo(a)anthracene
	Benzo(a)pyrene	Benzo(b)fluoranthene
	Benzo(k)fluoranthene	Fluoranthene
	Dibenzo(a,h)anthracene	Dibenzofuran*
	Indeno(1,2,3-cd)pyrene	Pyrene
Inorganics	Antimony	Arsenic
	Chromium	Lead

* - Retained due to lack of screening criteria.

3. Sediment

A risk screening assessment was prepared in the *Surface-Water/Sediment Investigation Report* (Blasland, Bouck & Lee, 2001). This screening assessment refined the input assumptions utilized in the RFI Report for evaluating potential ecological risks and compared sediment data to relevant benchmark screening criteria.The results of the tiered screening indicated that PAHs were the most prevalent COCs in sediments collected from the Ohio River bottom adjacent to the Facility. The 16 PAHs identified in the table below were reported at concentrations above sediment screening quality benchmarks and were, therefore, retained as COCs for sediment.

List of Sediment COCs

VOCs	None	
PAHs	Acenaphthylene	Acenaphthene
	Anthracene	Benzo(a)anthracene
	Benzo(a)pyrene	Benzo(b)fluoranthene
	Benzo(g,h,i)perylene	Benzo(k)fluoranthene
	Chrysene	Dibenzo(a,h)anthracene
	Fluoranthene	Fluorene
	Indeno(1,2,3-cd)pyrene	Naphthalene
	Phenanthrene	Pyrene
Inorganics	None	

4. Surface Water

The RFI Report concluded that only bis(2-ethylhexyl)phthalate was observed in surface-water samples at concentrations greater than that which could potentially have effects on ecological receptors. Although bis(2-ethylhexyl)phthalate was retained as a surface-water COC, it was not a COC for any other media at the Site and, therefore, its presence in surface water is not believed to be Site-related.

Due to lack of screening criteria, 4-methylphenol was also retained as a potential COC in surface water. Nearly all historical surface-water samples collected from previous investigations contained no detectable PAH concentrations.

A risk screening assessment was included in the *Surface-Water/Sediment Investigation Report* (Blasland, Bouck & Lee, 2001) to refine the input assumptions utilized in the RFI Report for evaluating potential ecological risk issues and compare surface-water data to relevant benchmark screening criteria. Analytes in all surface-water samples collected during the Surface-Water/Sediment Investigation were either below the laboratory practical quantification limit or were detected below background or EPA Region 3 RBCs. Therefore, results indicate that constituents previously reported [bis(2-ethyl)phthalate and 4-methylphenol] are not Site-related, and groundwater discharge that is occurring does not appear to be having an adverse effect on the Ohio River.

D. Extent of Groundwater COCs

Groundwater monitoring indicates that the groundwater contains dissolved benzene, toluene, ethylbenzene, and xylene (BTEX); PAHs; and phenolic compounds are at concentrations exceeding applicable maximum contaminant level (MCL) codified at 40 C.F.R. Part 141 and promulgated pursuant to the Safe Drinking Water Act, 42 U.S.C. §300f eq seq., or EPA Region 3 tap water RBCs.

Perched Unit Groundwater:

- BTEX concentrations have been highest in the vicinity of monitoring well A-116, which is located near the WPSC property boundary and in the vicinity of monitoring well B-1, which is located at the northwest corner of the Facility.

- PAH concentrations have been highest in the vicinity of the naphthalene production and storage area, adjacent to the WPSC property boundary.

- Phenolic compound concentrations have been highest in the vicinity of monitoring well B-3, which is located at the top of the river embankment west of Area of Concern (AOC) 22 (North Tank Farm), beneath the naphthalene production and storage area.

Alluvial Unit Groundwater (Upper Portion):

- The concentrations of most parameters have been highest in the vicinity of AOC 22 (North Tank Farm), AOC 10 (Caustic Plant), and AOC 15 (Naphthalene Desulfurization).

- Concentrations of COCs have been commonly lower in the alluvium than in the perched unit groundwater.

Alluvial Unit Groundwater (Lower Portion):

- BTEX concentrations have been highest in the vicinity of wells OW-3C and R-211, located in the west-central and northern portions of the Facility, respectively.

- PAH concentrations have been highest beneath the southern end of AOC 22 (North Tank Farm).

- Phenol concentrations have been highest along the western side of the Facility between the main sump and the unloading station, adjacent to recovery well R-225D.

Bedrock Groundwater:

- BTEX and PAH concentrations have been highest in the vicinity of the tar stills at R-312.

- Phenolic compound concentrations have been highest at the northern end of the Facility near R-307.

- COC concentrations in bedrock groundwater have all been below applicable screening criteria beneath the southern portion of the Facility.

Evidence of DNAPL has been observed in the upper three hydrogeologic units at many soil borings and monitoring well locations within the north and central portions of the Facility (Figure 3). The largest accumulation of DNAPL beneath the Facility is pooled on the bedrock surface beneath the Unloading Station east of the barge dock, in the vicinity of DNAPL recovery well R-225D. DNAPL has migrated into the upper fractured portion of the bedrock, but there is no evidence that it extends into the competent bedrock below. Bedrock groundwater samples have not been collected in wells containing DNAPL such as recovery well R-225D. It is likely that groundwater, within bedrock in proximity to the DNAPL plume, also contains dissolved COCs.

E. Extent of Soil COCs

Over 120 soil samples were collected to characterize the extent of soil COCs at the Facility Solid Waste Management Units and Areas of Concern (Table 2 and Figure 4).

The COCs within the unsaturated portions of the fill have been observed at many locations across the Facility. The presence of phenolic compounds may correlate with potential source areas AOC 10 (the Caustic Plant), AOC 21 (the Acid Barreling Area), and AOC 14 (the Base Plant), which were identified as potential source areas for phenolic compounds.

Both volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) have been observed in unsaturated fill material; the highest concentrations were most frequently detected in samples collected immediately above the water table (Figure 5). The COCs within the unsaturated portions of the fill material have been observed at many locations across the Site. No correlation with solid waste management units (SWMUs) or AOCs was detected during RFI soil sampling, except at one location within AOC 13 (Pitch Pans and Pencil Pitch Area) and near SWMU 5 (Pencil Pitch Storage Pile) (Figure 4), where a black pitch-like material was observed in the soil samples. The presence of phenolic compounds may correlate with potential source areas AOC 10 (the Caustic Plant), AOC 21 (the Acid Barreling Area), and AOC 14 (the Base Plant), which were identified as potential source areas for phenolic compounds (ICF Kaiser, 1996). Locations where evidence of residual DNAPL was observed in soil during the installation of monitoring wells are noted on Figure 6.

F. Extent of Sediment COCs

Sediments in the Ohio River adjacent to the Facility contain PAH compounds and residual DNAPL, including weathered and hardened tar, related to historical Facility activities (Figure 7). The occurrence of PAHs and residual DNAPL in sediments is concentrated within an approximately 1,000-foot-long stretch of the Ohio River that extends approximately 225 feet outward from the shoreline. The area of highest total PAH concentrations in the river sediment, correlates with the approximate location of the historical Facility Outfall #3. PAH concentrations are highest near the surface of the river bottom and tend to decrease with depth below the river bottom surface. Visual evidence of residual DNAPL also appears to diminish with depth.

Sediment samples collected from locations upstream of the Facility demonstrated that there is an elevated background level of PAHs in Ohio River sediments related to other upstream industrial sources, urban runoff and other sources.

G. Extent of Surface-Water COCs

Few surface-water samples collected from the Ohio River in the vicinity of the Facility have contained detectable concentrations of analyzed constituents. Nearly all historical surface-water samples collected from previous investigations contained no detectable PAH concentrations. Bis(2-ethylhexyl)phthalate was observed at a concentration greater than what has been reported to have significant effects on ecological receptors for aquatic receptors exposed to surface water as part of their natural habitat. However, this potential aquatic receptor exposure assessment involved considerable uncertainty based on the following:

- Bis(2-ethylhexyl)phthalate is a common laboratory contaminant that was detected in most samples at similar low level concentrations both upgradient and adjacent to the Site;
- Bis(2-ethylhexyl)phthalate is not a site-related COC in any other environmental media evaluated for the Site;
- Bis(2-ethylhexyl)phthalate was not detected in historical surface water sampling events prior to 1996; and
- Fish and macroinvertebrate community studies performed by the West Virginia Division of Natural Resources (WVDNR) in 1991 at River Mile 68.1 and in 1992 at River Mile 76 have shown that the portion of the Ohio River affected by the Facility is supporting a flourishing variety of fish species including a number of gamefish.

V. SUMMARY OF HUMAN HEALTH RISK ASSESSMENT

This section qualitatively summarizes the HHRA. The detailed quantitative HHRA is presented in Appendix A of the RFI Report.

A. Groundwater Exposure Pathways

Groundwater is considered an incomplete exposure pathway for the Facility because groundwater on the Facility is not used as a potable or industrial water source, and the Ohio River water quality adjacent to and immediately downstream from the Facility has met state and federal standards. Based on current groundwater quality, hypothetical future use of groundwater on Site as a potable supply for residential housing would not be acceptable to EPA as being protective of human health. However, no future residential development is planned for the Facility; therefore, EPA is proposing ICs to prevent future potable groundwater use.

B. Soil Exposure Pathways

The risk assessment incorporated traditional direct contact exposure pathways, such as incidental soil ingestion, incidental dermal contact with soil, and inhalation of dust associated with the mobilization of particulates in surface soil and inhalation of volatilized vapors released from subsurface soil among others for on-Site industrial worker receptors. It is important to note that these exposure pathways are hypothetical because the majority of the plant surface is paved or covered with structures. The pavement and structures prevent the routine direct contact required to complete these exposure pathways in most areas of the Facility, particularly in the tank farm and main process areas. For this reason, EPA has determined that there is no imminent health threat to on-Site workers via direct contact exposure pathway.

Potential future construction worker default conservative non-cancer hazard and theoretical excess lifetime cancer risk calculations yielded values that exceed traditional benchmarks (assuming disturbance of existing cover). For potential future construction workers at the Facility, personal protective equipment will be used during construction activities, as required by Koppers Site Health and Safety. Even though the exposures are short-term and episodic and risks estimated in the HHRA are conservative, personal protective equipment would eliminate or significantly reduce the potential for exposure pathways to be completed during activities that disturb the soil.

C. Sediment Exposure Pathways

Concentrations of COCs within sediment in the Ohio River adjacent to the Facility are within acceptable human health risks, which include potential risks associated with dermal contact, incidental ingestion, and leaching of COCs from sediment to surface.

D. Surface-Water Exposure Pathways

Surface-water quality in the Ohio River is within acceptable limits established by EPA as being protective of human health, and has met West Virginia Water Quality standards for protection of human health and the environment.

E. Air Exposure Pathways

Air emissions from the operation of the Facility are addressed under a site-wide air permit issued by the WVDEP and are not within the scope of the RCRA Corrective Action investigation of the Facility. Because the groundwater plume does not migrate beyond Facility boundaries, there is no potential impacts on indoor air in off-site residences from the contaminated groundwater. Although the plume may be present beneath certain Facility buildings, they are constructed in a manner (e.g. partially open to the outside, or designed with balanced air ventilation systems) unlikely to allow a significant migration or accumulation of subsurface volatiles to indoor air.

VI. SUMMARY OF ECOLOGICAL RISK ASSESSMENT

The ecological risk assessment, provided in Section 8 of the RFI Report, quantitatively predicted marginal potential adverse effects to select ecological receptors exposed to surface water and more than marginal potential adverse effects for shoreline river sediments. The evaluation incorporated multiple conservative assumptions to ensure that true effects are not under-predicted. The ecological risk assessment process was intended as a screening level assessment with conservative assumptions that would tend to over-predict the potential risk. A summary of the evaluation for each media is provided in the following sections.

A. Soil

The results for surface soil in the western embankment area indicated that COCs were not at concentrations that would likely have adverse effects on terrestrial fauna based on available literature benchmarks consulted during preparation of the ecological risk assessment. No stressed vegetation was observed in this area during the vegetation survey.

COC concentrations that were observed were commonly less than those that may cause adverse effects on two of the three terrestrial vertebrates selected for quantitative evaluation. Based on highly conservative assumptions, one COC (phenanthrene) had an ecological quotient that marginally exceeded the hazard quotient for the American robin. One other COC [benzo(a)pyrene] had an ecological quotient that marginally exceeded the hazard quotient for the Eastern cottontail rabbit. Five COC concentrations [benzo(a)anthracene, benzo(a)pyrene, fluoranthene, phenanthrene, and pyrene] for the third terrestrial receptor selected (Short-tailed shrew) were observed at concentrations greater than those that might produce adverse effects.

B. Sediment

PAHs are present in Ohio River sediments off shore from the Facility at concentrations that exceed ecological sediment screening quality benchmarks and may produce adverse effects on aquatic receptors, and in particular, on benthic macro-invertebrates. Although other constituents, primarily inorganic, are present in the sediments, they are not as widespread as PAHs, and their concentrations are lower or comparable to concentrations detected at upstream reference locations. Consequently, these other constituents were eliminated in the tiered screening process.

Conclusions drawn from a literature review report[1] by AMEC indicated that the benthic macro-invertebrates would not be expected to experience adverse effects at PAH concentrations below 200 mg/kg (and possibly higher) in sediment. EPA agrees with AMEC conclusions and established a more conservative sediment corrective action standard of 100 mg/kg for total PAHs in sediment, which is formalized in a letter to Beazer East, dated February 6, 2008.

C. Surface Water

Bis(2-ethylhexyl)phthalate was observed at a concentration greater than what has been reported to have significant effects on ecological receptors for aquatic receptors exposed to

[1] Literature review of papers reporting on the toxicity of pyrogenic PAH in sediments, AMEC Earth & Environmental, Inc., submitted to EPA on December 1, 2006.

surface water as part of their natural habitat. However, this potential aquatic receptor exposure cannot be definitively linked to the Facility because:

- Bis(2-ethylhexyl)phthalate is a common laboratory contaminant that was detected in most samples at similar low-level concentrations both upgradient and adjacent to the Facility.

- Bis(2-ethylhexyl)phthalate is not a Facility-related COC in any other environmental media evaluated for the Facility.

- Bis(2-ethylhexyl)phthalate was not detected in historical surface-water sampling events prior to 1996.

Fish community studies performed by the WVDNR have shown that the reach of the Ohio River affected by the Facility is supporting a flourishing variety of fish species, including a number of game fish.

VII. SUMMARY OF PROPOSED REMEDY

A. Scope of Remediation

Based on the findings set forth in the RFI, EPA has determined that past operations at the Facility have caused unacceptably high concentrations of COCs in soil, groundwater, and sediment.

(1) Soil

The proposed remedy for soil is to leave it in place by maintaining restrictions to direct contact exposure to soil containing COCs that exceed the media-specific standards by implementation of ICs. Since the majority of the plant surface is paved or covered with structures, the likely exposure pathway for contaminated soils would be potential future construction and the likely receptors would be construction workers who will be protected by OSHA and Facility Health and Safety Program requirements.. ICs such as land use restrictions will prevent the highly unlikely change of the site in the future from industrial to residential use.

(2) Groundwater

The primary corrective measures objectives for groundwater are to:

- Isolate, contain, and/or remove DNAPL from productive pools to remove source mass to the extent that monitored natural attenuation (MNA) may be implemented as a viable strategy.

- Control seeps from the perched fill unit.

- Restore groundwater quality for beneficial use, including achieving MCLs while recognizing that these standards will take decades to achieve.

(3) Sediment

The corrective action objectives for sediment include the following:

- Protect the benthic ecological community in areas of known or potential ecological toxicity.
- Isolate, contain, and/or remove known sources of sheens.
- Control the release of oils and sheens consistent with the West Virginia Water Quality Criteria.

(4) Surface Water

Sediment and groundwater corrective measures are being performed, in part, to protect surface-water quality. Because historical PAH concentrations in surface water have been either below practical laboratory quantification limits, or at concentrations below background or conservative risk-based screening levels, no corrective measures are proposed or warranted for surface water. As a result, no corrective action objectives have been established for surface water.

(5) Air

No additional corrective measures are being proposed for air emissions because the Facility operates under a site-wide Title V air discharge permit and operates under Occupational Safety and Health Administration (OSHA) standards where EPA Permissible Exposure Limits have been established and proper precautions are taken for worker safety. As explained in Section V(E), there has been no evidence of vapor intrusion or impacts to off-site properties. Because no additional corrective measures are necessary for air emissions, no corrective action objectives have been established for this media.

B. Remediation Standards

EPA has identified the following remediation standards for the COCs or indicator parameters for each media. The remediation standards were selected based on applicable federal and state requirements, or EPA Region 3 RBCs if applicable requirements do not exist.

<u>Soil</u> – The remediation standards for soil are based on EPA December 2009 industrial soil RBCs as listed below:

EPA Region 3 RBC table for soil December 2009	COC	Industrial Soil mg/kg	COC	Industrial Soil mg/kg
VOCs	Benzene	5.4E+00		
SVOCs	Dimethylphenol, 2,4-	1.2E+04		
PAHs	~Methylnaphthalene, 2-	4.1E+03	~Dibenzofuran	1.0E+03
	~Chrysene	2.1E+02	~Naphthalene	1.8E+01
	~Fluorene	2.2E+04	~Benz[a]anthracene	2.1E+00
	~Benzo[a]pyrene	2.1E-01	~Benzo[b]fluoranthene	2.1E+00
	~Benzo[k]fluoranthene	2.1E+01	~Fluoranthene	2.2E+04
	~Dibenz[a,h]anthracene	2.1E-01	~Dibenzofuran	1.0E+03
	~Indeno[1,2,3-cd]pyrene	2.1E+00	~Pyrene	1.7E+04
	~Acenaphthene	3.3E+04		
INORGANICs	Antimony (metallic)	4.1E+02	Arsenic, Inorganic	1.6E+00
	Chromium(III), Insoluble Salts	1.5E+06	~Lead and Compounds	8.0E+02

- Groundwater – For DNAPL in groundwater, the remediation standard is removal to the maximum extent practicable or less than 0.1 inch. For dissolved phased contaminants in groundwater, the remediation standards are the applicable Maximum Contaminant Levels (MCLs), applicable WVDEP Voluntary Remediation Deminimis Groundwater Values, or EPA Region 3 RBC values for tap water of December 2009 if applicable requirements do not exist.

Groundwater Standards	Analyte	EPA RBC Dec 09 ug/L	WVDEP Remediation Deminimis Groundwater values ug/l	MCL ug/L
	Benzene	4.1E-01		5.0E+00
	Chloromethane	1.9E+02		
	Ethylbenzene	1.5E+00		7.0E+02
VOCs	Methylene Chloride			5.0E+00
	Styrene			1.0E+02
	Toluene			1.0E+03
VOCs	Trichloroethane, 1,1,1-			2.0E+02
	Xylenes			1.0E+04
SVOCs	Dimethylphenol, 2,4-	7.3E+02		
	Phenol	1.1E+04		
	~Acenaphthene		3.7E+02	
	~Anthracene		1.8E+03	
	~Benz[a]anthracene	2.9E-02		
	~Benzo[a]pyrene			2.0E-01
	~Benzo[b]fluoranthene	2.9E-02		
PAHs	~Benzo[k]fluoranthene	2.9E-01		
	~Chrysene	2.9E+00		
	~Dibenz[a,h]anthracene	2.9E-03		
	~Fluoranthene	1.5E+03		
	~Fluorene		2.4E+01	
	~Indeno[1,2,3-cd]pyrene	2.9E-02		
	~Naphthalene	1.4E-01		
	~Pyrene		1.6E+02	
	Arsenic, Inorganic			1.0E+01
	Beryllium and compounds			4.0E+00
INORGANICs	Chromium, Total			1.0E+02
	Cyanide (CN-)			2.0E+02
	Lead			1.5E+01
	Mercury			2.0E+00

- Sediment – EPA has selected 100 mg/kg total PAHs as the appropriate remediation standard for sediments. The standard is applicable to the shallow bioactive layer in the top one foot of the river sediment based on literature review of sediment toxicity testing data from wood treating sites with creosote sediment contamination. Scientific justification of this standard identification was approved by EPA in letters to Beazer East, dated February 13, 2007 and February 11, 2008, which are included in Appendix E of the 2009 Corrective Measures Study prepared by Beazer East pursuant to the Order.

- Surface Water – No remediation for surface water is required as no site-related contaminants tested during the Surface-Water/Sediment Investigation were found to exceed State of West Virginia Requirements Governing Water Quality Standards (47 CSR 2) established for the portion of Ohio River affected by the Facility.

- Air – Air remediation is outside the scope of the Order because ambient air quality is regulated by a Facility-wide Title V air permit. Because the plume does not migrate beyond property boundaries, there is no concern regarding potential impacts to indoor air in off-site residences from the contaminated groundwater. Although the plume may be present beneath certain Facility buildings, they are constructed in a manner (e.g. partially open to the outside, or designed with balanced air ventilation systems) unlikely to allow a significant migration or accumulation of subsurface volatiles to indoor air.

C. Proposed Remedy

The proposed remedy consists of a soil component, a sediment component, a groundwater component, and facility wide non-engineering controls. The proposed remedy is summarized on Figure 8.

1. Soil – Institutional Controls

For soils, EPA is proposing to issue a determination that the corrective action is complete following the implementation of institutional controls implemented by an enforceable document such as an order and/or an Environmental Covenant recorded in a manner consistent with the West Virginia Uniform Environmental Covenants Acts, W.Va.Code, § 22-22B-1, *et seq*. Because the Facility is currently used for industrial purposes and the contaminated portion of the Site is nearly completely covered with buildings, paved surfaces and other improvements, EPA has determined that Facility soils do not currently pose a threat to human health or the environment and require no further engineering controls at this time. However, because COCs remain in the soil at concentrations that exceed residential use and construction worker scenarios, EPA is proposing that institutional controls be implemented to prevent residential use and limit construction workers exposure to soils containing COCs.

Institutional Controls are non-engineered instruments, such as administrative and/or legal controls, that minimize potential for human exposure to COCs and protect the integrity of the remedy.

2. Sediment – Shallow Depth Removal with Cap

For sediment, EPA is proposing to dredge to remove the areas of shallow sediment containing the highest concentrations of PAHs and capping the dredged area and surrounding areas that contain PAH concentrations exceeding 100 mg/kg (Figure 8). The installation of a cap will isolate the material remaining in the dredged area and return the sediment surface to existing grade. This remedial strategy will remove and cap approximately 1.9 acres of near shore sediment to a depth of 2 feet, and 2.8 acres of mid-channel sediment to a depth of 3 feet. The actual rock size and thickness of the armor will be designed with input from the United States Army Corps of Engineer (USACE) to maintain the integrity of the cap to accommodate the impacts of ship navigation and prop wash. The lateral bounds of removal and capping will extend to approximately the 100 mg/kg PAH concentrations contour and this alternative will remove approximately 16,000 cubic yards (cy) of sediment. Dredging may be performed using a barge-mounted excavator with a closed bucket to best control the depth of the dredge cut and to control the release of suspended sediment and sheen. A close bucket dredge may also be used if the dredge depth can be closely controlled. Sediment (16,000 cy) will be dewatered or otherwise treated to meet Department of Transportation (DOT) transportation requirements and would be transported and disposed of at an off-Site facility.

The capping will be placed over the dredged surface and will bring the grade to pre-dredge surface elevations. Two types of cap construction will be used based on flow rates for the Ohio River. The near shore cap will include an adsorptive layer (a reactive core mat or other absorptive granular organoclay product) and a sand and gravel isolation-filter layer (total cap thickness = approximately 24 inches). The offshore cap would include the reactive core mat/granular organoclay layer, a sand and gravel isolation-filter layer, and a cobble armor layer (total cap thickness = approximately 36 inches). Cap materials, including riprap along the shoreline, will be selected to provide isolation and protection of the underlying sediment from river flow, boat propeller wash, and other river surface-water movement, such as vessel wake and wind-driven wave action along the shoreline. The caps will be constructed to existing grade to minimize their effect on river navigation and flood control. The cap along the shoreline may also include a narrow strip of riprap to protect both the cap and the existing shoreline from wind- and wake-driven waves.

Prior to and during dredging and cap placement, a coffer dam or an oil boom-silt partial depth silt curtain skirt array may be placed around the work area. An upstream structure may also be constructed to divert surface-water flow away from the work area. Based on input from the permitting agency USACE, these mitigation measures will be selected to minimize short-term impact on ship traffic and water quality impact from sediment disturbances during the construction.

A post-corrective measures operations and maintenance management (OMM) program will be established pursuant to an enforceable order or permit to be issued by West Virginia to assess whether the protective cover was placed as intended, whether the elevation of the capped area is maintained, and whether the protective cover is effective in isolating residual PAH-containing sediment from surface water. Consistent with the USACE guidance document, monitoring will be conducted using a tiered approach designed to identify early warning signs that can be corrected relatively quickly and easily, if needed. This would entail establishment of threshold measurements and monitoring approaches to determine whether these thresholds are exceeded. A long-term monitoring program for this corrective measure will likely include periodic precision bathymetric surveys and inspections of the river for sheen. The bathymetric surveys would be the primary tool used to evaluate long-term integrity of the cap. Consistent with the USACE guidance, several methods are available to assess sediment surface elevation and cap thickness and one or more methods may be used depending on river conditions and results. If thresholds are not exceeded, it can be expected that the cap is performing as designed and periodic monitoring would continue.

If thresholds are exceeded, bathymetric surveys will be supplemented with underwater inspections made by divers. If frequent and significant sheens are observed, the underwater inspections will be expanded to include a more detailed evaluation of the cap's performance. Typical monitoring frequencies for capping are annually for the first 3 years and then once every 5 years for several cycles, with the flexibility to adjust the duration between monitoring events as data are collected over time and evaluated. The tiered approach will be detailed in the OMM Plan to be submitted by Beazer East to WVDEP for approval.

3. Groundwater – Expanded DNAPL Recovery with Continued Groundwater Containment

EPA's proposed remedy for groundwater is to expand the existing DNAPL recovery well network and continue operating the existing groundwater containment system (extraction and treatment) (Figure 8). DNAPL recovery would be enhanced in the vicinity of recovery well R-225D, where DNAPL recovery has been most successful, by converting monitoring well R-231D to a DNAPL recovery well of similar design to DNAPL recovery well R-225D. DNAPL would be recovered at well R-231D to increase the volume of DNAPL recovered from the base of Zone 3. R-231D has been targeted as a location for potential enhancement of DNAPL recovery because this well was tested in 2003 and showed a potential DNAPL recovery rate of up to 0.8 gallons per hour. In addition, well R-231D has consistently contained the greatest DNAPL thickness relative to the other Facility Zone 3 wells.

Performance monitoring of current DNAPL recovery rates would continue and would be used to optimize DNAPL recovery to the extent practicable. The existing Zone 1 groundwater collection system would continue to operate indefinitely for as long as the Zone 1 concentrations have not met the remediation standards, and as a containment system to prevent or reduce lateral and downward migration of contaminated groundwater to Ohio River and the lower geological zone.

It is expected that MNA will be an additional component of the groundwater remediation strategy at the time that DNAPL has been removed. Because it not possible to predict the duration of DNAPL removal or resulting change in the footprint of the future dissolved-phase plume, discussion of options for future remediation of dissolved-phase constituents in groundwater would be purely speculative at this time. EPA anticipates that groundwater recovery combined with MNA would remain the primary means by which dissolved-phase constituents would be remediated. In-situ enhancements to groundwater remediation, including possibly in-situ chemical oxidation, enhanced biological degradation, reconfiguration of the network of the active groundwater recovery system elements, or other yet-to-be-discovered technologies will be evaluated only after DNAPL recovery has terminated.

4. Facility Wide Non-Engineering Controls

EPA's proposed remedy includes the following non-engineering controls that may include, but not limited to, institutional controls enforceable by an order or environmental covenant, such as:

- Restrictions on the property deed to prevent conversion to residential use.
- Establishment of a program to monitor future changes to Facility conditions that may alter the assumptions used in the ICs and HHRA such as change in surface cover.
- Restrictions on potable use of groundwater in the Facility.
- Maintenance of all paved areas and/or building footprints to minimize surface water infiltration.
- Posting at the Facility identifying the soil locations exceeding the industrial RBCs at the Facility.
- Providing notice for the Facility containing information about the impacted groundwater to protect future on-site workers/contractors.
- A materials management plan that will guide how future workers will handle soil and groundwater during potential future subsurface construction work at the Facility.
- Development and implementation of a Health & Safety Plan by an appropriately qualified person familiar with the environmental conditions at the Facility, for excavation and disturbances to the subsurface soils, including utilities and process lines.
- Annual inspections and reporting to WVDEP regarding compliance with the covenant components for the area affected by the requirements.

In addition to non-engineering controls for the Facility, the USACE established regulations under the Rivers and Harbors Act of 1899 that any alteration or obstruction of any navigable channel must be permitted by USACE. Such regulations cover construction, excavation, and deposition of materials in, over, or under waters of the Ohio River. These restrictions will help preserve the integrity of the cap proposed under the proposed sediment remedy.

VIII. EVALUATION OF PROPOSED REMEDY

This section provides a description of criteria EPA uses to evaluate proposed remedies under the Corrective Action Program. The criteria are applied in two phases. In the first phase, EPA evaluates three remedy threshold criteria as general goals. In the second phase, for those remedies that meet the threshold criteria, EPA evaluates seven balancing criteria to determine which proposed remedy alternative provides the best relative combination of attributes.

A. Threshold Criteria

(1) Overall Protection of Human Health and the Environment

EPA's proposed remedies for soil, sediment, and groundwater are protective of human health and the environment. The proposed remedies for soil, pavement and the Facility structures themselves eliminate the direct contact exposure pathway in most areas of the Facility, particularly in the tank farm and main process areas and the other paved areas. For this reason, EPA has determined that there is no imminent threat to public health or the environment associated with on-site workers. Therefore, under current land use conditions, contaminated soil can be left in place with no unacceptable health risks. EPA proposes implementation of institutional controls to prevent potential future exposure due to unanticipated land use change or potential future construction activities that may deviate from the current exposure scenario.

For sediment, the top 2-foot bioactive layer that exceeds the remediation standard will be removed and additional material will be removed, as necessary, to accommodate the thickness of cap that may include a sand filtering layer, an adsorptive media barrier, and an armoring layer. This work will extend over the entire horizontal extent (approximately 4.7 acres) where total PAH concentrations exceed 100 mg/kg remediation standard. The remedy, combined with performance monitoring, will provide long-term isolation of biota and humans from direct contact exposure to deeper residual PAHs.

For groundwater, the perched groundwater collection system, which has been operating at the Facility since 1983, and the DNAPL recovery system have reduced the source mass of COCs remaining on-Site. Approximately 80,000 gallons of DNAPL have been recovered, and approximately 100 million gallons of water have be captured and treated over the lifespan of the groundwater IM. The proposed expansion of the DNAPL recovery system and perched groundwater collection system, as well as continued monitoring and the implementation of groundwater use restrictions will ensure long-term protectiveness to human health and the environment. EPA is proposing that groundwater-use restriction institutional controls be maintained while the groundwater is being remediated to prevent future potential exposure to COCs.

(2) Attainment of Media Cleanup Standards

The proposed corrective action, complete with controls determination for soils, meets the soil remediation standards. There are no exposed soils at the Facility that exceed industrial screening criteria. The implementation of institutional controls will protect against future land uses that may deviate from the current land use. These controls will also provide guidance to the owner when utility and construction workers must excavate beneath the existing direct contact exposure barrier that isolate**s** soil that may contain COCs that exceed the media-specific standard.

For sediment, the proposed remedy will remove and cap shallow PAH-impacted sediments that exceed the 100 mg/kg concentration laterally, and up to 2 to 3 feet vertically.

For groundwater, the proposed remedy meets the objectives of greatly reducing the source mass of COCs through the recovery of DNAPL with the long-term goal of achieving MCLs for the groundwater COCs. In addition, the proposed remedy will eliminate human exposure to groundwater via groundwater use restrictions until such time that natural attenuation can be completed. MCLs will be achieved only after the DNAPL source mass has been largely or entirely removed.

(3) Source Control

Historically, DNAPL source material migrated downward through the hydrogeological units to create a pool of DNAPL at or near the top of the lower-permeability bedrock. The soil column through which the DNAPL passed now likely contains DNAPL that is at residual saturation, which thereby limits its mobility. As a source control measure, the pooled DNAPL on the bedrock is being, and will continue to be, recovered. In addition, the groundwater extraction systems have further reduced and will continue to reduce the secondary source mass of COCs dissolved in groundwater.

The proposed sediment remedy requires that the highest concentration PAH-contaminated sediments be removed and capped, which will further reduce the secondary source of COCs in the sediments from leaching into the water column.

B. Balancing Criteria

EPA is satisfied that the proposed remedy is protective of human health and the environment, and evaluation of other alternatives is not necessary. Nonetheless, because EPA is proposing active remediation of sediment and groundwater, EPA presents the five criteria below to substantiate the protectiveness of the sediment and groundwater remedies:

(1) Long-Term Reliability and Effectiveness

For soil, institutional controls that limit the potential future use at the Facility to industrial and engineering controls that maintain a ground surface exposure barrier will provide a long-term reliable and effective remedy for soil.

For sediment, direct laboratory measurement of DNAPL mobility within site-specific sediment samples, direct field observations of the vertical distribution of residual DNAPL in the sediment column, and theoretical calculations of the potential for density driven movement of DNAPL within the sediment (Appendix D of the Corrective Measures Study [ARCADIS, 2009]) all conclude that upward vertical movement of DNAPL within the sediment column is extremely unlikely. Therefore, naturally existing limitations to movement of the residual DNAPL alone will provide a long-term reliable and effective remedy. In addition to the existing conditions that restrict the movement of DNAPL, the proposed sediment remedy will provide additional measures of protectiveness through partial removal of shallow sediment containing concentrations of PAHs greater than 100 mg/kg and isolation of that material via installation of a multilayer cap. One layer of the cap will provide adsorptive capacity to strip PAHs that may adhere to gas bubbles (generated by ambient, naturally occurring microbial activities) that may transport these PAHs to the surface via a process called ebullition. The filter and armor cap layer components of the multi-layer cap will provide a clean substrate for biological activity and further isolate underlying sediment and provide long-term protection of the cap from erosion.

After completion of the cap construction, implementation of an Operation and Maintenance Plan and routine monitoring will be conducted to evaluate the long-term overall effectiveness, permanence, and integrity of the cap and will detect cap erosion, if it were to occur. Depending on the extent of cap damage, the cap could likely be repaired using the same technology and procedures as used to initially place the cap. Most repairs could likely be made without disturbing the underlying sediment. Repair and replacement could be costly, however, as it would involve the same mobilization and on-water equipment and materials as the original corrective measures.

The proposed groundwater remedy, which includes expanding the existing DNAPL recovery system at the Facility and continuing operation of the existing perched groundwater collection system, will also help reduce the flow of groundwater to potential seepage faces along the embankment of the Ohio River and WPSC coal pits. This portion of the proposed remedy component would potentially also remove an increased volume of relatively easily recoverable DNAPL by expanding the existing DNAPL recovery system to include a new DNAPL recovery well at existing monitoring well R-231D. DNAPL recovery from this monitoring well could be relatively significant based on historical pilot testing of this well. It is possible that by increasing the rate of DNAPL recovery, the time to meet remediation standards could be slightly reduced.

(2) Reduction of Waste Toxicity, Mobility, or Volume

The IC component of the proposed soil remedy will ensure continued reduction of the mobility of COCs in soil by preventing land use change, and ensuring maintenance of impervious land covers (pavement, building, and structures) to minimize rainfall infiltration.

The proposed sediment remedy will partially remove and cap shallow sediments containing COCs above the sediment remediation standard. The removal and capping of shallow-impacted sediments will reduce both the volume and mobility of residual COCs remaining in the sediment.

The proposed groundwater remedy includes expansion of the interim DNAPL recovery system and groundwater collection system to remove source mass from the subsurface and capture and treat impacted shallow-perched groundwater. The reduction of the pool of DNAPL will both reduce the potential mobility of that pool and will reduce the mass/volume of this secondary source. The operation of a groundwater extraction system will further control the mobility of the COCs and will reduce the overall mass of COCs in groundwater.

(3) Short-Term Effectiveness

The proposed soil remedy is effective in that it will limit the potential for direct contact exposure, and because the remedy is based on institutional controls, no physical change will be made during implementation of the soil remedy, which could change the potential short-term exposures or remedy effectiveness.

For sediment, construction dredging, and to a lesser extent capping, are likely to create short-term adverse effects. Dredging both during sediment and cap placement is likely to cause some suspension of PAH-containing sediments. Resuspended sediments could be redeposited inside of the dredged area and would be covered by the cap and, to a lesser degree, move and redeposit outside of the remediation area. Given the proposed dredging equipment, operational procedures, hydraulic controls, and the granular nature of most of the sediment being dredged, the majority of sediments resuspended during dredging are expected to settle within the area that will be capped. Dredging of sediments containing residual DNAPL could also create sheen on the water surface. These releases would be controlled, using an oil boom-silt curtain skirt array that covers the upper portion of the water column. An upstream flow diversion structure may also be erected to limit the surface-water flow velocity through the work area to reduce the potential transport of resuspended sediment to areas outside of the sediment remediation area. Visual observation and water quality monitoring would be used to monitor short-term resuspension and would provide the basis for implementing and measuring the short-term effectiveness of the sediment remedy.

Because the DNAPL pool in groundwater is still relatively productive, DNAPL removal remains the most effective means of short-term source mass removal in groundwater.

(4) Implementability

The proposed soil remedy is readily implementable in that the remedy only requires putting in place ICs which would prevent future uses of the land inconsistent with the remedy and maintenance of a direct contact exposure barrier.

The sediment remedy is readily implementable. Dredging and capping materials, equipment, and technology are commercially available and have been used successfully on other sites under similar conditions. Significant coordination with other boat traffic would be necessary when working in the heavily used river channel. When possible, an open navigable channel would be maintained. If construction activities necessitated partially blocking or closing the channel, it would be scheduled to create as little disruption of river traffic as possible.

Dredging, especially those sediments containing residual DNAPL, would create some sediment resuspension, and likely, the appearance of some sheen. These water quality issues would be controlled to the extent practicable. The control of such occurrences of sheens could affect production rates, extend the duration of on-water activity, and ultimately increase costs. The movement, repair, and replacement of surface-water controls, such as an oil boom-silt curtain array or the upstream flow diversion components, could further complicate the logistics of coordinating with boat traffic on the river. Dredged sediment would be staged in the upland area, dewatered or stabilized to meet DOT requirements. The dredging depth along the shoreline is approximately 1 foot; therefore, minimal impacts associated with shoreline stability are expected. The relatively small dredge volume also reduces the area needed for upland areas to dewater, stabilize, stage, and ship the sediment. After processing, the stabilized sediments would be loaded into trucks or barges and disposed at a licensed off-Site facility. The proposed methods for handling, dewatering, and stabilizing the sediment are routinely used and would be effective at managing the material for transport. If dewatering were used, the water generated would be treated and/or disposed using conventional and approved methods.

The groundwater remedy would be a simple modification to the existing IM program by adding limited new recovery wells to the system; therefore, it would be readily implementable and would likely have no significant physical or technical limitations. Existing monitoring well R-231D would be converted into a DNAPL recovery well of similar design. This well would operate in a manner similar to that for recovery well R-225D, thereby requiring minimal design and modeling. The design would likely be supplemented by field testing to determine the appropriate pump and piping size and flow rates. The piping from R-231D would be plumbed into the existing DNAPL recovery system operating at R-225D. Once in operation, R-231D would be monitored at the same frequency as R-225D.

(5) Cost

The total cost of the proposed remedy, as estimated by Beazer East, is 8.2 million dollars in capital outlay, and 1.5 million dollars in operation costs for the next 30 years based on the following assumptions.

The soil remedy is expected to have a relatively low cost to implement because the work to construct impervious covering throughout the contaminated portion of the Facility has already been completed, and the additional costs associated with administration of the ICs to maintain the covering is minimal compared to the capital costs of the remedy. There will also be periodic evaluations of Site conditions to ensure that Facility conditions continue to appropriately restrict the potential for direct contact exposure to soil containing elevated concentrations of COCs.

The proposed sediment remedy is expected to have a relatively higher cost of implementation than the no action/monitored natural recovery and cap only alternatives, but relatively lower costs of implementation than the hot spot removal with cap or the full removal alternatives.

Costs would include:

- Dredging and disposal of 16,000 cy of sediment.
- Materials and installation of the 4.7-acre cap.
- Construction of an upland sediment dewatering and staging facility.
- Surface-water controls, such as an oil boom-silt curtain skirt array or an upstream diversion.
- Post-construction monitoring.

Although the cost of the proposed groundwater remedial alternative is relatively high compared with the three other groundwater alternatives evaluated, the absolute costs should be relatively low because the treatment of water and power to operate the systems are incrementally small when considered in terms of the concurrent operation of the wastewater treatment plant used at the Facility. The costs that will be incurred include:

- Design costs and capital costs for installation of DNAPL recovery system at R-231D.
- OMM costs for four existing perched groundwater recovery wells (RW-1, RW-2, RW-4C, and RW-5) and associated trenches and treatment systems.
- OMM of the DNAPL recovery systems at R-225D and R-231D, including disposal of recovered DNAPL.

The Facility is required to provide financial assurance to implement the remedy as a component of an order issued under available legal authorities including, but not limited to RCRA Section 3008(h), 42 U.S.C. 6928(h).

(6) Community Acceptance

The Community Acceptance of EPA's proposed remedy will be evaluated based on comments received during the public comment period and will be described in the Final Decision and Response to Comments.

(7) State Acceptance

EPA's proposed remedy for the Facility was evaluated and approved by the WVDEP prior to EPA's proposing the remedy in this SB. Furthermore, EPA has solicited state input throughout the investigation process.

IX. PUBLIC COMMENT

On September 10, 2010 EPA placed an announcement in the Weirton Daily Times to notify the public of EPA's proposed remedy and the location of the Administrative Record. Copies of this SB will be mailed to anyone who requests a copy. The Administrative Record, including this SB, is available for review during business hours at two locations:

United States Environmental Protection
Agency Region 3
1650 Arch Street
Philadelphia, Pennsylvania 19103
Telephone Number: (215) 814-3426
Attn: Mr. Andrew Fan (3WC23)

and

County Clerk's Office
Brooke County Court House
632 Main Street
Wellsburg, West Virginia 26070
Telephone Number: (304) 737-3661

EPA is requesting comments from the public on the remedy proposed in this SB. The public comment period will last 30 calendar days beginning September 10, 2010 and ending October 11, 2010. Comments on, or questions regarding, EPA's preliminary identification of a proposed remedy may be submitted to:

Mr. Andrew Fan (3WC23)
United States Environmental Protection Agency, Region 3
1650 Arch Street
Philadelphia, Pennsylvania 19103
Telephone Number: (215) 814-3426
Fax: (215) 814-3113
Email: fan.andrew@epa.gov

Following the 30-day public comment period, EPA will hold a public meeting on EPA's proposed remedy if sufficient public interest indicates that a meeting would be valuable for distributing information and communicating ideas. After evaluation of the public's comments, EPA will prepare a Final Decision Document and Response to Comments (FDRTC) that identifies the final selected remedy. The FDRTC will also address all significant written comments and any significant oral comments generated at the public meeting. The FDRTC will be made available to the public. If, on the basis of such comments or other relevant information, significant changes are proposed to be made to the corrective measures identified by EPA in this SB, EPA may seek additional public comments. . The final remedy will be implemented using available legal authorities including, but not necessarily limited to, RCRA Section 3008(h), 42 U.S.C. 6928(h).

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